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NFPA 1410 A Training Standard on Initial Fire Attack 1988 Edition

National Fire Protection Association Batterymarch Park, Quincy, MA 02269

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Policy Adopted by NFPA Board of Directors on December 3, 1982

The Board of Directors reaffirms that the National Fire Protection Association recognizes that the toxicity of the products of combustion is an important factor in the loss of life from fire. NFPA has dealt with that subject in its technical committee documents for many years.

There is a concern that the growing use of synthetic materials may produce more or additional toxic products of combustion in a fire environment. The Board has, therefore, asked all NFPA technical committees to review the documents for which they are responsible to be sure that the documents respond to this current concern. To assist the committees in meeting this request, the Board has appointed an advisory committee to provide specific guidance to the technical committees on questions relating to assessing the hazards of the products of combustion.

Statement on NFPA Procedures

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NATIONAL FIRE PROTECTION ASSOCIATION

NFPA 1410

A Training Standard on

Initial Fire Attack

1988 Edition

This edition of NFPA 1410, *A Training Standard on Initial Fire Attack*, was prepared by the Technical Committee on Fire Service Training, and acted on by the National Fire Protection Association, Inc. at its Fall Meeting held November 9-11, 1987 in Portland, Oregon. It was issued by the Standards Council on December 2, 1987, with an effective date of December 22, 1987, and supersedes all previous editions.

The 1988 edition of this standard has been approved by the American National Standards Institute.

Origin and Development of NFPA 1410

The first edition of this training standard on Initial Fire Attack was officially adopted as NFPA Standard Number 197, at the 1966 NFPA Annual Meeting held in Chicago, Illinois, May 16-20. It was prepared by the Committee on Fire Service Training and was tentatively adopted at the 1964 Annual Meeting.

The 1966 edition was revised in 1979.

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This list represents the membership at the time the Committee was balloted on the text of this edition. Since that time, changes in the membership may have occurred.

NOTE: Membership on a Committee shall not in and of itself constitute an endorsement of the Association or any document developed by the Committee on which the member serves.

Contents

NFPA 1410

A Training Standard on

Initial Fire Attack

1988 Edition

NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates explanatory material on that paragraph in Appendix A.

Chapter 1 Introduction

1-1 Scope. This standard deals with the evaluation of prior training in initial fire flow delivery procedures by fire department personnel engaged in structural fire fighting efforts. It suggests basic evolutions that can be adapted to local conditions and serves as a standard mechanism for evaluation of minimum acceptable performance during initial fire attack.

1-2* Purpose. This is a training standard designed to assist fire departments in obtaining a high level of performance in initial fire flow delivery procedures with available personnel and equipment.

1-3 General.

1-3.1* Individual fire fighting evolutions involving the placement and connection of hose lines and the operation of hose streams and engines are essentials of good fire department procedures. This standard gives the fire chief and other department officers a method of measuring the effectiveness of these evolutions based on their normal first alarm engine company response.

1-3.2 Three aspects of initial fire attack will be covered in this standard:

(a) Handlines — 1½ in. to 2½ in.

(b) Master Streams — portable and apparatus mounted.

(c) Automatic sprinkler system support.

1-4 Definitions. Unless expressly stated elsewhere, the following terms will, for the purpose of this standard, have the meanings indicated below.

Back-up Line. An additional hose line used to reinforce and protect personnel in case the initial attack proves inadequate.

Company. The basic fire fighting organizational unit staffed by various grades of fire fighters under the supervision of an officer and assigned to one or more specific pieces of apparatus.

Effective Operation. Accomplishing or able to accomplish the intended task.

Effective Stream. A fire stream that has achieved and sustained the proper flow.

Engine. A fire department pumper having a rated capacity of 500 gpm or more.

Engine Company. A group of fire fighters who work as a unit and are equipped with one or more pumping engines having rated capacities of 500 gpm or more.

Evolution. A set of prescribed actions that result in an effective fireground activity.

GPM. Gallons per minute (U.S.)/(Metric Conversion).

Initial Attack Line. The first hose stream placed in service by a company at the scene of a fire in order to prevent further extension of fire and to protect lives while additional lines are being laid and placed in position.

Large Diameter Hose (LDH). A hose of 3½ in. (90 mm) or larger size designed to move large volumes of water to supply master stream appliances, portable hydrants, manifolds, standpipe and sprinkler systems, and fire department pumpers from hydrants and in relay.

Leader Line. A hose line supplying one or more smaller lines, as in a wyed line (also called supply line).

Line. One or more lengths of connected fire hose.

LPM. Liters per minute.

Preconnected Line. A discharge hose line already attached to an engine outlet.

PSI. Pounds per square inch.

Residual Pressure. The pressure remaining in a system while fluid is flowing.

Shall. This term indicates a mandatory requirement.

Supply Line. One or more lengths of connected fire hose used to provide water to wyed lines or to the intake of a pump.

Support Line. A handline used to supplement total extinguishment and overhaul in buildings protected by automatic sprinkler systems.

Chapter 2 Methods To Be Employed

2-1 Standard Evolutions.

2-1.1* These evolutions are designed to measure the initial attack capability of a department's first responding unit(s) and personnel. All evolutions employed shall be those the department normally uses in its regular engine company operations.

2-1.2 The hose layouts and hydrant connections employed shall provide the flow necessary to adequately supply the requirements of each evolution, and proper

hose connections shall be made between the hydrant(s), engine(s), and inlets.

2-2 Hose Loads and Layouts.

2-2.1 Hose shall be loaded in the manner utilized by the department, and hose lays and carries used shall be those normally employed by the department.

2-2.2 The initial attack lines shall be preconnected to an engine outlet, supplied through a wye from another line, or connected to an engine outlet at the scene.

2-2.3* Direct hydrant streams shall not be employed unless the desired flow is available at the hydrant with a residual pressure of 100 psi (690 kPa) or greater.

2-2.4 Depending on the size of hose lines used and the quantity of water delivered, the proper number of personnel shall be assigned to ensure safety for all personnel involved.

2-2.5 All personnel involved in the evolutions shall be properly clothed in fire fighting and safety gear, and those individuals operating handlines and support lines shall wear self-contained breathing apparatus.

Chapter 3 Facilities Needed

3-1 Location.

3-1.1 These evolutions shall be conducted in an area where hose can be laid for a distance of 300 ft (92 m) to or from the water source and 200 ft (61 m) from an engine or wye to the nozzle(s), master stream devices, or sprinkler connection.

3-2 Equipment and Personnel.

3-2.1* The number of units and personnel normally assigned to respond on an initial alarm shall report to the training officer at the assigned area. In volunteer or call departments, personnel utilized shall be limited to the average strength normally responding.

3-2.2 Apparatus to be deployed shall consist of not more than that normally assigned to respond on the initial alarm. Where companies are equipped with two pieces of apparatus, they shall operate in the normal manner with both.

3-2.3 Nozzles employed should be those provided on the apparatus. Normally, this would be combination nozzles for the initial attack lines and either solid stream or combination nozzles for the back-up line, all capable of the required flow at not over 100 psi (690 kPa) nozzle pressure.

3-3 Water Supply.

3-3.1 The water supply shall consist of one or more fire hydrants capable of giving the required flow at effective residual pressures needed for the operation. In general, this requires one or more hydrants capable of delivering 750 gpm (2840 L/m) at 20 psi (140 kPa) residual pressure. A drafting location or tanker shuttle shall be used for water supply in areas not served by hydrants.

Chapter 4 Required Performance for Handlines

4-1 General.

4-1.1* The required performance for handlines shall consist of obtaining a water supply through one or two supply lines, placing two initial attack lines in service, and immediately backing them up with another line.

4-1.2 This evolution shall be performed by the first unit(s) to arrive with the average number of personnel ordinarily responding.

4-1.3* In evolutions employing two or more companies, there shall be a 30-second delay between each arriving company.

4-2 Required Flow.

4-2.1 The total flow of the required streams shall be a minimum of 400 gpm (1515 L/m).

4-2.2 The flow from the two initial attack lines shall be a minimum of 200 gpm (760 L/m), a minimum of 100 gpm (380 L/m) from each nozzle.

4-2.3 The required flow from the back-up line shall be a minimum of 200 gpm (760 L/m).

4-2.4* The training officer shall see that effective pressure/flows are provided at each nozzle. When using solid stream nozzles, the pressure shall be 50+ psi (345 kPa), and when using combination nozzles, the pressure shall be 100+ psi (690 kPa). Pressures shall be within the range of ± 10 percent.

4-3 Hose Evolutions.

4-3.1 The supply line(s) shall be laid by an engine a distance of 300 ft (92 m) to/from the hydrant or water source. When using large diameter hose (LDH), a single line is sufficient.

4-3.2* The attack lines shall be advanced by hand a distance of 200 ft (61 m) before streams are activated.

4-3.3 When a booster tank is used to supply the first attack line, a second line shall not be charged until a permanent water supply is established.

4-4 Method of Evaluation.

4-4.1 When the order is given to start the evolution, one or more supply lines, two initial attack lines, and one backup line shall be advanced and placed in effective operation at the required pressures/flows within the recommended time period.

4-4.2 Evaluation shall be based on the following considerations:

(a) The ability to get one or two supply lines, two initial attack lines, and one backup line in service without delay.

(b) The ability to deliver a minimum of 400 gpm through three handlines producing effective streams.

4-4.3 Once streams are placed in service, the flows shall continue until the evaluation is complete.

4-4.4* Failure to supply an engine adequately shall be considered a serious deficiency in operations.

4-4.5* Failure to maintain water pressure in any line until all lines are properly operating shall be considered an undesirable interruption of the attack. Interruptions of less than 10 seconds shall not be counted.

4-4.6 The evolution shall not be concluded until the evaluating officer considers that an effective stream has been obtained at each nozzle.

4-5 Evaluation.

4-5.1* Performance shall be evaluated as follows:

	Satisfactory	Unsatisfactory
(a) Was a minimum of 400 gpm (1515 L/m) delivered?	_____	_____
(b) Were nozzle pressures/flows correct?	_____	_____
(c) Were effective streams in service within the recommended time?	_____	_____
(d) Were the hose layouts from the water source adequate to supply engines?	_____	_____
(e) Were streams operated without major interruption?	_____	_____

Chapter 5 Required Performance for Master Streams

5-1 General.

5-1.1* The required performance for master streams shall consist of laying one or more supply lines and placing a master stream device in operation.

5-1.2 This evolution shall be performed by the first unit(s) to arrive with the average number of personnel ordinarily responding.

5-1.3* In evolutions employing two or more companies, there shall be a 30-second delay between each arriving company.

5-2 Required Flow.

5-2.1 The total flow of the required master stream shall be a minimum of 500 gpm (1893 L/m).

5-2.2* The training officer shall see that effective pressures/flows are provided at the master stream nozzle and that nozzle pressures range from 50 psi to 100 psi (345 kPa to 690 kPa) depending on the type and style of nozzle used. Pressures shall be within the range of ± 10 percent.

5-3 Hose Evolutions.

5-3.1 In general, supply lines between the water source and the master stream device shall be laid a distance of 300 ft (92 m). When using large diameter hose (LDH), a single line is sufficient.

5-3.2 Booster tanks of less than 1,000 gal (3785 L) capacity shall not be used to supply master streams.

5-4 Method of Evaluation.

5-4.1 When the order is given to start the evolution, one or more supply lines shall be laid to supply the engine(s), and if required by the evolution, one or more supply lines shall be laid to supply the master stream device. The master stream shall be placed in effective operation at the required pressures/flows within the recommended time period.

5-4.2 Evaluation shall be based on the following considerations:

(a) The ability to supply the master stream device without delay.

(b) The ability to deliver at least 500 gpm (1893 L/m) and produce an effective master stream.

5-4.3 Once streams are placed in service, the flows shall continue until the evaluation is complete.

5-4.4* Failure to supply an engine adequately shall be considered a serious deficiency in operations.

5-4.5* Failure to maintain water pressure in any line until all lines are properly operating shall be considered an undesirable interruption of the attack. Interruptions of less than 10 seconds shall not be counted.

5-4.6 The evolution shall not be concluded until the evaluating officer considers that an effective stream has been obtained.

5-5 Evaluation.

5-5.1* Performance shall be evaluated as follows:

	Satisfactory	Unsatisfactory
(a) Was a minimum of 500 gpm (1893 L/m) delivered?	_____	_____
(b) Were nozzle pressures/flows correct?	_____	_____

	Satisfactory	Unsatisfactory
(c) Was an effective stream in service within the recommended time?	_____	_____
(d) Were the hose layouts adequate to supply the nozzles?	_____	_____
(e) Was stream operated without major interruption?	_____	_____

Chapter 6 Required Performance for Automatic Sprinkler System Support

6-1 General.

6-1.1* The required performance for automatic sprinkler system support shall consist of providing two supply lines to an automatic sprinkler connection, and advancing one or more support lines.

6-1.2 This evolution shall be performed by the first unit(s) to arrive with the average number of personnel ordinarily responding.

6-1.3* In evolutions employing two or more companies, there shall be a 30-second delay between each arriving company.

6-2 Required Flow.

6-2.1 The total flow of the required streams shall be a minimum of 700 gpm (2650 L/m).

6-2.2* The training officer shall see that effective pressures/flows are provided to sprinkler connections and handline nozzles. A minimum of 150 psi (1035 kPa) engine pressure shall be used to supply the sprinkler system. Pressures shall be within the range of ± 10 percent.

6-3 Hose Evolutions.

6-3.1 Supply lines shall be laid by an engine a distance of 300 ft (92 m) to/from the hydrant or water source and support lines shall be advanced a distance of 200 ft (61 m). When using large diameter hose (LDH), a single line is sufficient.

6-3.2 Booster tanks shall not be used for these evolutions.

6-4 Method of Evaluation.

6-4.1 When the order is given to start the evolution, a water supply shall be established for the engine(s), two supply lines laid to the sprinkler connection, and one or two handlines laid to provide support.

6-4.2 Evaluation shall be based on the ability to deliver at least 700 gpm (2650 L/m) through two supply lines to the sprinkler connection and one or two support lines.

6-4.3 Once streams are placed in service, the flows shall continue until the evaluation is complete.

6-4.4* Failure to supply an engine adequately shall be considered a serious deficiency in operations.

6-4.5* Failure to maintain water pressure in any line until all lines are properly operating shall be considered an undesirable interruption. Interruptions of less than 10 seconds shall not be counted.

6-4.6 The evolution shall not be concluded until the evaluating officer considers that the proper flows have been provided.

6-5 Evaluation.

6-5.1* Performance shall be evaluated as follows:

	Satisfactory	Unsatisfactory
(a) Was a minimum of 700 gpm (2650 L/m) delivered?	_____	_____
(b) Was the engine pressure correct?	_____	_____
(c) Were flows obtained within the recommended time?	_____	_____
(d) Were the hose layouts from the water source adequate?	_____	_____
(e) Were flows obtained without major interruption?	_____	_____

Appendix A

This Appendix is not a part of the requirements of this NFPA document, but is included for information purposes only.

A-1-2 The basic engine company operations of laying supply lines, advancing attack and backup lines, supplying special devices, and operating engines are addressed in this standard. It is recognized that most successful fire fighting efforts involve a coordinated engine, truck, and rescue operation; however, for the purpose of this standard, all initial responding personnel will concentrate on water delivery procedures only.

A-1-3.1 With the exception of very small communities and isolated rural areas, standard response to structural fires is generally a minimum of two engine companies on the initial alarm. There are several reasons for this practice. First, one engine company cannot ordinarily be expected to promptly operate the proper streams for fast attack and also provide the necessary backup stream(s), and experience has frequently shown that small streams prove inadequate. Second, fires commonly call for

prompt application of hose streams from at least two positions. And third, there is always the possibility that an accident or mechanical failure may delay the arrival of one company.

A-2-1.1 Only the number of personnel that normally respond on the initial alarm should be used to perform the evolutions recommended in this standard. However, the evolutions are not restricted to personnel arriving on engines. Rescue, truck company, and other units' personnel may be used to assist engine company personnel but should *not* be included if typical fireground operations require them to perform other tasks.

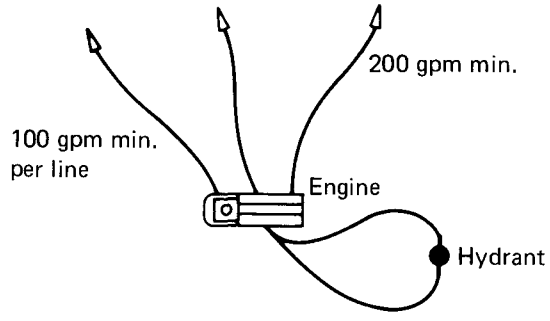
A-2-2.3 The purpose of these evolutions is to test the department's ability to get fire suppression streams in service promptly with correct flows and nozzle pressures. Direct streams from low-pressure hydrants usually do not provide the proper flows and nozzle pressures. Where this practice is employed, serious delays are often encountered before effective streams are in service. Therefore, this practice is not valid when applied to this standard. However, if a department commonly employs direct hose streams, it may wish to apply the suggested scoring to determine the relative efficiency of this method against the proper employment of engines.

A-3-2.1 The limitation of emergency scene operations to those that can be safely conducted by the number of personnel on the scene is intended to reduce the risk of fire fighter death or injury due to understaffing. While members may be assigned and arrive at the scene of an incident in many different ways, it is strongly recommended that interior fire fighting operations not be conducted without an adequate number of qualified fire fighters operating in companies under the supervision of company officers.

It is recommended that a minimum acceptable fire company staffing level consist of four members responding on or arriving with each engine or aerial ladder company responding to any type of fire. Companies responding in high-risk areas should have a minimum acceptable staffing of six fire fighters per ladder company and five fire fighters per engine company. These recommendations are based on experience from actual fires and in-depth fire simulations, critically and objectively evaluating fire company effectiveness. These studies indicate significant reductions in performance and safety when crews have fewer members than the above recommendations. Overall, five-member crews were found to provide a more coordinated approach for search and rescue and fire suppression tasks. (*See NFPA 1500, Standard on Fire Department Occupational Safety and Health Program, A-6-2.1.*)

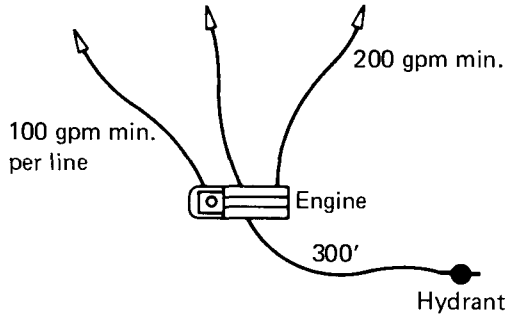
A-4-1.1 Illustrations of some handline evolutions that may be used:

No. 1 — forward lay using one engine and two supply lines.



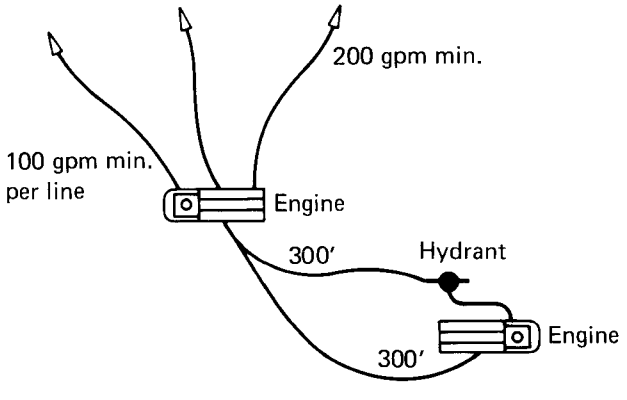
Recommended Maximum Time: 4 Min.

No. 2 — Forward lay using one engine and one large-diameter supply line.



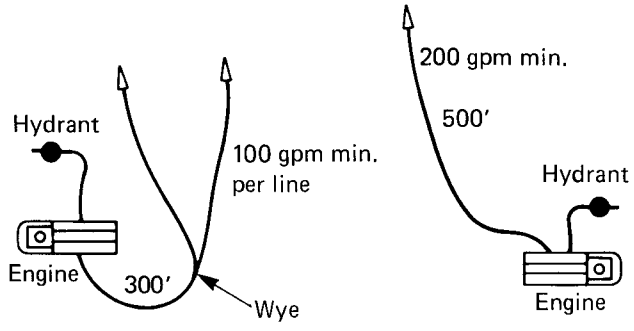
Recommended Maximum Time: 3.5 Min.

No. 3 — Forward and reverse lays using two engines, two supply lines, and utilizing an inline or hydrant valve.



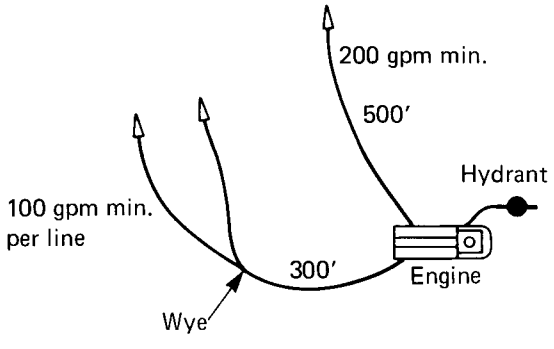
Recommended Maximum Time: 5.5 Min.

No. 4 — Reverse lays using two engines and two hydrants.



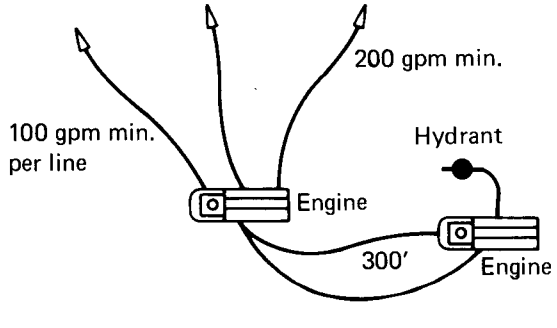
Recommended Maximum Time: 5 Min.

No. 5 — Reverse lay using one engine and two supply lines. Engine at hydrant supplies leader line and backup line.



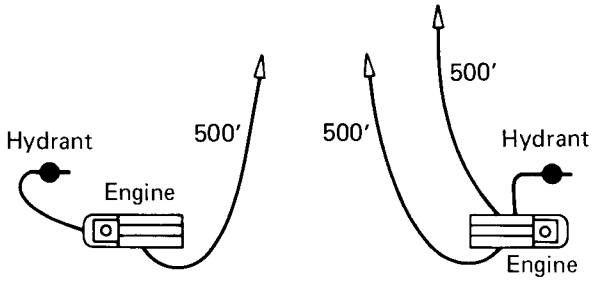
Recommended Maximum Time: 6 Min.

No. 6 — Reverse or forward lay using two engines and two supply lines. Two pump operation.



Recommended Maximum Time: 4.5 Min.

No. 7 — Reverse lay using two hydrants and two engines to supply two attack lines and one backup line.



Recommended Maximum Time: 5.5 Min.

A-4-1.3 The delay in putting the second and additional units in service recognizes the fact that, in many cases, the companies do not arrive simultaneously due to such factors as volunteer response and traffic conditions. It also provides the evaluator with a greater opportunity to check the operations of the second and additional companies. This is merely to suggest a standard procedure for the purposes of the test. The evaluator may desire to increase the time interval to simulate conditions where responding companies are located far apart from one another.

A-4-2.4 Pressure/flow may be determined either by Pitot gage measurement, piezometer gage readings, flow meter readings, or by pump discharge gage readings based on known pressure requirements for the particular nozzles. Spray nozzles may be estimated at their rated delivery if the proper pump pressure is provided.

A-4-3.2 This is to show ability to advance the lines to necessary positions of operation. The evaluator may designate the positions where streams will be operated.

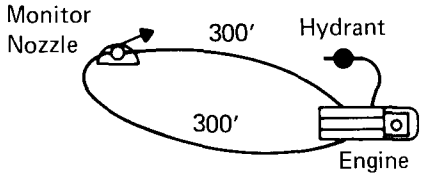
A-4-4.4 Failure to promptly make adequate connections to utilize the available water supply is one of the most serious errors in making an initial attack on a fire. Getting streams into service quickly when they lack adequate volume and pressure cannot be considered as furnishing a standard initial fire attack. The most common cause of failure is depending on a single 2½-in. supply line to provide the required flow. At least two 2½-in. supply lines or a large engine supply hose would be required to carry the needed flows at the required pressures.

A-4-4.5 Up to 10 seconds of interruption may be permitted to take care of situations such as transfer of water supply from tank to pump or shifting of lines from hydrants to pumps. Failure to obtain water from a hydrant before the booster tank is empty, or the inability to maintain flow when changing from tank to hydrant supply, would be unsatisfactory. When the booster tank is used to supply the first attack line, a second line shall not be charged until a permanent water supply has been established.

A-4-5.1 The evaluation obtained should be useful to the training officer in determining areas where additional training is needed to provide a standard initial fire attack capability. It should not be considered surprising if, upon the first trial with these evolutions, performance is not fully satisfactory. The concept of teamwork between companies for effective initial attack requires special training.

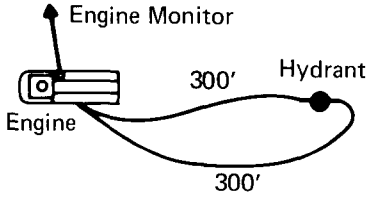
A-5-1.1 Illustrations of some master stream evolutions that may be used:

No. 8 — Reverse lay from portable monitor nozzle using one engine.



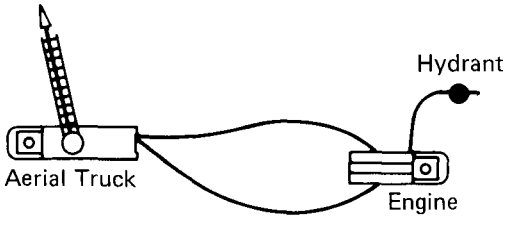
Recommended Maximum Time: 4.5 Min.

No. 9 - Forward lay with one engine and using engine monitor.



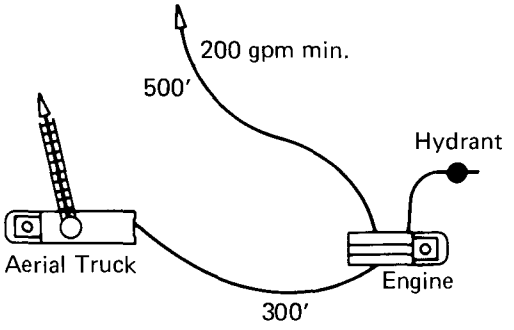
Recommended Maximum Time: 3 Min.

No. 10 — Reverse lay from elevated master stream using one engine.



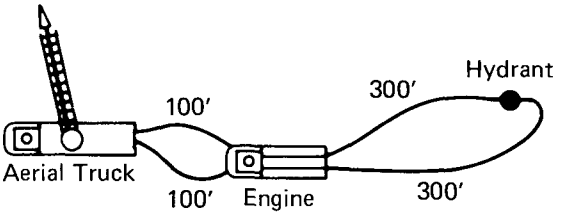
Recommended Maximum Time: 4 Min.

No. 11 — Reverse lay from elevated master stream using one engine and supplying one handline.



Recommended Maximum Time: 4 Min.

No. 12 — Forward lay using one engine to supply an elevated master stream with two lines.



Recommended Maximum Time: 5 Min.

A-5-1.3 The delay in putting the second and additional units into service recognizes the fact that, in many cases, the two companies do not arrive simultaneously due to such factors as volunteer response and traffic conditions. It also provides the evaluator with a greater opportunity to check the operations of the second and additional companies. This is merely to suggest a standard procedure for the purposes of the test. The evaluator may desire to increase the time interval to simulate conditions where responding companies are located far apart from one another.

A-5-2.2 Pressure/flow may be determined either by Pitot gage measurement, piezometer gage readings, flow meter readings, or by pump discharge gage readings based on known pressure requirements for the particular nozzles. Spray nozzles may be estimated at their rated delivery if the proper pump pressure is provided.

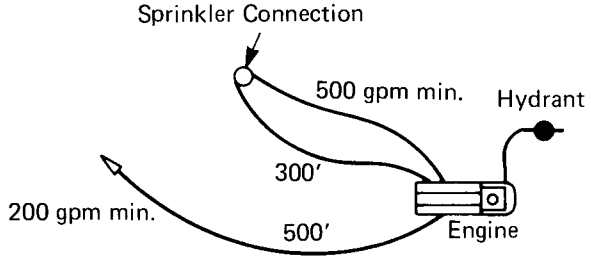
A-5-4.4 Failure to promptly make adequate connections to utilize the available water supply is one of the most serious errors in making an initial attack on a fire. Getting streams into service quickly when they lack adequate volume and pressure cannot be considered as furnishing a standard initial fire attack. The most common cause of failure is depending on a single 2½-in. supply line to provide the required flow. At least two 2½-in. supply lines or a large engine supply hose would be required to carry the needed flows at the required pressures.

A-5-4.5 Up to 10 seconds of interruption may be permitted to take care of situations such as transfer of water supply from tank to pump or shifting of lines from hydrants to pumps. Failure to obtain water from a hydrant before the booster tank is empty, or the inability to maintain flow when changing from tank to hydrant supply, would be unsatisfactory. When the booster tank is used to supply the first attack line, a second line shall not be charged until a permanent water supply has been established.

A-5-5.1 The evaluation obtained should be useful to the training officer in determining areas where additional training is needed to provide a standard initial fire attack capability. It should not be considered surprising if, upon the first trial with these evolutions, performance is not fully satisfactory. The concept of teamwork between companies for effective initial attack requires special training.

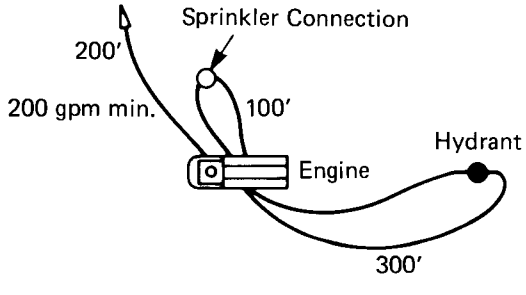
A-6-1.1 Illustrations of some automatic sprinkler system support evolutions that may be used:

No. 13 — Reverse lay from sprinkler connection using one engine, two supply lines, and one support line.



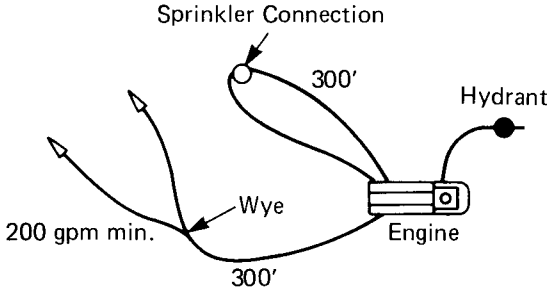
Recommended Maximum Time: 4 Min.

No. 14 — Forward lay to sprinkler connection using one engine, two supply lines, and one support line.



Recommended Maximum Time: 4 Min.

No. 15 — Reverse lay from sprinkler connection using one engine, two supply lines, and one leader line for two support lines.



Recommended Maximum Time: 5 Min.

A-6-1.3 The delay in putting the second and additional unit into service recognizes the fact that, in many cases, the two companies do not arrive simultaneously due to such factors as volunteer response and traffic conditions. It also provides the evaluator with a greater opportunity to check the operations of the second and additional companies. This is merely to suggest a standard procedure for the purposes of the test. The evaluator may desire to increase the time interval to simulate conditions where responding companies are widely spaced.

A-6-2.2 Pressure/flow may be determined either by Pitot gage measurement, piezometer gage readings, flow meter readings, or by pump discharge gage readings based on known pressure requirements for the particular nozzles. Spray nozzles may be estimated at their rated delivery if the proper pump pressure is provided.

A-6-4.4 Failure to promptly make adequate connections to utilize the available water supply is one of the most serious errors in making an initial attack on a fire. Getting streams into service quickly when they lack adequate volume and pressure cannot be considered as furnishing a standard initial fire attack. The most common cause of failure is depending on a single 2½-in. supply line to provide the required flow. At least two 2½-in. supply lines or a large engine supply hose would be required to carry the needed flows at the required pressures.

A-6-4.5 Up to 10 seconds of interruption may be permitted to take care of situations such as transfer of water supply from tank to pump or shifting of lines from hydrants to pumps. Failure to obtain water from a hydrant before the booster tank is empty, or the inability to maintain flow when changing from tank to hydrant supply, would be unsatisfactory. When the booster tank is used to supply the first attack line, a second line shall not be charged until a permanent water supply has been established.

A-6-5.1 The evaluation obtained should be useful to the training officer in determining areas where additional training is needed to provide a standard initial fire attack capability. It should not be considered surprising if, upon the first trial with these evolutions, performance is not fully satisfactory. The concept of teamwork between

companies for effective initial attack requires special training.

Appendix B Evaluation Guide Sheets and Instructions

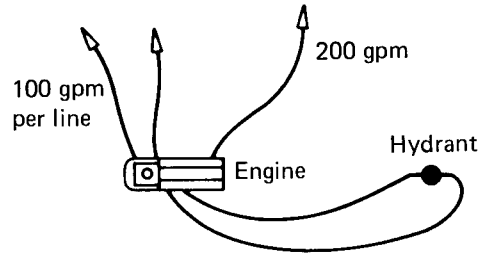
This Appendix is not a part of the requirements of this NFPA document, but is included for information purposes only.

(a) The following guide sheets are provided to assist training personnel when using the evolutions illustrated in Appendix A.

(b) All personnel involved in the evolutions should be properly clothed in fire fighting and safety gear, and those individuals operating handlines should wear SCBA.

(c) The total number of personnel used for each evolution should not exceed the total number of persons that normally respond on the initial alarm. Some evolutions use a single engine, but the number of personnel used does not have to be limited to a single engine complement if more than one engine responds on the initial alarm. All personnel over the number that normally respond on the first engine shall be delayed 30 seconds before entering the evolution.

Evolution No. 1 — Forward lay using one engine and two supply lines.



This evolution uses two supply lines and three handlines. If the number of personnel used to perform this evolution exceeds the normal single engine staffing, the additional personnel shall be delayed 30 seconds before becoming involved in the evolution.

1. Stage or ready engine and personnel away from the hydrant. When personnel are ready, give signal for engine to proceed to hydrant.

2. START TIME WHEN ENGINE STOPS AT THE HYDRANT. (Don't allow additional personnel to start for 30 seconds.)

3. Steps of Operation:

(a) Lay two supply lines from the hydrant a distance of 300 ft.

(b) Advance two attack lines from the engine a distance of 200 ft.

(c) Advance one backup line from the engine a distance of 200 ft.

(d) Operate all lines at proper pressures/flows.

4. STOP TIME WHEN ALL LINES ARE SUPPLIED PROPERLY. (Record time in "F" below.)

5. Equipment and personnel used in test:

(a) Size of supply lines used? _____

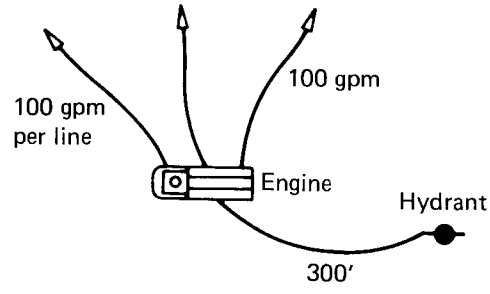
(b) Size of attack lines used? _____

(c) Size of backup lines used? _____

(d) Number of persons used? _____

6. Total time of evolution: _____

Evolution No. 2 — Forward lay using one engine and one large-diameter supply line.



This evolution uses one engine, one large-diameter supply line, and three handlines. If the number of personnel used to perform this evolution exceeds the normal single engine company staffing, the additional personnel shall be delayed 30 seconds before becoming involved in the evolution.

1. Stage or ready engine and personnel away from the hydrant. When personnel are ready, give signal for engine to proceed to hydrant.

2. START TIME WHEN ENGINE STOPS AT THE HYDRANT. (Don't allow additional personnel to start for 30 seconds.)

3. Steps of Operation:

(a) Lay one supply line from the hydrant a distance of 300 ft.

(b) Advance two attack lines from the engine a distance of 200 ft.

(c) Advance one backup line from the engine a distance of 200 ft.

(d) Operate all lines at proper pressures/flows.

4. STOP TIME WHEN ALL LINES ARE SUPPLIED PROPERLY. (Record time in "F" below.)

5. Equipment and personnel used in text:

(a) Size of supply line used? _____

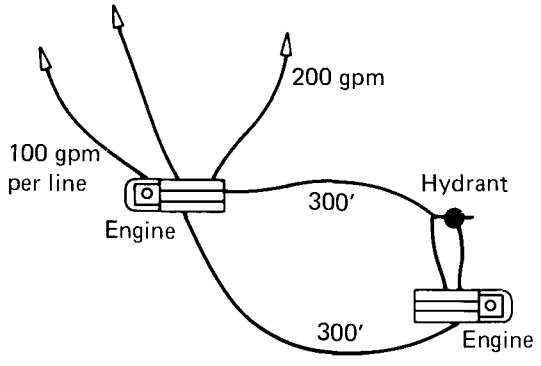
(b) Size of attack lines used? _____

(c) Size of backup line used? _____

(d) Number of persons used? _____

6. Total time of Evolution: _____

Evolution No. 3 — Forward and reverse lays using two engines, two supply lines, and utilizing an inline or hydrant valve.



This evolution uses two engines, two supply lines, and three handlines. A 30-second delay shall be used to start the second engine and all personnel over the normal staffing of the first engine.

1. Stage or ready engine and personnel away from the hydrant. When personnel are ready, give signal for first engine to proceed to hydrant.

2. START TIME WHEN FIRST ENGINE STOPS AT THE HYDRANT. (Don't allow second engine and additional personnel to start for 30 seconds.)

3. Steps of Operation:

(a) Connect an inline or four-way valve to the hydrant and lay one supply line from the hydrant a distance of 300 ft.

(b) Using a second engine, lay a second supply line from the first engine a distance of 300 ft and connect second engine to the hydrant.

(c) Advance two attack lines from the first engine a distance of 200 ft.

(d) Advance one backup line from the first engine a distance of 200 ft.

(e) Operate all lines at proper pressures/flows.

4. STOP TIME WHEN ALL LINES ARE SUPPLIED PROPERLY. (Record time in "F" below.)

5. Equipment and personnel used in text:

(a) Size of supply lines used? _____

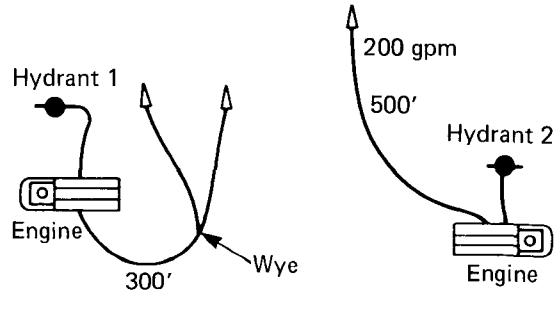
(b) Size of attack lines used? _____

(c) Size of backup line used? _____

(d) Number of persons used? _____

6. Total time of Evolution: _____

Evolution No. 4 — Reverse lays using two engines and two hydrants.



This evolution uses two engines, two attack lines operated from a wye, and one backup line. A 30-second delay shall be used to start the second engine and all personnel over the normal staffing of the first engine.

1. Stage or ready engine and personnel away from the fire area. When personnel are ready, give signal for first engine to proceed to fire area.

2. START TIME WHEN FIRST ENGINE STOPS AT THE FIRE AREA. (Don't allow second engine and additional personnel to start for 30 seconds.)

3. Steps of Operation:

(a) At the fire area, remove two attack lines, wye, and leader line from the first engine.

(b) Lay leader line to first hydrant a distance of 300 ft and connect engine to hydrant.

(c) At fire area remove a minimum of 200 ft of hose from the second engine to be used as a backup line and lay a second leader line to hydrant #2 a distance of 300 ft and connect second engine to hydrant #2.

(d) Operate all lines at proper pressures/flows.

4. STOP TIME WHEN ALL LINES ARE SUPPLIED PROPERLY. (Record time in "F" below.)

5. Equipment and personnel used in text:

(a) Size of leader lines used? _____

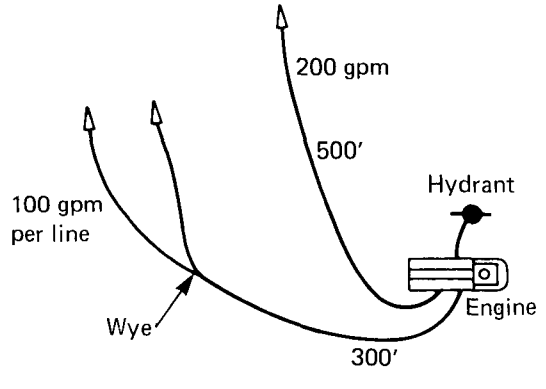
(b) Size of attack lines used? _____

(c) Size of backup line used? _____

(d) Number of persons used? _____

6. Total time of Evolution: _____

Evolution No. 5 — Reverse lay using one engine and two supply lines. Engine at hydrant supplies leader line and backup line.



This evolution uses one engine, two attack lines operated from a wye, and one backup line. If the number of personnel used to perform this evolution exceeds the normal single engine company staffing, the additional personnel shall be delayed 30 seconds before becoming involved in the evolution.

1. Stage or ready engine and personnel away from the fire area. When personnel are ready, give signal for first engine to proceed to fire area.

2. START TIME WHEN FIRST ENGINE STOPS AT THE FIRE AREA. (Don't allow additional personnel to start for 30 seconds.)

3. Steps of Operation:

(a) At the fire area, remove two attack lines, wye, and a portion of the leader line from the engine. Also, remove a minimum of 200 ft of hose to be used as a backup line. The backup line should be connected to similar or larger supply hose.

(b) Lay two supply lines a distance of 300 ft and connect engine to the hydrant.

(c) Advance attack lines and backup line a distance of 200 ft and operate all lines at proper pressures/flows.

4. STOP TIME WHEN ALL LINES ARE SUPPLIED PROPERLY. (Record time in "F" below.)

5. Equipment and personnel used in text:

(a) Size of supply lines used? _____

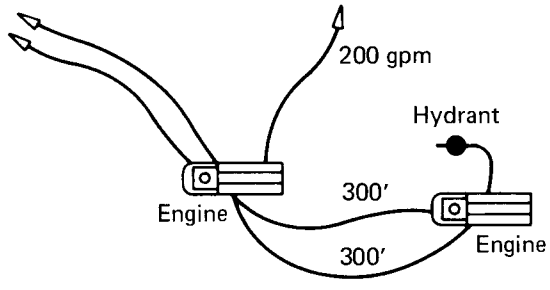
(b) Size of attack lines used? _____

(c) Size of backup line used? _____

(d) Number of persons used? _____

6. Total time of Evolution: _____

Evolution No. 6 — Reverse or forward lay using two engines and two supply lines. Two pump operation.



This evolution uses two engines, two supply lines, and three handlines. A 30-second delay shall be used to start the second engine and all personnel over the normal staffing of the first engine.

1. Stage or ready engines and personnel away from the hydrant or fire area. When personnel are ready, give signal for first engine to proceed to fire area or hydrant. (Evolution may start from either position.)

2. START TIME WHEN FIRST ENGINE STOPS AT HYDRANT OR FIRE AREA. (Don't allow second engine and additional personnel to start for 30 seconds.)

3. Steps of Operation:

(a) Stop the first engine at the hydrant or fire area and either lay two 300-ft supply lines or remain stationary and allow second engine to lay supply lines.

(b) Second engine should proceed to opposite location of first engine and lay two 300-ft supply lines, if not already laid. (When properly positioned, one engine will be located at the hydrant and one engine will be located at the fire area with two 300-ft supply lines connecting them.)

(c) Advance two attack lines a distance of 200 ft from the engine located at the fire area.

(d) Advance one backup line a distance of 200 ft from the engine located at the fire area.

(e) Operate all lines at proper pressures/flows.

4. STOP TIME WHEN ALL LINES ARE SUPPLIED PROPERLY. (Record time in "F" below.)

5. Equipment and personnel used in text:

(a) Size of supply lines used? _____

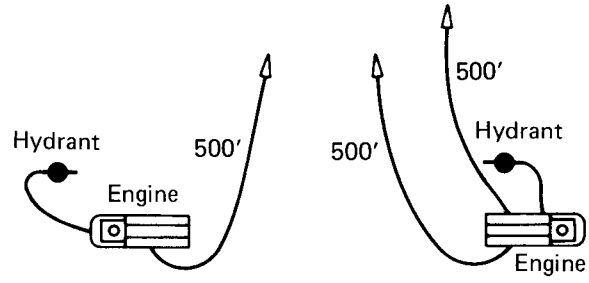
(b) Size of attack lines used? _____

(c) Size of backup line used? _____

(d) Number of persons used? _____

6. Total time of Evolution: _____

Evolution No. 7 — Reverse lay using two hydrants and two engines to supply two attack lines and one backup line.



This evolution uses two engines, two attack lines, and one backup line, all supplied directly from engines connected to hydrants. A 30-second delay shall be used to start the second engine and all personnel over the normal staffing of the first engine.

1. Stage or ready engines and personnel away from the fire area. When personnel are ready, give signal for first engine to proceed to fire area.

2. START TIME WHEN FIRST ENGINE STOPS AT FIRE AREA. (Don't allow second engine and additional personnel to start for 30 seconds.)

3. Steps of Operation:

(a) At the fire area, remove two hose lines to be used as attack lines and first engine proceeds 300 ft and connects to hydrant.

(b) Second engine stops at fire area, remove hose to be used as a backup line and engine proceeds 300 ft to hydrant.

(c) Attack lines and backup line should be advanced 200 ft and operated at proper pressures/flows.

4. STOP TIME WHEN ALL LINES ARE SUPPLIED PROPERLY. (Record time in "F" below.)

5. Equipment and personnel used in text:

(a) Size of supply lines used? _____

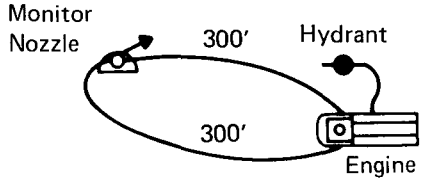
(b) Size of attack lines used? _____

(c) Size of backup line used? _____

(d) Number of persons used? _____

6. Total time of Evolution: _____

Evolution No. 8 — Reverse lay from portable monitor nozzle using one engine.



This evolution uses one engine, one portable monitor, and two supply lines. If the number of personnel used to perform this evolution exceeds the normal single engine staffing, the additional personnel shall be delayed 30 seconds before becoming involved in the evolution.

1. Stage or ready engine and personnel away from the fire area. When personnel are ready, give signal for engine to proceed to fire area.

2. START TIME WHEN ENGINE STOPS AT FIRE AREA. (Don't allow additional personnel to start for 30 seconds.)

3. Steps of Operation:

(a) At the fire area, remove two supply lines from engine, locate the monitor device, and connect supply lines to the monitor.

(b) Lay two supply lines a distance of 300 ft and connect engine to the hydrant.

(c) Supply monitor nozzle at proper pressure/flow.

4. STOP WHEN MONITOR NOZZLE IS SUPPLIED PROPERLY. (Record time in "F" below.)

5. Equipment and personnel used in text:

(a) Size of supply lines used? _____

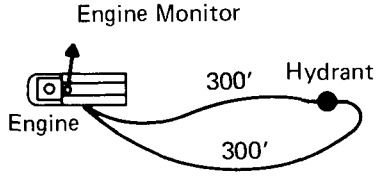
(b) Size of nozzle used? _____

(c) Amount of water flowed? _____

(d) Number of persons used? _____

6. Total time of Evolution: _____

Evolution No. 9 — Forward lay with one engine and using an engine monitor.



500-700 gpm Total Flow

This evolution uses one engine, an engine monitor, and two supply lines. If the number of personnel used to perform this evolution exceeds the normal single engine company staffing, the additional personnel shall be delayed 30 seconds before becoming involved in the evolution.

1. Stage or ready engine and personnel away from the hydrant. When personnel are ready, give signal for engine to proceed to hydrant.

2. START TIME WHEN ENGINE STOPS AT THE HYDRANT. (Don't allow additional personnel to start for 30 seconds.)

3. Steps of Operation:

(a) Lay two supply lines from the hydrant a distance of 300 ft.

(b) Place engine monitor in operation and operate at proper pressure/flow.

4. STOP WHEN MONITOR NOZZLE IS SUPPLIED PROPERLY. (Record time in "F" below.)

5. Equipment and personnel used in text:

(a) Size of supply lines used? _____

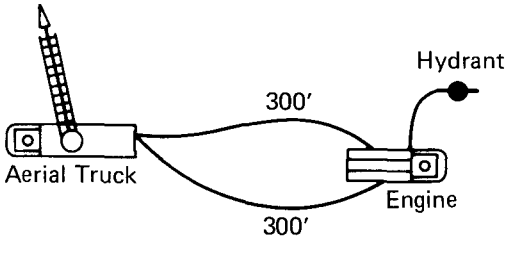
(b) Size of nozzle used? _____

(c) Amount of water flowed? _____

(d) Number of persons used? _____

6. Total time of Evolution: _____

Evolution No. 10 — Reverse lay from apparatus equipped with master stream device using one engine.



This evolution uses one aerial truck with elevated master stream device, one engine, and two supply lines. The numbers of personnel used to perform this evolution should not exceed the normal engine and truck company staffing.

1. Stage or ready all apparatus and personnel away from the fire area. When personnel are ready, give signal for apparatus to proceed to fire area.

2. START TIME WHEN FIRST VEHICLE STOPS AT FIRE AREA.

3. Steps of Operation:

(a) Position apparatus and prepare elevated master stream for service.

(b) Lay two supply lines a distance of 300 ft and connect engine to hydrant.

(c) Connect supply lines to elevated master stream device intake and operate stream at proper pressure/flow.

4. STOP TIME WHEN ELEVATED STREAM IS SUPPLIED PROPERLY. (Record time in "F" below.)

5. Equipment and personnel used in text:

(a) Size of supply lines used? _____

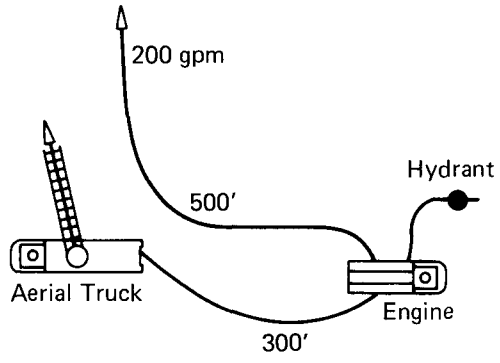
(b) Size of nozzle used? _____

(c) Amount of water flowed? _____

(d) Number of persons used? _____

6. Total time of Evolution: _____

Evolution No. 11 — Reverse lay from apparatus equipped with elevated master stream device using one engine and supplying one handline.



This evolution uses one apparatus equipped with elevated master stream device, one engine, one large-diameter supply line, and one handline. The number of personnel used to perform this evolution should not exceed the normal engine and truck company staffing.

1. Stage or ready all apparatus and personnel away from the fire area. When personnel are ready, give signal for apparatus to proceed to fire area.

2. START TIME WHEN FIRST VEHICLE STOPS AT FIRE AREA.

3. Steps of Operation:

(a) Position apparatus and prepare elevated master stream for service.

(b) Remove large-diameter supply line and one handline from engine.

(c) Engine proceeds 300 ft and connects to hydrant.

(d) Connect supply line to elevated master stream intake and advance handline.

(e) Operate all lines at proper pressures/flows.

4. STOP TIME WHEN ALL LINES ARE SUPPLIED PROPERLY. (Record time in "F" below.)

5. Equipment and personnel used in text:

(a) Size of supply lines used? _____

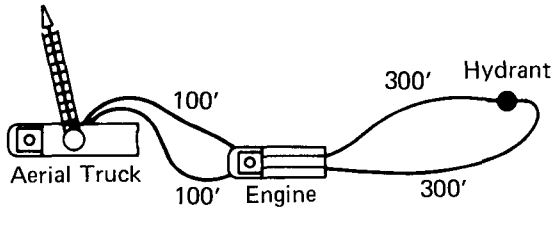
(b) Size of handline used? _____

(c) Size of elevated master stream nozzle used? _____

(d) Number of persons used? _____

6. Total time of Evolution: _____

Evolution No. 12 — Forward lay using one engine to supply an apparatus equipped with elevated master stream device with two lines.



This evolution uses one apparatus equipped with elevated master stream device, one engine and four supply lines (two supply lines between the hydrant and engine, and two supply lines between the engine and the elevated master stream device intake). The number of personnel used to perform this evolution should not exceed the normal engine and truck company staffing.

1. Stage or ready all apparatus and personnel away from the hydrant. When personnel are ready, give signal for engine to proceed to hydrant and apparatus equipped with elevated master stream device intake.

2. START TIME WHEN ENGINE STOPS AT THE HYDRANT.

3. Steps of Operation:

(a) Lay two supply lines from hydrant a distance of 300 ft.

(b) Position apparatus and prepare elevated master stream for service.

(c) Lay two 100 ft supply lines from engine to elevated master stream device intake.

(d) Operate elevated master stream at proper pressure/flow.

4. STOP TIME WHEN ELEVATED STREAM IS SUPPLIED PROPERLY. (Record time in "F" below.)

5. Equipment and personnel used in text:

(a) Size of supply lines used? _____

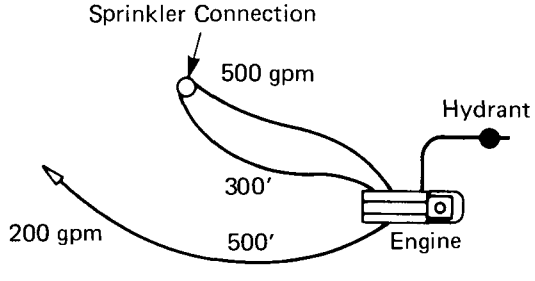
(b) Size of nozzle used? _____

(c) Amount of water flowed? _____

(d) Number of persons used? _____

6. Total time of Evolution: _____

Evolution No. 13 — Reverse lay from sprinkler connection using one engine, two supply lines, and one support line.



This evolution uses a simulated sprinkler connection, one engine, two supply lines, and one support line. If the number of personnel used to perform this evolution exceeds the normal single engine staffing, the additional personnel shall be delayed 30 seconds before becoming involved in the evolution.

1. Stage or ready engine and personnel away from the sprinkler connection. When personnel are ready, give signal for the engine to proceed to the sprinkler connection.

2. START TIME WHEN ENGINE STOPS AT THE SPRINKLER CONNECTION. (Don't allow additional personnel to start for 30 seconds.)

3. Steps of Operation:

(a) Lay two supply lines a distance of 300 ft from sprinkler connection to hydrant.

(b) Advance one 500-ft support line from engine.

(c) Operate all lines at proper pressures/flows.

4. STOP TIME WHEN ALL LINES ARE SUPPLIED PROPERLY. (Record time in "F" below.)

5. Equipment and personnel used in text:

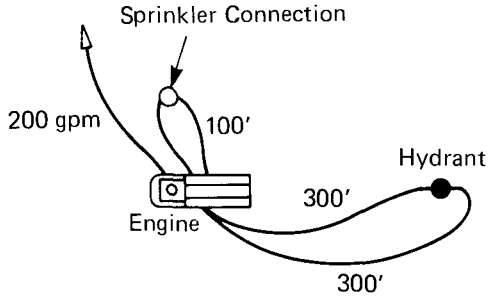
(a) Size of supply lines used? _____

(b) Size of support lines used? _____

(c) Number of persons used? _____

6. Total time of Evolution: _____

Evolution No. 14 – Forward lay to sprinkler connection using one engine, two supply lines, and one support line.



700 gpm Total Flow

This evolution uses a simulated sprinkler connection, one engine, one support line, and four supply lines (two supply lines between the hydrant and engine, and two supply lines between the engine and sprinkler connection). If the number of personnel used to perform this evolution exceeds the normal single engine staffing, the additional personnel shall be delayed 30 seconds before becoming involved in the evolution.

1. Stage or ready engine and personnel away from the hydrant. When personnel are ready, give signal for engine to proceed to hydrant.

2. START TIME WHEN ENGINE STOPS AT THE HYDRANT. (Don't allow additional personnel to start for 30 seconds.)

3. Steps of Operation:

(a) Lay two supply lines from the hydrant a distance of 300 ft.

(b) Lay two supply lines a distance of 100 ft from the engine to the sprinkler connection.

(c) Advance one support line a distance of 200 ft from the engine.

(d) Operate all lines at proper pressures/flows.

4. STOP TIME WHEN ALL LINES ARE SUPPLIED PROPERLY. (Record time in "F" below.)

5. Equipment and personnel used in text:

(a) Size of supply lines used between hydrant and engine? _____

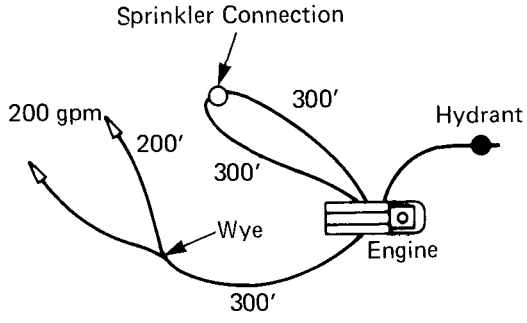
(b) Size of attack lines used between engine and sprinkler? _____

(c) Size of support line used? _____

(d) Number of persons used? _____

6. Total time of Evolution: _____

Evolution No. 15 – Reverse lay from sprinkler connection using one engine, two supply lines, and one leader line for two support lines.



700 gpm Total Flow

This evolution uses one engine, two supply lines, and one leader line to supply two support lines. If the number of personnel used to perform this evolution exceeds the normal single engine staffing, the additional personnel shall be delayed 30 seconds before becoming involved in the evolution.

1. Stage or ready engine and personnel away from the sprinkler connection. When personnel are ready, give signal for the engine to proceed to the sprinkler connection.

2. START TIME WHEN ENGINE STOPS AT THE SPRINKLER CONNECTION. (Don't allow additional personnel to start for 30 seconds.)

3. Steps of Operation:

(a) Remove wye and two 200-ft support lines from engine.

(b) Lay two supply lines a distance of 300 ft and connect engine to hydrant.

(c) Connect supply lines to sprinkler connection and supply at proper pressure/flow.

(d) Lay 300 ft of leader line from the engine connect to the wye.

(e) Advance two attack lines 200 ft.

(f) Operate all lines at proper pressures/flows.

4. STOP TIME WHEN ALL LINES ARE SUPPLIED PROPERLY. (Record time in "F" below.)

5. Equipment and personnel used in text:

(a) Size of supply lines used? _____

(b) Size of leader lines used? _____

(c) Size of support line used? _____

(d) Number of persons used? _____

6. Total time of Evolution: _____

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SUBMITTING PROPOSALS ON NFPA TECHNICAL COMMITTEE DOCUMENTS

Contact NFPA Standards Administration for final date for receipt of proposals on a specific document.

INSTRUCTIONS

Please use the forms which follow for submitting proposed amendments. Use a separate form for each proposal.

1. For each document on which you are proposing amendment indicate:
   (a) The number and title of the document
   (b) The specific section or paragraph.

2. Check the box indicating whether or not this proposal recommends new text, revised text, or to delete text.

3. In the space identified as "Proposal" include the wording you propose as new or revised text, or indicate if you wish to delete text.

4. In the space titled "Statement of Problem and Substantiation for Proposal" state the problem which will be resolved by your recommendation and give the specific reason for your proposal including copies of tests, research papers, fire experience, etc. If a statement is more than 200 words in length, the technical committee is authorized to abstract it for the Technical Committee Report.

5. Check the box indicating whether or not this proposal is original material, and if it is not, indicate source.

6. If supplementary material (photographs, diagrams, reports, etc.) is included, you may be required to submit sufficient copies for all members and alternates of the technical committee.

NOTE: The NFPA Regulations Governing Committee Projects in Paragraph 10-10 state: Each proposal shall be submitted to the Council Secretary and shall include:

(a) identification of the submitter and his affiliation (Committee, organization, company) where appropriate, and

(b) identification of the document, paragraph of the document to which the proposal is directed, and

(c) a statement of the problem and substantiation for the proposal, and

(d) proposed text of proposal, including the wording to be added, revised (and how revised), or deleted.