

**FIRE FIGHTING.****CARE OF FIRE APPLIANCES AND FIRE DRILLS.****Fighting Fires.**

The following points which are not generally known should be noted for guidance:—

1. No two fires are exactly alike, consequently no definite action can be laid down regarding their extinction.—*Avoid laying down definite fire fighting detail.*

2. Fire in itself is not to be feared as the heat will give necessary warning of danger, but the smoke will often interfere with a simple operation.—*Avoid the smoke.* Smoke, except in the case of gaseous or heavy oil fires, will almost invariably rise from the ground. When tackling any fire, the air will often be found quite breathable close to the ground, while it would be impossible to kneel or stand up.—*Go under the smoke.*

3. Electric, phosphorus, petrol and carbide of calcium (acetylene) fires cannot be extinguished with water alone. Sand or chemicals are necessary.—*Be prepared accordingly.*

Petrol on fire will flow in all directions and will continue burning even on top of water, so that Petrol must be confined.

Phosphorus is a delusive agent where fire is concerned and will often appear to be extinguished, but will break out again if exposed to the air. Fires, where phosphorus is concerned, should be closely watched for some hours after their supposed extinction.

4. Fire will not burn without air, so that doors of rooms, huts, hangars, etc., on fire should not be opened until the fire appliances are actually at work and not even then if it is possible to attack the fire closely without doing so. Small openings are suggested to permit this being done.

5. Fire Appliances should always be kept in an easily getatable position. If the Fire Picquet have to search about in a smoke-laden atmosphere for the appliances, they will probably be in no fit condition to handle them effectively when they do find them.

6. A Fire impossible to "wet out" with water can often be "knocked" out by water under pressure, so that *all fires* should be tackled from a point as close as possible to the fire.

7. Fires, if not extinguished in the first few minutes, will probably last hours. Pay most attention to First Aid appliances.

**CHEMICAL EXTINGUISHERS AND CHEMICAL FIRE ENGINES.****General.**

These should be examined *weekly*, to ascertain if they are fit for action. If unfit they are useless for emergency and are *dangerous*.

If when charging these machines any of the acid is spilt or comes in contact with human flesh its action may be easily nullified by rubbing in a little of the bi-carbonate of soda. Chemical extinguishers are tested to withstand a pressure from 300-lbs. to 350-lbs. to the square inch. If the contents cannot escape they will generate more than this pressure, and so burst the cylinder.

Should an extinguisher fail to act, the following action is necessary:—

**1. At a fire—**

Place it aside and get some other extinguisher to work.

**2. At a drill practice or while testing the appliance—**

Immediately unscrew the cover until the gas or the contents commence to escape, and then lay aside. After it becomes inactive take off the cover, remedy the fault, recharge and test again.

The method to be adopted in examination is as follows:—

**Examination.**

1. Examine the delivery outlet and see that it is quite clean and free from corrosion.
2. Unscrew the cover and stir the alkali solution with a stick.
3. Test the solution for prompt reaction by dropping one or two drops of the acid into it.
4. Examine acid container, striker, washer, etc.
5. Smear the threads and moving parts with oil, replace the cover and screw up tightly.

**Charging.**

A charge for one of these machines is 1-lb. of bi-carbonate of soda and 1½ fluid ozs. of commercial sulphuric acid to every gallon of water.

The chamber should be thoroughly cleaned before renewing a charge.

The chamber should only be filled with water to about 7/8ths of its capacity, and the soda should be added and thoroughly stirred until completely dissolved.

Examine the acid charge and place in position.

Smear all working parts with oil and replace cover, taking care to screw up tightly.

**Working.**

This depends on nature of fire, but as a general principle the closer the nozzle is taken to the fire the more effective the work.



## HOSE.

### General.

Canvas hose should be kept thoroughly dry or thoroughly wet. At any intermediate stage the action of the air and water sets up oxidization, which causes deterioration.

The delivery end of hose under pressure will swing about dangerously if the men who are attending it let it go. Where high pressures are concerned the force it can exert is sufficient to break limbs. Take care that the hose is never left unattended while under pressure.

### Care of Hose.

Hose should not be dragged one inch along the ground if it is possible to carry it. This specially applies to wet hose.

Hose should be kept "flaked" (*i.e.*, in folds) where possible, and if rolled should be rolled from the centre of the length, so that both couplings are on the outside when the rolling is completed.

This facilitates handling and avoids tangling and kinking.

Rubber hose should be made up in the biggest possible coil, and kept free from contact with oil products.

Hose should be tested at the maximum pressure it will be expected to withstand. After testing it should be washed free from dirt and hung from its centre to drain and dry.

### Testing of Hose.

To test hose efficiently the following procedure should be adopted:—

Water should be run along the hose until all the air is forced out, then a blank or blind cap should be placed on the "male" or fixed coupling and the full force of the water turned on. Hose unable to withstand this test should be returned.

### Quantity of Hose Required.

The quantity of hose required to protect a camp or installation is 50 per cent. over and above the length required to reach the furthest point of danger from the nearest water supply.

Each motor pump should carry 700 feet.

„ steam engine should carry 600 feet.

„ manual engine should carry 600 feet.

### Hose Connections, etc.

**General.**—Great care is necessary in handling these fittings, as a slight knock in some cases will temporarily unfit the appliance for action.

**Threads.**—The fine "starting" thread in all cases should be removed to permit the thread to start abruptly at full size. This prevents cross-threading when men are excited and facilitates the making of connections.

### Branches and Nozzles.

These appliances should never be left standing on end. Most care is required at the delivery end of this appliance, as the slightest abrasion affects the stream of water.

### Couplings.

Ensure that a well oiled leather washer is maintained in the "female" or moveable coupling.

Leather cuffs should not be used when attaching couplings to hose.

Great care should be exercised to ensure that couplings are never dropped on to the ground; in the case of the male coupling the threads are easily burred, and in the case of the female coupling it is liable to get knocked out of shape, thus preventing free play and putting the length of hose out of action.

### Hydrants.

Hydrant is the name given to that portion of a water pipe system to which standpipes are connected. These hydrants should always be kept clear—should be clearly marked and examined periodically to ensure that they are fit for use. This inspection also serves to memorize their position on nights when the indicators cannot be seen.

### Standpipes.

Should be tried on every hydrant it is intended to use—the water turned on and the supply and pressure recorded for future reference.

Where hydrants are situated at no great distance from one another, the one giving the better supply should be used in preference and the two should be tried in conjunction to ensure that the using of one will not put the other out of action. If this is the case at least it is well to know it before a fire takes place.

## BUCKETS.

Buckets are more easily handled if kept only three parts filled, and if there is a rim for a finger grip at the bottom.

If buckets are filled with earth or sand the contents should be kept thoroughly dry.

In handling buckets of water at a fire it is well to remember that water thrown on the upper portions of a fire does double work in that it also helps to extinguish the fire below.

## MOTOR FIRE ENGINES.

### Accessories.

All accessories likely to be required at a fire should be kept in fixed positions on the appliance. These are liable to be left behind when the engine is called out.



### **Suction Hosing.**

Sufficient suction hose should be kept coupled to connect with the lowest level in the area protected. This saves time in the event of it being required for low water levels, and does not increase the "lift" of the water at any other level. This provision will obviate possible delays.

Care should be taken that the washers are soft and pliable and the joints made properly air-tight.

Suction piping on turbine pumps always requires priming; during this operation the turbine should only be run at about quarter-speed.

### **Points generally overlooked.**

Petrol tanks and grease cups to be kept always fully charged, and these should be attended to immediately after any fire or practice.

Hose should be kept coupled together and flaked in the hose box (one turn on each coupling is sufficient).

Hose "keys" or spanners should always be carried in a prominent place.

While the engine is working the pump, the overflow pipe from the radiator should show a full stream; this may be eased off until the water coming from it is too hot to touch.

During the first few minutes of working, the driver should ascertain if the branch men are in difficulties or can take more pressure.

### **STEAM FIRE ENGINES.**

These engines should not be left in charge of any other than a fully qualified steam engine driver who has had considerable experience in charge of steam fire engines. Even in the bigger engines the crown is only covered by about from four to six gallons of water, and the risk of dropping the crown is considerable. This would put the fire engine out of action at once.

On arrival at the fire the driver should commence a steady round, first attending the water, then the fire, then the lubrication, repeating each in turn; his attention should not be distracted from this work.

The same general rules apply regarding the accessories, suction piping, etc., as in a motor pump.

These engines should never be moved without someone being placed in charge of the brakes.

### **MANUAL FIRE ENGINES.**

The same points regarding accessories, suction piping, hose, etc., as laid down for motor and steam fire engines are essential with these engines.

### **DRILLS.**

#### **General.**

"Fire drills" should be practised at regular intervals and at stated times. They should be dealt with entirely separate from "alarms."

The drill should be varied as much as possible, and be of such a nature that the interest of the Fire Picquet is fully maintained.

Situations likely to arise at fires should be explained at these drills, and methods of overcoming these situations should be discussed beforehand and practised.

An "alarm" should be given from time to time at such hours and in such a way that the conditions prevailing at the previous "alarm" will have no bearing on the one being practised.

Situations explained at previous "Fire Drills" should be made the subject for practice at "alarms."

To provide for the contingency of two fires occurring in the same locality at one time, variety should be introduced by occasionally giving a second alarm at a different location while the first "alarm" is being dealt with.

Fire Drills laid down in this pamphlet should be adhered to as far as is possible, variety being introduced by "changing round" or causing one or several of the drill squad to become "casualties," the duties then being automatically distributed amongst the remainder of the squad. Thus a 6-men drill may be varied to a 5, 4, 3, 2 or 1-man drill.

The object of the drills should not only be general efficiency, but should be practised with a view to teaching the men *automatically* to handle the appliances in the correct and quickest manner, so permitting their thoughts to concentrate on the fire itself.

Competitions should be introduced to maintain interest.

### **CHEMICAL EXTINGUISHER DRILL FOR TWO MEN.**

No. 1 carries an extinguisher and operates it.

No. 2 carries two spare extinguishers.

On command, *get to work*—

Nos. 1 and 2 double a distance of 100 yards and halt.

No. 1 strikes the knob and gets the extinguisher to work.

On command, *take cover*—

Nos. 1 and 2 kneel behind nearest cover, No. 1 keeping his extinguisher in play.

On command, *advance and avoid heavy smoke*—

Nos. 1 and 2 advance keeping their faces as close to the ground as possible. (When the first extinguisher is exhausted No. 2 will pass No. 1 a fresh one and take charge of the empty one.)

On command, *cease work*—

No. 1 places his thumb over the nozzle and prevents the escape of the fluid but remains at his post.



On command, *make up*—

Nos. 1 and 2 retire and immediately proceed to recharge exhausted machines.

No. 1 may be made a casualty at any stage of the drill, when No. 2 will immediately carry on.

If it is found necessary to prevent further damage by water, it is only necessary to turn the outlet of the extinguisher toward the ground and the gas will escape, but the water will remain in the cylinder.

### CHEMICAL ENGINE DRILL FOR 7 MEN.

Positions on the engine—

Nos. 1, 3 and 5 on near side—2, 4 and 6 on the off side. No. 7 at “Starting handle.”

On command, *take posts*—

The whole squad take up positions facing in the direction the engine is facing.

On command, *move off*—

No. 1 takes his place between shafts, Nos. 2, 3, 4, 5 and 6 take the drag ropes, and No. 7 assists and acts as brake power. The appliance will then be moved off at the “double.”

On command, *get to work*—

Nos. 1 and 2 will take the “nozzle.” Nos. 3 and 4 will assist in running out the hose. Nos. 5 and 6 will bring up fresh supplies of water and prepare to replace the charge in the engine. No. 7 will get the engine to work keeping the contents stirred up as necessary.

Commands, *take cover—advance and avoid heavy smoke*—to be the same as drill for Chemical extinguishers.

On the command *cease work*, the cock will be closed by No. 1 to prevent the escape of the fluid, and Nos. 1 and 2 will remain at their posts.

On the command *make up*, each man will make up what he has laid out in getting to work, but in the reverse order. Nos. 5, 6 and 7 will proceed to recharge the cylinder.

On the command *change round*, No. 7 becomes No. 1, No. 1 becomes 2, 2 becomes 3, etc.

### HOSE AND HYDRANT DRILL FOR 4 MEN.

Gear should be laid out in front of respective numbers.

On command, *stand by*—

No. 1 takes the Branch and Nozzle.

No. 2 takes the “male” coupling end of the hose.

No. 3 takes the standpipe.

No. 4 takes the “female” coupling.

On command, *get to work*—

No. 1 takes branch to nearest point of the fire and screws it on hose.

No. 2 follows with male coupling of hose and places it at the feet of No. 1.

No. 3 “sinks” the standpipe at the nearest hydrant and doubles off to half way along hose to pass orders from No. 1 to No. 4.

No. 4 couples the female coupling to the standpipe and stands by to take orders *re* turning on and off the water.

Commands such as, *add a length of hose* or *change a length of hose*, should be practised as laid down in motor engine drill.

NOTES.—The easiest and quickest way to screw on a branch is as follows:—

No. 1 places his foot on the hose immediately in rear of the male coupling. (This should bring the opening well off the ground.) He should then use both hands on the branch, using leverage to screw it up tightly.

There is only one satisfactory way of connecting a pair of couplings, and that is as follows:—

The male coupling is taken in the left hand and the shank of the female coupling is placed between the knees with the right hand. This leaves the right hand free to manipulate the moveable part of the female coupling at ease.

When coupling to a standpipe, the shank of the female coupling should be held in the left hand, leaving the right hand free to manipulate moveable part of the female coupling.

### BUCKET DRILL.

This is simply extended order drill, the intervals being governed by the number of men and the distance the water supply is from the fire.

Once extended, the line should be turned so that their left hands are nearest the fire.

At the “fire” end of the chain two strong men are required to throw the water (additional footage can be gained with practice and is vital).

At the water supply end, three men are required to keep the chain supplied. (Buckets should only be three-parts filled.)

On command, *carry on*—

The men nearest the fire throw the water and pass the buckets back, empty buckets being taken with the left hand and full ones with the right.

On command, *cease work*—

All empties will be passed back to the water supply base and filled, but the chain will not be broken.

On the command, *make up*—

All buckets will be returned, three-parts filled, to their stations.



## MOTOR FIRE ENGINE DRILL FOR 8 MEN.

*Positions on engine*—Nos. 1, 3, 5 and 7 on near side.

Nos. 2, 4 and 6 on the off side.

No. 7 at rear.

No. 8, Driver.

*Duties*—Nos. 1 and 2 will take branches and nozzles from their respective sides.

Nos. 3 and 4 will assist Nos. 1 and 2 respectively.

Nos. 5 and 6 will attend to female couplings on respective sides.

Nos. 7 and 8 will attend the suction hose and pumps.

NOTE.—If it is intended to work from the town mains, a dam or cistern is required to hold the water, which should be collected by means of standpipes and “ feed ” lengths of hose; in this event two extra numbers may be added to the drill team, who will perform these duties.

On command, *take posts*—

Each number takes up his respective position.

On command, *get to work (near side, off side or both sides)*—

Nos. 1 and 3; 2 and 4, or all of them, according to the order given, will double off with the branch and hose to the scene of the fire. (Disengaged numbers assist generally.)

Nos. 5 and 6 will assist in the “ paying out ” of the hose, and when sufficient has been “ paid out ” will couple the female coupling to the delivery outlets on the pumps, and station themselves half way along the hose to pass orders from the branchmen to the driver.

No. 7 will clear the suction and place the strainer at least 6 inches under water. (If required he will erect the dam or cistern.)

No. 8 will place pump gears in action and take charge of the pump. (With turbine pumps he will start his air pump or primer immediately.)

Nos. 9 and 10 will attend feed lengths, standpipes, etc. (if required).

On commands, *take cover or advance and avoid heavy smoke*—

The same procedure as laid down in Chemical Extinguisher Drill will be followed.

On command, *cease work*—

The pump gear will be placed in “ neutral,” and the whole squad stand by to wait further orders (Nos. 1, 2, 3 and 4 retain their hold on the hose).

On the command to *make up*—

Each number will make up that which he laid out in getting to work, but in the reverse order.

On the command, *change a length of hose* (as a rule this is only used to replace a burst length) or *add a length of hose* (this should only be done at the branch end)—

No. 7 will call on Nos. 5 and 6 to assist, and the new length will be laid out alongside the length it is intended to change, care being taken to see that the couplings on the new length overlap the length to be replaced. As soon as the hose is ready, No. 7 will go back to the pump, and No. 8 will turn the water off from that line.

Nos. 5 and 6 each stand by coupling on the new length, and when the pressure is taken off, will immediately “ break ” the couplings on the length to be removed and “ couple ” the new length at their respective ends. As soon as this is completed, the number nearest the engine will report “ All clear,” and the water will be turned on to this line by No. 8.

NOTE.—Wet hose should always be rolled, for transport to drying station, by starting at the male coupling, but in the case where a length has been removed owing to a “ burst ” the opposite procedure should be adopted, and this taken as a sign that the hose is unfit for use.

## STEAM FIRE ENGINE DRILL FOR 8 MEN.

### Positions on the Appliance.

No. 1 on the driver's seat.

„ 2 on the offside (right hand of the driver).

„ 3 on the nearside (left hand of the driver).

„ 4 on the offside behind No. 2.

„ 5 on the nearside behind No. 3.

„ 6 on the offside behind No. 4.

„ 7 on the nearside behind No. 5.

„ 8 on the footplate at rear.

### Duties at Drill.

No. 1 Supervisor.

Nos. 2 and 3 take charge of branches.

Nos. 4 and 5 attend female couplings and assist Nos. 2 and 3.

Nos. 6 and 7 attend standpipes and feed lengths.

No. 8 attends “ Dam,” “ Suction ” and Engine.

On command, *take posts*—

Each number will take up his respective position.

On command, *get to work (near side, off side or both sides)*—

No. 1 immediately takes charge, assisting where he can and checks irregularities or omissions.

Nos. 2 and 3 take the branch ends of the hose to the nearest point to the fire, proceeding at the double and securing a tactical position.



Nos. 4 and 5 assist in paying out the hose, connect up the female couplings to the delivery outlet on the engine, and move off at the double to assist Nos. 2 and 3 respectively.

Nos. 6 and 7, if required, sink standpipes in the nearest hydrants and connect feed hose from these standpipes to the dam and turn the water on. They then station themselves half way along hose to pass orders from the branch men to the engine driver.

No. 8 lays out dam or cistern (if required), places suction in position, and, when strainer is covered with water, signals with one blast of the whistle that he is about to commence pumping.

On the commands *take cover, advance and avoid heavy smoke, add a length of hose, change a length of hose, make up, or cease work*, the same rules as laid down for motor engines apply. (The driver should signal his intention to stop pumping by two blasts on the whistle.)

#### **MANUAL ENGINE DRILL FOR 8 MEN.**

Same position as in steam fire engine drill.

Same duties as in steamer drill except that No. 8 tends to the pumps instead of the engine.

On the command, *take posts*, the same as laid down for steam engine drill.

On the command, *get to work*, the same duties as in steam engine drill will be carried out, except that Nos. 1, 4, 5, 6, 7 and 8 will man the pump handles after the hose has been laid out.

On the commands, *take cover, advance and avoid heavy smoke, change a length of hose, add a length, make up, cease work*, the same rules as laid down for motor engines apply.

#### **CONCLUSION.**

In conclusion, it is pointed out that these rules are only laid down for general guidance; and local conditions, number of men available or type of appliance being used may permit of some modification.

It is recommended that these modifications be made wherever their adoption will improve the working and increase the speed in which the appliances can be got to work.

Special notes on care of steam fire engines and handling the various types of ladders will be issued on application to the fire expert, G.H.Q., by officers who may require them.