Marin County Standardized Training Manual

Draft Version II
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Evolution: Donning Personal Protective Equipment, Structure Fire

Time Standard: XXX Seconds, Protective Boots, Trousers, Coat, Nomex Hood, Helmet, Gloves, and Truck Belts (if available)

Description: A firefighter will don all structure fire protective clothing and truck belts while wearing Agency approved work uniform. Time starts when the firefighter touches personal protective equipment.

Key Tasks:

1. Step into boots one foot at a time
2. Pulls up pants and secures all internal and external snaps and fasteners provided by the manufacturer.
3. Pulls up suspenders, if present, over top of shoulders
4. Put on Nomex hood, covering the head neck and ears
5. Puts on coat and secures all internal and external snaps and fasteners provided by the manufacturer.
6. Fasten collar and throat strap on the coat.
7. Lower Nomex hood around the outside of coat collar
8. Puts helmet on and secures chin strap.
9. Dons agency approved truck belt
10. Have structure fire approved gloves readily available

References:

IFSTA Essentials
CAL FIRE 4300 Manual

Evolution: Donning Personal Protective Equipment, Vegetation Fire

Time Standard: XXX Seconds, Fully Dressed, Web Gear, No Skin Showing

Description: A firefighter will don all wildland fire personal protective clothing, including web gear, under simulated fire conditions while wearing Agency approved work uniform. Time starts when the firefighter touches personal protective equipment.

Key Tasks:

1. Firefighter dons pants one leg at a time, pulls them straight up until they fully extended and fastened.
    a. At the waist
    b. Zipper up
    c. Both legs zipped and fastened
2. Don shirt and completely zipped to the top
3. Dons Agency approved web gear/belt with fire shelter in place.
4. Properly secure web gear/belt ensuring that no twists are in place.
5. Dons helmet, secure chin strap
6. Position helmet shroud and fastens
    a. Draped outside of shirt collar
    b. Covering neck and face
7. Puts on goggles
8. Dons gloves with wristlets fully extended and under sleeves of shirt.
9. Secures shirt sleeves on both arms covering any exposed skin.

Reference:

IFSTA Essentials
CAL FIRE 4300 Manual

Evolution: SCBA Donning –Cab Seat

Time Standard: XXX Minutes, Breathing air via mask, required checks completed, firefighter exited cab

Description: The firefighter dons SCBA mounted in a cab seat, exits the cab, and breathes air via mask. All manufacturer's, NFPA, and Cal-OSHA safety checks are completed. The time begins for this evolution when the simulated parking brake has been set and the firefighter has been given orders from the company officer.

Key Tasks:

1. Firefighter checks cylinder gauge prior to sitting in the seat
2. Firefighter initiates evolution from the seated position wearing all structure PPE according to Agency and industry standard, headset, and seatbelt fastened.
3. Firefighter exits cab facing the direction of travel and using handhold when stepping down from cab
4. Firefighter ensures the harness shoulder and waste straps are fastened and adjusted to transfer SCBA weight to waist
5. Mask donned so as not to abusively stretch retaining straps and also for a tight seal
6. Helmet secure on head with chin strap adjusted and in place
7. Three checks are performed:
    1. Shoulder gauge
    2. Bypass valve operation
    3. Presence of positive pressure
8. Nomex hood in place with no bare skin on the head visible
9. Gloves in place with no bare skin observable at the glove-turnout sleeve junction

Additional Information:

Mask is <u>not</u> donned over Nomex hood to preserve seal.

SCBAs should have a minimum of 4000 psi in the cylinder confirmed by observing the cylinder gauge and verified on the shoulder harness gauge.

It is extremely important that the firefighter does not remove her/his seatbelt while the fire engine is moving. On average (excluding data from 9/11), 21% of our annual **firefighter fatalities** are from responding to or returning from calls.

Do not don SCBA mask while inside of cab unless an IDLH environment exists directly outside of cab. Donning mask inside of cab makes exiting the vehicle more dangerous and often makes the firefighter use up valuable air supply to defog the mask.

References:

IFSTA Essentials
Interspiro *Spiromatic S,* Operating Instructions Handbook
Survivair, Operating Instructions Handbook
Scott, Operating Instructions Manual

Evolution: SCBA Donning –External Compartment

Time Standard: XXX Minutes Breathing air via mask, required checks completed

Description: The firefighter dons SCBA from an external compartment or removes SCBA from inside the cab and breathes air via the mask. All manufacturer's, NFPA, and Cal-OSHA safety checks are completed. Time starts when the firefighter touches the SCBA.

Key Tasks:

1. Firefighter approaches the fire apparatus wearing full structure PPE according to Agency and industry standard.
2. Firefighter checks cylinder gauge prior to donning
3. SCBA is donned using the "coat" method away from apparatus
4. All harness shoulder and waste straps fastened and adjusted to transfer SCBA weight to waist
5. Mask donned so as not to abusively stretch retaining straps and also for a tight seal
6. Helmet secure on head with chin strap adjusted and in place
7. Three checks are performed:
    1. Shoulder gauge
    2. Bypass valve operation
    3. Presence of positive pressure
8. Nomex hood in place with no bare skin on the head visible
9. Gloves in place with no bare skin observable at the glove-turnout sleeve junction

Additional Information:

Mask is <u>not</u> donned over Nomex hood to preserve seal.

SCBAs should have a minimum of 4000 psi in the cylinder confirmed by observing the cylinder gauge and verified on the shoulder harness gauge.

Firefighter should verify area is clear of objects and personnel before removing SCBA from compartment or from inside of cab.

In addition to engines that actually have an exterior compartment; this evolution is intended for the moments when it is necessary to reach into the cab to retrieve a SCBA.

References:

IFSTA Essentials
Interspiro *Spiromatic S,* Operating Instructions Handbook
Survivair, Operating Instructions Handbook
Scott, Operating Instruction Manual

Evolution: Extension Ladder, One Person, High/Low Shoulder Carry, Beam/Flat Raise

Time Standard: XXX Minutes, ladder tip to appropriate location, halyard tied

Description: A Type I engine is staged near the fire building. A firefighter removes the extension ladder and deploys it to an assigned location. Time begins when the firefighter touches the ladder.

Key Tasks:

1. The firefighter will don structure PPE, including SCBA, according to Agency and industry standard prior to the start of the evolution.
2. All applicable industry safety standards, laws, and practices are followed.
3. The firefighter is ultimately responsible for the ladder positioning, fluid and expeditious movements associated with the raise, and performing with safe body mechanics. Every attempt shall be made to position the ladder correctly with the first raise and positioning.
4. Roof ladder is removed from the engine and placed to avoid causing a tripping hazard and exposure to heat (away from exhaust from engine)
5. Ladder is removed from apparatus and carried using the high or low shoulder method
6. Ladder is led to the scene butt first with the firefighter positioned just slightly behind the center of gravity of the ladder. The butt of the ladder is carried slightly lowered.
7. Ladder is raised to assigned position using the nearby base of the building as a footing whenever possible (beam raise when carried high-shoulder, flat raise when carried low shoulder)
8. Prior to raising the fly, the ladder is pivoted to be parallel to the building in the vertical position, fly toward the building, halyard away from the building
9. Fly is raised to appropriate height, one leg bracing lower portion of beam, elbows bracing upper portions of beams
10. The firefighter attempts to keep the fly section away from the building as it is raised to keep the fly from becoming scraped as it travels upward
11. Ladder base is moved outward from building to achieve approximate 75 degree angle
12. Halyard is tied using a clove hitch and successive half hitches (or agency approved knot). The halyard is taught and excess line is avoided to remove any potential tripping hazards
13. Ladder is leveled so that equal loading will be placed on both beams and transmitted to the ground.
14. Ladder is pivoted on one beam so fly is positioned per manufacturer's recommendations
15. When able, the tip of the ladder will be secured using means such as window sills or tying the tip of the ladder to a nearby stable object
16. One member of the crew will be assigned to stabilize the base of the ladder whenever it is mounted and the tip is unsecured. When possible, the ladder will be secured at both the tip and the base (butt).

Additional Information:

Ladders should be placed considering several elements: strong points of the building (ex., corners, hips, valleys, pilasters); access from the unburned side of the building; avoidance of electrical hazards; avoidance of laddering over windows or blocking door access; multiple points of ingress/egress using ladders.

Halyards shall be tied using a clove hitch and successive half hitches (or agency approved knot) to secure the knot and to remove excess halyard that could form a tripping hazard. The knot should "capture" the halyard that is travelling up the ladder so that it is secure and taught.

This evolution requires that the ladder be pivoted as the last step to achieve the "fly out" positioning (or manufacturer's recommendation). When initially positioning the ladder, the firefighter should consider this extra one ladder-width that will be needed as the ladder is pivoted in position.

Reference:

IFSTA Essentials

Evolution: 14-Foot Roof Ladder, One Person, High/Low Shoulder Carry, Beam/Flat Raise

Time Standard: XXX Minutes, ladder properly placed on a pitched roof with hooks deployed

Description: A Type I engine is staged near the fire building. A firefighter removes the 14-foot roof ladder and properly deploys it to the assigned location. Time begins when the firefighter touches the ladder.

Key Tasks:

1. The firefighter will don structure PPE, including SCBA, according to Agency and industry standard.
2. All applicable industry safety standards, laws, and practices are followed.
3. The firefighter is ultimately responsible for the ladder positioning, fluid and expeditious movements associated with the raise, and performing with safe body mechanics. Every attempt shall be made to position the ladder correctly with the first raise and positioning.
4. Ladder is removed from apparatus and carried using the high or low shoulder method.
5. Ladder is led to the scene butt first with the firefighter positioned just slightly behind the center of gravity of the ladder. The butt of the ladder is carried slightly lowered.
6. Spot the ladder at the base the ground ladder that is to be climbed and deploy the hooks
7. Raise the ladder using the beam/flat raise
8. Lean the roof ladder against the ground ladder, hooks away from the ground ladder.
9. Proceed up the ground ladder, place arm between second and third or more convenient rungs on roof ladder.
10. Balance roof ladder on shoulder and continue climbing using both hands.
11. Lock in on ground ladder at or near roof level.
12. Remove roof ladder from shoulder and slide onto the roof using a hand over hand method.*****
13. Slide roof ladder up the roof until the hooks go past the ridge of the roof, pull back ensuring that hooks catch solidly.

Additional Information:

Ladders should be placed considering several elements: strong points of the building (ex., corners, hips, valleys, pilasters); access from the unburned side of the building; avoidance of electrical hazards; avoidance of laddering over windows or blocking door access; multiple points of ingress/egress using ladders.

*****You may slide the roof ladder on a single beam with the hooks facing away from you or you may slide it flat on both beams with the hooks facing down.

Reference:

IFSTA Essentials

Evolution: Close Hydrant LDH Supply Line

Time Standard: XXX Minutes, Continuous uninterrupted supply line

Description: The engine stops at a point of safe tactical advantage that is less than 100 feet from a hydrant. The engineer establishes the supply line. Time begins after the parking brakes have been set.

Key Tasks:

1. All firefighters don structure PPE according to Agency and industry standard.
2. All applicable industry safety standards, laws, and practices are followed.
3. Company officer selects appropriate hydrant and is ultimately responsible for the engine positioning at the fire scene.
4. Company officer clearly communicates tasks and goal to crew. The officer is ultimately responsible for the expeditious and fluid movements of the crew.
5. Engineer engages pump, chocks apparatus wheels, and assures engine radio is on the incident tactical channel and is able to be monitored from exterior of cab.
6. The engineer will maintain an adequate and uninterrupted water supply to attack line
7. The engineer/crew pulls a supply line using a working line drag technique and connection is completed to designated hydrant in a manner that maximizes the flow in the supply line.
8. The engineer is primarily responsible for establishing the supply line to the nearby hydrant.

Additional Information:

Crewmembers shall don structure PPE prior to response. If the firefighter dons SCBA in the cab (enclosed cab models), all efforts must be to do this from the sitting position if the engine is still moving.

Reference:

IFSTA Essentials

Evolution: Water Supply, Augmenting Hydrant Pressure.

Time Standard: XXX Minutes, water to attack engine at appropriate flow and pressure

Description: An initial attack engine has completed a hydrant connection via the gated tri-wye, clappered Siamese, or 4-way valve to the hydrant and proceeded with a supply line to the fire. An additional engine (**Supply Engine**) has arrived at the hydrant and will pump the supply line via the appliance thus increasing the water pressure to the attack engine. Time starts when engine sets parking brakes.

Key Tasks:

1. All firefighters don structure PPE according to Agency and industry standard. Company officer and firefighter must be wearing SCBAs by the time they are leaving the engine and proceeding to the fire building for their next assignment.
2. All applicable industry safety standards, laws, and practices are followed.
3. The company officer is ultimately responsible for the engine positioning at the hydrant. The engine is placed sufficiently close to the hydrant and appliance to allow short hose connections and to maintain the passage of traffic on the roadway.
4. The company officer clearly communicates tasks and goals to the crew. While the officer is ultimately responsible for the expeditious completion of the task, this evolution is primarily completed by the engineer who is responsible for methodical and expeditious movements.
5. Assuming no extraordinary conditions, the company officer and firefighter will be immediately available for reassignment by the Incident Commander.
6. Engineer engages pump, chocks apparatus wheels, and assures engine radio is on the incident tactical channel and is able to be monitored from exterior of cab.
7. The supply engine is connected to the hydrant using the largest available hydrant discharge, the main suction intake to the pump, and the largest diameter supply line available.
8. The tri-wye, clappered Siamese, or 4-way valve is fed from the supply engine via appropriate diameter hose into remaining inlets.
9. Prior to pumping the main supply line, the supply engineer confers with attack engine on appropriate pressure and readiness to receive the augmented supply
10. Tri-wye gates are operated prior to pumping to avoid excess pressure against the ball valves. Water hammers are to be avoided.
11. **This step is dependent on Agency SOP:** Original tri-wye, clappered Siamese, 4-way valve connection to hydrant is disconnected and connected to supply engine discharge using appropriate diameter hose and subsequently pumped at appropriate pressure.
12. Additional connections are made to hydrant from supply engine as necessary to maintain the required fire flow.

Additional Information:

The relay connection and subsequent pumping evolution is performed in those isolated incidences when the initial attack engine must connect to a lower pressure hydrant at a significant distance from the fire.

Crewmembers shall don structure PPE prior to response. If the firefighter dons SCBA in the cab (enclosed cab models), all efforts must be to do this from the sitting position if the engine is still moving.

The largest diameter hose, discharges, and suctions should be utilized to deliver maximum water flows with minimal friction losses.

Required engine pressure is based on CQ^2L formula or current pump pressure calculator/chart in engineer's compartment.

References:

IFSTA Essentials
IFSTA Pumping Apparatus DRIVER/OPERATOR Handbook

Evolution: Sprinkler Connection (FDC), Close Hydrant

Time Standard: XXX Minutes, water to system at appropriate pressure, connection to hydrant with an uninterrupted water supply.

Description: The engine stops at a point of safe tactical advantage that is less than 100 feet from a hydrant and connects a minimum of two 2.5-inch lines to the FDC (some FDCs have more than two inlets). The engineer/crew establishes the supply line to the hydrant. Time begins after parking brakes have been set. Time starts when the engine sets parking brake.

Key Tasks:

1. All firefighters don structure PPE according to Agency and industry standard. Company officer and firefighter do not have to don SCBAs for this evolution.
2. All applicable industry safety standards, laws, and practices are followed.
3. Company officer selects appropriate hydrant and is ultimately responsible for the engine positioning at the fire scene.
4. Company officer clearly communicates tasks and goal to crew. The officer is ultimately responsible for the expeditious and fluid movements of the crew.
5. Engineer engages pump, chocks apparatus wheels, sets appropriate engine pressure, sets relief valve, and assures engine radio is on the incident tactical net and is able to be monitored from exterior of cab. **Class "A" foam is not pumped into the sprinkler system**. Transfer valve on two-stage pumps are to be placed in "Pressure."
6. The engineer/crew pulls the appropriate sized supply line using a working line drag technique and connection is made to the designated hydrant in a manner that maximizes the flow.
7. Maintain an adequate and uninterrupted water supply to system
8. Crew works to deploy 2.5-inch hoseline(s) or larger from the supply bed to the FDC.
9. The hose is charged as soon as one line is completely connected.

Additional Information:

The first crewmember to reach the FDC shall bring tools to open the caps. Caps may be frangible and only require striking to break off. Other caps require an adjustable wrench or hydrant spanner to open. The inside should be inspected for clapper operation and debris.

Class "A" foam is not pumped into the system to assure against contamination of the domestic water supply.

Company officers should choose hydrants that are not in use for other suppression operations or are the last in a "dead-end" water main (if available).

Beginning water supply pressure to the FDC:

Nothing showing: 100 PSI,
Fire confirmed: 150 PSI

References:

IFSTA Essentials
IFSTA Pumping Apparatus DRIVER/OPERATOR Handbook

Evolution: Fire Service Knots; Tie

Time: XXX Minutes per Knot

Evolution: The firefighter uses utility/rescue rope or webbing to tie a variety of fire service knots.

Key Tasks:

1. Appropriate rope, webbing is removed from the apparatus.
2. The firefighter will tie the following knots:
    a. Figure-Eight Stopper
    b. Figure-Eight Follow Through
    c. Figure-Eight on a Bight
    d. Clove Hitch
    e. Bowline
    f. Becket Bend (Sheet Bend)
    g. Square Knot
    h. Water Knot
    i. Hewitt Knot (SRFD)

References:

IFSTA Essentials
Rescue Systems I Manual, Current Edition

Evolution: Rope: Equipment Tie

Time Standard: 1:00 Minute, per piece of equipment tied

Description: The firefighter uses either the rope from an SCBA personal rope bag or a utility rope to tie a basic knot to a piece of equipment that is to be hauled aloft.

Key Tasks:

1. Firefighter obtains sufficient length of rope and bisects it to provide sufficient rope to haul equipment aloft and to provide a tag line to keep equipment from striking side of building during its upward travel.
2. Firefighter uses a knot or hitch that is easily recognizable, easy to tie and untie, does not degrade rope integrity, and will form a holdfast to the tool during its ascent.
3. The knot or hitch chosen allows expeditious tying and untying of the tool
4. Typical tools requiring hoisting include:
    - **a.** Axe
    - **b.** Chain saw
    - **c.** Rotary saw
    - **d.** Pike pole or rubbish hook
    - **e.** Hose pack
    - **f.** Charged or uncharged hoseline with nozzle
    - **g.** Medical bag

Additional Information:

Typical hitches and knots successful in tying equipment include: bowline, clove hitch, half hitch, lark's foot, figure eight, and Hewitt Knot (SRFD).

There is no one specific method to tie a given tool. This evolution recognizes diversity as long as the above mentioned Key Tasks are satisfied.

PERSONAL ESCAPE ROPE IS NOT TO BE USED TO TIE OFF EQUIPMENT.

References:

IFSTA Essentials
Rescue Systems I Manual, Current Edition

Evolution: Technical Rescue, Small Rope Systems

Time Standard: XXX Minutes per system

Description: The firefighter uses the rope and related equipment available with their assigned unit to construct one of several small systems. The firefighter will construct any or all of the following:

- **a.** Ladder rig
- **b.** "Z" rig with brake
- **c.** 2:1 Piggyback system
- **d.** Personal packaging system (chest and pelvic harness)
- **e.** Hasty seat
- **f.** Friction/safety line system with figure "8" or opposing carabiners (combinations including 2-2 and 1-2-1 systems)
- **g.** Anchor attachments (single loop, multiple loop, wrap three pull two, three bight, larks foot, two and three point self-adjusting anchors)
- **h.** Stokes/Litter Basket PT packaging (Chest and pelvic harness, Lashing)

Key Tasks:

1. The firefighter dons helmet and remaining PPE that will provide optimum protection and ability to work in the rescue environment. Gloves must be ready to protect the hands from sharp or abrasive objects.
2. Appropriate rope and hardware bags are removed safely from apparatus
3. Equipment is not thrown or tossed to the ground. Software and hardware are protected from dirt or surfaces covered with debris via a salvage cover/disposable plastic cover.
4. Where an anchor is required to support a system, it must be considered ultimately "bombproof"
5. Figure eight knots and water knots (double overhand bend) do not require tails to be finished in any other knot but should be kept short
6. ALL carabiner gates are locked after system is built and prior to use
7. Systems are safety inspected prior to use

Additional Information:

Reference:

Rescue Systems I Manual, Current Edition

Evolution: Fire Shelter Deployment, New Generation

Time Standard: 30 Seconds, Fire shelter deployed

Description: A firefighter will deploy a fire shelter, using the standing to sitting/dropdown or lying down method under simulated fire condition, while wearing full wildland fire PPE and carrying a hand tool. Time begins when gear is tossed on the ground.

Key Tasks:

1. Firefighter dons all wildland fire PPE and web gear/belt according to Agency and industry standard.
2. All applicable industry safety ordinances and practices are followed **(LACES, 10 Standard Fire Orders, 18 Watch Out Situations).**
3. Select an appropriate deployment area and clear to mineral soil. Area should be as large as time allows.
4. Make sure all gear is tossed far enough that it will not ignite and burn the fire shelter*****
5. Remove fire shelter from case
6. Select preferred deployment method, standing to sitting, standing to drop down, or lying down
7. Open and remove shelter from plastic protective case
8. Unfold shelter grasping the handles, "RIGHT HAND" LEFT HAND", with the appropriate hands. Shake out the fold until the shelter is fully extended.
9. Enter the shelter, rollover on to stomach, position body with feet towards the oncoming fire (head away from fire)
10. Anchor the shelter by placing the arms through the side hold-down straps and extending up to the elbows, maintain a good shelter to ground seal.

Additional Information:

All firefighting personnel shall carry the fire shelter whenever working on the fire ground in a wildland setting. A fire shelter is intended to be used as a tool of last resort, when fire entrapment is imminent and escape s not possible.

4 Common Denominators of fire behavior on fatal and near-fatal fires:

1. On relatively small fires or deceptively quiet areas of large fires.
2. In relatively light fuels, such as grass, herbs, and light brush.
3. When there is an unexpected shift in wind direction or in speed.
4. When fire responds to topographic conditions and runs uphill.

* In an entrapment situation, you do not have time to think about items in your pack that could be dangerous. If you do not remove your pack you **must** remove all flammable items.

References:

Cal Fire 4300 Manual
The New Generation Fire Shelter, NWCG, 2003, NFES 2710
Fire Shelter manufacturers' Deployment Instructions

Evolution: Drip Torch Assembly

Time Standard: 60 Seconds, Torch Fully Assembled, Fire on the Ground

Description: A firefighter fully assembles a drip torch and is prepared to put fire on the ground in a simulated fire situation. The firefighter is in full wildland PPE. Time begins when the firefighter steps out of the engine.

Key Tasks:

1. Firefighter dons all wildland PPE according to Agency and industry standard. Web gear/belt, helmet, gloves, goggles, and shrouds are to be worn for this evolution.
2. All applicable industry safety standards, laws, and practices are followed. **(LACES, 10 Standard Fire Orders, 18 Watch Out Situations).**
3. Firefighter waits until the apparatus comes to a complete stop and brakes are set before exiting the cab.
4. Remove the torch from the engine compartment/bumper.
5. Shake torch vigorously to mix the fuel, set on the ground in an area clear of combustible material.
6. Loosen and remove lock ring placing it on a clean surface
7. Loosen and remove the fuel flow plug, reposition into thread retainer. Ensure that it does not fall into the fuel tank.
8. Remove the fuel spout from the tank and inspect components (gasket, spout, and wick)
9. Inspect fuel level, tank should be ¾ maximum.
10. Reposition the spout assembly on top of the tank with the wick and fuel trap positioned away from the handle.
11. Replace and secure locking ring until hand tight
12. Open the air vent counter clockwise, ¾ open
13. Light the torch wick by placing a small amount of fuel on the ground and lighting with a fusee

Additional Information:

Recommended fuel mix is 2 parts diesel to 1 part gasoline.

Reference:

Cal Fire 4300 Manual

Evolution: Forward Hoselay from Hydrant, LDH or appropriate size supply

Time Standard: XXX Minutes, water to pump panel

Description: The supply engine company lays a minimum of 200 feet of supply line from the designated hydrant and proceeds to the fire. The engine stops at a point of safe tactical advantage. The engineer proceeds to complete water supply connection to the engine. Time starts when the engine arrives at the hydrant.

Key Tasks:

1. All personnel don structure PPE according to Agency and industry standard.
2. All applicable industry safety standards, laws, and practices are followed.
3. Company officer selects appropriate hydrant and is ultimately responsible for the engine positioning at the fire scene.
4. Company officer clearly communicates tasks and goal to crew. The officer is ultimately responsible for the expeditious and fluid movements of the crew.
5. LDH supply line connection is completed to designated hydrant in a manner that maximizes the flow in the supply line.
6. Engineer engages pump, chocks apparatus wheels, sets appropriate engine pressure, sets relief valve, and assures engine radio is on the incident tactical net and is able to be monitored from exterior of cab. Class "A" foam supplied where appropriate.
7. Maintain an adequate and uninterrupted water supply.

Additional Information:

Crewmembers shall don structure PPE prior to arrival at drill scene. It is the company officer's discretion whether the firefighter will don SCBA prior to dismounting (enclosed cab engines) for the hydrant connection. If the firefighter dons SCBA in the cab prior to making hydrant connection, all efforts must be done from the sitting position while the engine is moving.

Reference:

ISFSTA *Essentials*

Evolution: LDH Split Lay, Foreward/Reverse

Time Standard: xxx Minutes, hydrant connection complete and LDH charged to attack engine (400 feet minimum combined LDH for drill evolution)

Description: The initial attack engine company arrives at the scene of a fire that requires an excessively long (greater than 800 feet) supply lay but is still attainable with an additional engine. Many of these remote areas exist in rural locations. The initial engine places the butt of the LDH either at a strategic location (often the driveway entrance) so that the engine will reach the destination with enough supply hose. The second arriving engine connects their LDH to the open butt and proceeds out to a nearby hydrant. The second engine completes the hydrant connection and augments hydrant pressure as needed. Time begins when the firefighter exits the cab of the engine.

Key Tasks:

1. All firefighters don structure PPE according to Agency and industry standard. Company officer and firefighter must be wearing SCBA by the time they are beginning attack operations at the fire building.
2. All applicable industry safety standards, laws, and practices are followed.
3. The company officer is ultimately responsible for the engine positioning at the fire scene and the placement location of the LDH coupling.
4. The company officer clearly communicates tasks and goals to the crews. It is extremely important that the officer communicate the location of the LDH coupling and the need for the next engine to lay out to the hydrant.
5. The officer is ultimately responsible for the expeditious and fluid movements of the crew.
6. Coupling of first engine is placed at a conspicuous location, either at the base of the driveway or at a distance that assures the engine will reach the fire with sufficient supply hose
7. Coupling and LDH is secured by grasping a bight of hose until at least the next coupling clears the hose bed and/or hose is stationary. The firefighter will have to walk back to the attack engine once the initial supply line is laid.
8. Second engine drives to location of coupling, makes connection and performs a reverse lay to the hydrant. The second engine may choose to do a foreward lay from the hydrant to the first engines supply line.
9. Firefighter and company officer dismount from the second supplying engine at coupling location and proceed to fire location with minimum of SCBAs and any other equipment requested by the attack engine (bundle/midrise packs, hand tools, etc.)
10. Second engine completes the supply line connection and augments the hydrant pressure as needed.

Additional Information:

Crewmembers shall don structure PPE prior to response. If firefighters don SCBA in the cab (enclosed cab models), all efforts must be to do this from the sitting position if the engine is still moving.

Required engine pressure is based on CQ^2L formula. Water supplies from greater distances require multiple engines (relay evolution), hose tenders, or water tender shuttles.

Depending on the specific area of the hoselay, personnel should strive to keep LDH to roadsides in an effort to allow additional apparatus and crew to pass. Obviously, this is not possible in many areas due to restrictive driveway or road dimensions.

It is extremely important that crewmembers do not attempt to anchor LDH with their feet. Anchor only by grasping a bight of hose with excess hose positioned to the front of the body. Any other configuration poses a hazard to firefighters and is an extreme safety violation.

Evolution: Reverse Strip

Time Standard: XXX Minutes, water supply established, water to initial hoseline at appropriate flow and pressure, 200 foot reverse hose lay.

Description: The engine company arrives at the fire building prior to reaching a water supply. The crew works to deploy sufficient hose and equipment to begin an attack on the fire. The engine makes a reverse hoselay to the nearest tenable and safe hydrant that will supply the required fire flow.

Key Tasks:

1. All firefighters don structure PPE according to Agency and industry standard. Company officer and firefighter must be wearing SCBA by the time they have finished assembling the first attack line and are ready for fire attack to occur. The attack crew does not have to breathe SCBA air for this evolution.
2. All applicable industry safety standards, laws, and practices are followed.
3. Company officer selects appropriate hydrant, equipment deployment location, and is ultimately responsible for the engine positioning at the fire scene.
4. Company officer clearly communicates tasks and goal to crew. The officer is ultimately responsible for the expeditious and fluid movements of the crew.
5. Engineer assists in equipment deployment.
6. The crew works to deploy the following equipment at a safe area at the fire building:

   SCBAs and spare cylinders
   Ladders
   Hose spanners/appropriate fittings
   Tri-wye
   Gated Wyes
   2.5 inch nozzle
   Bundles/Midrise packs
   Rotary saw
   Flathead axe and Halligan tool
   100 foot bight of 2.5 inch and/or LDH supply hose.
   Any other equipment deemed necessary by the Company Officer

7. Firefighter and company officer secure 2.5 and/or LDH supply hose by grasping bight. All excess hose is forward of their position.
8. Company officer and firefighter work to assemble hoseline and appliances for initial fire attack evolution
9. Engine is dispatched to hydrant by attack crew using audible and visual cues
10. Engineer obtains water supply from assigned water source using typical evolutions adopted by the Agency.
11. Engineer delivers water of sufficient flow and pressure to attack team in the correct hoseline when cued.

Additional Information:

The equipment deployed at proximity of the fire building is modifiable by the company officer depending on the fire conditions and the expected mode of fire attack.

The largest diameter waterways should be used to assure sufficient water flow to the fire scene. Additional hydrant connections may be necessary to achieve the desired flow rate.

The required engine pressure is calculated using the CQ^2L formula or on the current pump pressure calculator/chart in the engineer's compartment.

Reference:
IFSTA Essentials

Evolution: Reverse Lay, Master Stream Attack

Time Standard: XXX Minutes, supply line and water to nozzle at appropriate pressure, flow, and pattern. 200 foot supply line reverse hose lay.

Description: The engine company stops at a point of tactical advantage, deploys deluge set (nozzle and base), supply hose, and attack crew. The engine proceeds to complete a "reverse" supply line to a hydrant to obtain a water supply. Time starts when engine arrives at the simulated fire scene.

Key Tasks:

1. All firefighters don structure PPE according to Agency and industry standard. Company officer and firefighter must be wearing SCBAs by the time they have finished assembling the deluge appliance. The attack crew does not have to breathe SCBA air for this evolution.
2. All applicable industry safety standards, laws, and practices are followed.
3. Company officer selects appropriate hydrant and is ultimately responsible for the engine and deluge set positioning at the fire scene.
4. Company officer clearly communicates tasks and goal to crew. The officer is ultimately responsible for the expeditious and fluid movements of the crew.
5. Engineer assists in equipment deployment, then proceeds with a reverse lay to the hydrant and completes the supply line connection.
6. The engineer is responsible for maintaining an adequate and uninterrupted water supply to the master stream appliance.
7. Crew works to assemble deluge set to the supply line. The hose is arranged according to the deluge manufacturer's recommendations including maintaining 10 feet of straight hose behind the deluge set. All kinks and twists are removed from the supply line.
8. Two person attack crew work together to operate nozzle and position the fire stream.

Additional Information:

Crewmembers shall don structure PPE prior to response. If the firefighter dons SCBA in the cab (enclosed cab models), all efforts must be to do this from the sitting position if the engine is still moving.

Required engine pressure is based on CQ^2L formula or current pump pressure calculator/chart in engineer's compartment.

Company officers are urged to avoid staffing the "nozzle" position on the hose and to remain in a position where they can assess the fire and tactics.

Officers should consider power lines, collapse zones (rule of thumb is 1.5 times the height of the building), stream reach, penetration, and tactical objectives when positioning the deluge appliance.

Reference:

IFSTA Essentials

Evolution: Water Supply: Drafting

Time Standard: XXX Minutes for prime achieved, 50 psi delivered at remote engine

Description: The supply engine company lays a supply line "200 feet minimum" from a positioned attack engine and proceeds to a static water source. The engine company crew operates to secure a water supply from the static source via drafting. The engine supplies a minimum inlet pressure of 50 psi to the attack engine. Time starts when engine arrives at the attack engine.

Key Tasks:

1. All firefighters don structure PPE according to Agency and industry standard. Crewmembers of the supply engine do not have to wear SCBAs for this evolution.
2. All applicable industry safety standards, laws, and practices are followed.
3. Company officer is ultimately responsible for the engine positioning at the water source.
4. Company officer clearly communicates tasks and goal to crew. The officer is ultimately responsible for the expeditious and fluid movements of the crew.
5. Engine backs/drives to attack engine. Attack engine engineer grasps bight of supply line and signals supply engine to proceed to water source.
6. Supply line connection is made to the largest intake of attack engine
7. Engineer removes external valve to main suction intake on applicable engines, ensure that tank to pump valve is closed.
8. Engines with dual-stage pumps have transfer valve in "**VOLUME**" position.
9. Crew works to deploy hard suction into static water source and into the main pump intake. Hard suction fittings are spanner tight with intact gaskets.
10. Hard suction is supported and tied with utility rope to point on engine of good structural integrity (e.g., fixed piping of deluge monitor). The rope captures the lower side of the midpoint and strainer coupling points to relieve strain.
11. Suction hose inlet (strainer) maintains a two-foot clearance from walls, bottom, and surface of water to avoid development of vortices and eddies.
12. Primer is operated not to exceed time allotted for flow rating of pump.
13. Supply line is charged while maintaining prime.

Additional Information:

Once hard suction has been connected and introduced into water source, tasks for the firefighter and company officer is minimized. These personnel are now available for re-assignment. Prior to leaving engine, these crewmembers should don SCBAs and bring requested equipment to next assignment.

The entire supply engine crew will be needed at the water source to complete the drafting evolution.

Under no circumstances shall personnel secure supply line by stepping on it. All excess hose shall be in front of personnel grasping the supply line.

References:

IFSTA Essentials
IFSTA Pumping Apparatus DRIVER/OPERATOR Handbook

Evolution: Wildland Water Supply; Type I Shuttle to Type III Engine

Time Standard: 5:00 Minutes, Type I pumping progressive hoselay

Description: The crew of a Type III engine has begun a progressive hoselay from a roadside anchor point. A Type I engine is assigned to take over the pumping and supply of the hoselay so that the Type III engine is available to proceed to a mobile attack assignment. During the process, the Type I engine secures a hydrant supply if available.

Key Tasks:

1. All firefighters don wildland PPE and web gear/belts according to Agency and industry standard.*
2. All applicable industry safety ordinances and practices are followed. **(LACES, 10 Standard Fire Orders, 18 Watch Out Situations)**
3. Engine is placed in position to avoid exposure of crew and apparatus to fire, provide for passage of other apparatus, and be accessible to the gated wye on Type III progressive hoselay
4. Type I forestry preconnect is deployed and connected to gated wye on Type III hoselay
5. Type I engineer determines progressive hoselay engine pressure and charges Type I feeder to progressive
6. Wye is manipulated so Type I is supplying hoselay and Type III supply is shut off. There must be no disruption of water flow or nozzle pressure.
7. Hydrant water supply is secured for the Type I with 2.5 inch hose and all appropriate adapters and appliances**

Additional Information:

Starting Engine Pressures: 125 psi, flat terrain; 140 psi, slopes

*Crewmembers shall don all wildland PPE (exception; web gear/belts) prior to arrival at the evolution. This diminishes reflex time once a company arrives at the scene.

**It is strongly suggested that the 2.5-inch supply line be utilized

Evolution: Rural Water Supply, Engine and Water Tender Shuttle

Time Standard: XXX Minutes, water to nozzle at appropriate pressure, flow, pattern and water supply achieved to engine from tender

Description: The initial attack engine company and water tender proceed to the remote location of the fire and position for the optimum tactical and water supply advantage. The engine crew begins fire attack on tank supply while the remaining personnel work to provide a water supply to the engine via the water tender. **There is no hydrant supply available in the vicinity.** Time starts when the engine sets the parking brake

Key Tasks:

1. All firefighters don structure PPE according to Agency and industry standard. Company officer and firefighter must be wearing SCBA by the time they are beginning to deploy the preconnected hoseline. **The attack crew must breathe SCBA air for this evolution.**
2. All applicable industry safety standards, laws, and practices are followed.
3. The company officers are ultimately responsible for the engine and water tender positioning at the fire scene. The water tender is placed as close as possible to the pumping engine to minimize friction losses in supply line(s).
4. The company officers clearly communicate tasks and goals to the crews. The officer is ultimately responsible for the expeditious and fluid movements of the crew.
5. Initial priority is to begin fire attack on the involved structure by deploying appropriate attack line. The company officer and firefighter staff the line and flow water at the designated rate and pattern on the fire.
6. Engineer engages pump, chocks apparatus wheels, sets appropriate engine pressure, sets relief valve, and assures engine radio is on the incident tactical net and is able to be monitored from exterior of cab. Class "A" foam supplied as indicated by agency for the fire attack.
7. Water tender operator establishes supply line usung the largest diameter line available. A clappered Siamese should be used for future water shuttle operations.
8. Engine maintains a full tank as soon as water tender supply is achieved
9. I/C is advised by engineer of water level milestones

Additional Information:

Crewmembers shall don structure PPE prior to response. If the firefighter dons SCBA in the cab (enclosed cab models), all efforts must be to do this from the sitting position if the engine is still moving.

The short supply line hose or 2.5-inch hose may be used to connect the water tender and engine. The largest diameter hose, discharges, and suctions should be utilized to deliver maximum water flows with minimal friction losses.

Once the water supply is established into the engine, the Type I engineer may be released to assist in other operations if the Engine pump panel can be easily monitored by the water tender engineer (if the two units are in close proximity).

As soon as possible, a supply line should be established from the water tender into an area that can be easily accessed by other tenders shuttling water. The connection to the water tender shall be through the largest suction available to reduce filling times. Once again, the largest diameter supply line as feasibly possible should be utilized with consideration given to friction loss from excessive distance and blockage of access by hose. Additional engines as necessary need to be used to complete this phase.

Required engine pressure is based on CQ^2L formula or on current pump pressure calculator/chart in engineer's compartment.

References:

IFSTA Essentials
IFSTA Pumping Apparatus DRIVER/OPERATOR Handbook

Evolution: Portable Tank Deployment with Water Tender

Time Standard: XXX Minutes, Portable Tank Full, Ready to Supply Water

Description: The crew of the water tender is assigned to set up a portable tank used for filling nearby engines. The tank is located so that other traffic can pass and so that tenders and engines have easy access for filling. The tender's portable pump* is used as the means to complete the fill operation of other apparatus. Time starts when the water tender sets the parking brake.

Key Tasks:

1. All firefighters don appropriate PPE according to Agency and industry standard.
2. All applicable industry safety ordinances and practices are followed.
3. Water tender is positioned so that traffic can pass and portable tank can be filled.
4. Visually inspect deployment area for sharp or protruding objects that may damage the tank. A salvage cover is placed on the ground over the chosen deployment area. Try to avoid slopes whenever possible.
5. Portable tank is placed on ground with drain or sleeve placed toward area where filling will take place, downgrade if any slope exists.
6. Fully expand the tank and ensure that drain is secure
7. Portable tank is filled from tender just to the point before it overflows by using the rear or side dump chutes, hard suction, or the 30-degree elbow fitting.
8. Once the water tender is correctly spotted, mark the position of the left rear tire on the ground for future reference.
9. Portable pump is connected to 2.5-inch gate valve with hard suction and primed
10. A section of 1.5-inch filler line is attached to pump discharge via gated wye for filling apparatus.

Additional Information:

Keep the filler hose lengths from portable pump to engine short to avoid excessive friction loss.

*Alternatives to the portable pump include the Floto-pump and engines drafting from the portable tank.

Crewmembers shall don all PPE prior to response. This diminishes reflex time once a company arrives at the scene.

References:

IFSTA Essentials
IFSTA Pumping Apparatus DRIVER/OPERATOR Handbook
CAL FIRE 4300 Manual

Evolution: Portable Pump

Time: XXX Minutes, Portable pump primed and flowing water

Description: A portable pump is deployed near a static water source and flows water. Time starts when the engine sets the parking brake.

Key Tasks:

1. Firefighters don all wildland fire PPE according to Agency and industry standard.
2. Company officer clearly communicates tasks and goal to crew. The officer is ultimately responsible for the expeditious and fluid movements of the crew.
3. Firefighters wait until the apparatus comes to a complete stop and brakes are set before exiting the cab.
4. Firefighters work together and remove the portable pump with kit from the engine or water tender and deploy it near the water source.
5. Connect hard suction with strainer to intake and place it in the water.
6. Connect gated wye with appropriate fittings to discharge side of the pump.
7. Connect filler hose from gated wye to engine tank fill.
8. Prime pump (fill pump chamber with water or use siphon valve)
9. Start engine and slowly charge the hose line.
10. Increase throttle speed for desired GPM discharge.

Additional Information:

If pumping near a natural water source (creek, lake, pond, river, etc.) place portable pump in the catchall to prevent fuel spills.

Operating the pump dry will destroy the pump seal. Be sure the pump chamber is filled with water before starting the engine.

Pump output will decrease the further the pump is placed from the water source.

<u>Honda Pump WH20X:</u>

Max Pressure: 71psi
Max GPM: 132 GPM
Max Suction: 26.2 Feet

Evolution: 1.75-Inch Pre-Connect Exterior Attack, Supply Line

Time Standard: XXX Minutes, water to nozzle at appropriate pressure, flow, pattern

Description: The initial attack engine company lays 200 feet of supply line from the designated hydrant and proceeds to the fire. The engine stops at a point of safe tactical advantage and deploys 1.75-inch pre-connected line. The hose is stretched and staffed with company officer and firefighter that flow water at the designated target. Time starts when engine stops at the hydrant.

Key Tasks:

1. All firefighters don structure PPE according to Agency and industry standard. Company officer and firefighter must be wearing SCBAs by the time they are beginning to deploy the preconnected hoseline. The attack crew must breathe SCBA air for this evolution.
2. All applicable industry safety standards, laws, and practices are followed.
3. Company officer selects appropriate hydrant and is ultimately responsible for the engine positioning at the fire scene.
4. Company officer clearly communicates tasks and goal to crew. The officer is ultimately responsible for the expeditious and fluid movements of the crew.
5. Supply line connection is completed to designated hydrant in a manner that maximizes the flow in the supply line.
6. Engineer is responsible for completing the supply line connection to the engine.
7. Engineer must maintain an adequate and uninterrupted water supply to the attack line.
8. Crew works to deploy hoseline from the supply bed to the fire with consideration given to collapse zone, electrical wires, kinks, and any other additional issues.
9. The company officer and firefighter staff the line and flow water at the designated rate and pattern on the fire.

Additional Information:

Crewmembers shall don structure PPE prior to arrival at drill scene. It is the company officer's discretion whether the firefighter will don SCBA prior to dismounting (enclosed cab engines) for the hydrant connection. If the firefighter dons SCBA in the cab prior to making hydrant connection, all efforts must be done from the sitting position while the engine is moving.

Before the 1.75-inch pre-connect line is pulled from the supply bed, the company officer should evaluate the area to assure the pre-connect will reach. **If the goal is not within the length of your pre-connect, this is the wrong evolution.**

Required engine pressure is based on CQ^2L formula with C = 15.5 (C factors for 1.75 inch line respectively) or on current pump pressure calculator/chart in engineer's compartment.

References:

IFSTA Essentials
IFSTA Pumping Apparatus DRIVER/OPERATOR Handbook

Evolution: 1.75 Pre-Connect Interior Attack, Supply Line

Time Standard: XXX Minutes, supply line and water to nozzle at appropriate pressure, flow, pattern with fire attack initiated.

Description: The initial attack engine company lays a supply line from the designated hydrant and proceeds to the fire. The engine company stops at a point of safe tactical advantage and deploys the 1.75 inch pre-connect hoseline. The hose is staffed with the company officer and firefighter that initiate an interior attack on a fire. Time begins when the engine arrives at the hydrant.

Key Tasks:

1. All firefighters don structure PPE according to Agency and industry standard. Company officer and firefighter must be wearing SCBAs by the time they are beginning to deploy the 1.75-inch pre-connected hoseline. **The attack crew must ultimately breathe SCBA air for this evolution.**
2. All applicable industry safety standards, laws, and practices are followed.
3. Company officer selects appropriate hydrant and is ultimately responsible for the engine positioning at the fire scene.
4. Company officer clearly communicates tasks and goal to crew. The officer is ultimately responsible for the expeditious and fluid movements of the crew.
5. Engineer is responsible for completing the supply line connection to the engine. Maintain an adequate and uninterrupted water supply to the attack line.
6. Crew works to stretch 1.75 inch pre-connect hoseline and equipment to the designated target.
7. Crews enter rooms using doors/doorways to their best advantage as heat shields and stay low to the floor during attack.
8. Appropriate forcible entry tool is brought to the point of entrance along with the means to block the entry door in "open" position. Crew must have radios, flashlights, and TIC if available.
9. Back up hoseline is stretched from attack engine to proximity of entry point but not charged (by the pumping engineer as priorities allow)
10. The company officer and firefighter staff the attack line and flow water at the designated rate and pattern on the fire.

Additional Information and References:

Crewmembers shall don structure PPE prior to response. If the firefighter dons SCBA in the cab (enclosed cab models), all efforts must be to do this from the sitting position if the engine is still moving.

Required engine pressure is based on CQ^2L formula with C = 15.5 (C factors for 1.75 inch line respectively) or on current pump pressure calculator/chart in engineer's compartment.

Company officers are urged to avoid staffing the "nozzle" position on the hose and to remain in a position where they can assess the fire and tactics.

Additional equipment should be deployed (by the pumping engineer as priorities allow) including a blower near the point of entrance (not operated unless by order), ceiling/rubbish hook, and the rehab mat placed in a spot clear of smoke and heat.

References:

IFSTA Essentials
IFSTA Pumping Apparatus DRIVER/OPERATOR Handbook

Evolution: 1.75-Inch Pre-Connect Attack, Close Hydrant Supply Line

Time Standard: XXX Minutes, supply line and water to nozzle at appropriate pressure, flow, pattern.

Description: The engine stops at a point of safe tactical advantage that is less than 100 feet from a hydrant. The pre-connect hose is immediately stretched, charged, and staffed with company officer and firefighter who flow water at the designated target. The engineer establishes the supply line. Time starts when engine stops at the hydrant.

Key Tasks:

1. All firefighters don structure PPE according to Agency and industry standard. Company officer and firefighter must be wearing SCBAs by the time they are beginning to deploy the 1.75-inch pre-connected hoseline. **The attack crew must ultimately breathe SCBA air for this evolution.**
2. All applicable industry safety standards, laws, and practices are followed.
3. Company officer selects appropriate hydrant and is ultimately responsible for the engine positioning at the fire scene.
4. Company officer clearly communicates tasks and goal to crew. The officer is ultimately responsible for the expeditious and fluid movements of the crew.
5. Crew works to stretch 1.75 inch pre-connect hoseline to the designated target.
6. The Engineer is primarily responsible for establishing a supply line to the nearby hydrant.
7. Engineer must maintain an adequate and uninterrupted water supply to the attack line.
8. The company officer and firefighter staff the attack line and flow water at the designated rate and pattern on the fire.

Additional Information:

Crewmembers shall don structure PPE prior to response. If the firefighter dons SCBA in the cab (enclosed cab models), all efforts must be to do this from the sitting position if the engine is still moving.

Required engine pressure is based on CQ^2L formula with C = 15.5 (C factors for 1.75 inch line respectively) or on current pump pressure calculator/chart in engineer's compartment.

References:

IFSTA Essentials
IFSTA Pumping Apparatus DRIVER/OPERATOR Handbook

Evolution: 2.5-Inch Pre-Connect; Exterior Attack, Supply Line

Time Standard: XXX Minutes, 200 feet supply line, water to nozzle at appropriate pressure, flow, pattern

Description: The initial attack engine company lays a supply line from the designated hydrant and proceeds to the fire. The engine stops at a point of safe tactical advantage and deploys 2.5-inch preconnected line. The 2.5-inch hose is stretched and staffed with the company officer and firefighter who flow water onto the designated target. Time starts when the engine stops at the hydrant.

Key Tasks:

1. All firefighters don structure PPE according to Agency and industry standard. Company officer and firefighter must be wearing SCBAs by the time they are beginning to deploy the 2.5-inch preconnected hoseline. The crew does not have to breathe SCBA air for this evolution.
2. All applicable industry safety standards, laws, and practices are followed.
3. Company officer selects appropriate hydrant and is ultimately responsible for the engine positioning at the fire scene.
4. Company officer clearly communicates tasks and goal to crew. The officer is ultimately responsible for the expeditious and fluid movements of the crew.
5. Supply line connection is completed to designated hydrant in a manner that maximizes the flow in the supply line.
6. Engineer engages pump, chocks apparatus wheels, sets appropriate engine pressure, sets relief valve, and assures engine radio is on the incident tactical net and is able to be monitored from exterior of cab. Class "A" foam supplied as indicated by agency.
7. Engineer must maintain an adequate and uninterrupted water supply to the attack line.
8. Crew works to deploy 2.5-inch pre-connected hoseline to the fire with consideration given to collapse zone, electrical wires, and any other additional hazards.
9. The company officer and firefighter staff the line and flow water at the designated rate and pattern on the fire.

Additional Information:

Crewmembers shall don structure PPE prior to response. It is the company officer's discretion whether the firefighter will don SCBA prior to dismounting (enclosed cab engines) for the hydrant connection. If the firefighter dons SCBA in the cab prior to making hydrant connection, all efforts must be done from the sitting position while the engine is moving.

Before the 2.5-inch preconnect line is pulled, the company officer should recon the area to assure the pre-connect will reach. If the goal is not within the length of the pre-connect, this is the wrong evolution!

Required engine pressure is based on CQ^2L formula with C = 2 (2.5 inch hose C factor) or on current pump pressure calculator/chart in engineer's compartment.

References:

IFSTA Essentials
IFSTA Pumping Apparatus DRIVER/OPERATOR Handbook

Evolution: 2.5-Inch Supply Bed Exterior Attack, Working Line Drag/Shoulder Load and Advance, Supply Line

Time Standard: XXX Minutes for 300 foot 2.5-inch (or similar diameter) hose deployment, 200 feet Supply Line, Water to nozzle at appropriate pressure, flow, and pattern. Time starts when the engine stops at the hydrant.

Description: The initial attack engine company lays a supply line from the designated hydrant and proceeds to the fire. The engine company stops at a point of safe tactical advantage and deploys a 2.5-inch or appropriate size line with nozzle from the supply bed using the working line drag/shoulder load and advance technique. The hoseline is stretched 300 feet and staffed with the company officer and firefighter that flow water onto the designated target.

Key Tasks:

1. All firefighters don structure PPE according to Agency and industry standard. Company officer and firefighter must be wearing SCBA by the time they are beginning to deploy the attack line. The crew does not have to breathe SCBA air for this evolution.
2. All applicable industry safety standards, laws, and practices are followed.
3. Company officer selects appropriate hydrant and is ultimately responsible for the engine positioning at the fire scene.
4. Company officer clearly communicates tasks and goal to crew. The officer is ultimately responsible for the expeditious and fluid movements of the crew.
5. Supply line connection is completed to designated hydrant in a manner that maximizes the flow in the supply line.
6. Engineer engages pump, chocks apparatus wheels, sets appropriate engine pressure, sets relief valve, and assures engine radio is on the incident tactical net and is able to be monitored from exterior of cab. Class "A" foam supplied as indicated by agency.
7. Engineer maintains an adequate and uninterrupted water supply to attack line
8. Crew works to expeditiously deploy the 2.5-inch or similar hoseline from the supply bed to the fire using the working line drag/shoulder load technique with consideration given to collapse zone, electrical wires, and any other additional hazards
9. The company officer and firefighter staff the line and flow water at the designated rate and pattern on the fire.

Additional Information:

Crewmembers shall don structure PPE prior to response. It is the company officer's discretion whether the firefighter will don SCBA prior to dismounting (enclosed cab engines) for the hydrant connection. If the firefighter dons SCBA in the cab prior to making hydrant connection, all efforts must be done from the sitting position while the engine is moving.

Before the attack line is pulled from the supply bed, the company officer should evaluate the area to approximate how much line will be needed. Greater lengths of line require additional personnel to assist in the pull.

Crewmembers should remember to attach 2.5-inch nozzle to supply bed hose before deploying. Similarly, the hose will have to be uncoupled and attached to a pump discharge once the line has been stretched.

Required engine pressure is based on CQ^2L formula with C = 2 (2.5 inch hose C factor) or on current pump pressure calculator/chart in engineer's compartment

References:

IFSTA Essentials
IFSTA Pumping Apparatus DRIVER/OPERATOR Handbook

Evolution: Apartment Extension, LDH Supply

Time Standard: XXX Minutes for 300 foot 2.5-inch hose deployment with one gated wye bundle/midrise pack, 200 feet LDH
Water to nozzle at appropriate pressure, flow, pattern

Description: The initial attack engine company lays a supply line from the designated hydrant and proceeds to the fire. The engine company stops at a point of safe tactical advantage and deploys 2.5-inch line with nozzle from the supply bed using the working line/Shoulder Load and advance drag technique. The crew connects one gated wye bundle/midrise pack to the end of the 2.5-inch line and advances.

Key Tasks:

1. All firefighters don structure PPE according to Agency and industry standard. Company officer and firefighter must be wearing SCBAs by the time they are beginning to deploy the 2.5-inch hoseline. The crew must be breathing air via SCBA mask by the time they are beginning to flow water from the bundle/midrise pack.
2. All applicable industry safety standards, laws, and practices are followed.
3. Company officer selects appropriate hydrant and is ultimately responsible for the engine positioning at the fire scene.
4. Company officer clearly communicates tasks and goal to crew. The officer is ultimately responsible for the expeditious and fluid movements of the crew.
5. Supply line connection is completed to designated hydrant in a manner that maximizes the flow in the supply line.
6. Engineer engages pump, chocks apparatus wheels, sets appropriate engine pressure, sets relief valve, and assures engine radio is on the incident tactical net and is able to be monitored from exterior of cab. Class "A" foam supplied as indicated by agency.
7. Engineer maintains an adequate and uninterrupted water supply to attack line
8. The crew uses a combination of shoulder loads, working line drags to navigate corners, stairs, and obstructions to reach the target with approximately 50 feet of 2.5-inch hose remaining
9. Crew deploys the bundles/midrise packs and attaches them to the 2.5-inch hoseline using a gated wye.
10. The company officer and firefighter staff the line and flow water at the designated rate and pattern on the fire.

Additional Information:

Crewmembers shall don structure PPE prior to response. It is the company officer's discretion whether the firefighter will don SCBA prior to dismounting (enclosed cab engines) for the hydrant connection. If the firefighter dons SCBA in the cab prior to making hydrant connection, all efforts must be done from the sitting position while the engine is moving.

Before the 2.5-inch attack line is pulled from the supply bed, the company officer should evaluate the area to approximate how much line will be needed. Greater lengths of line or obstructions require additional personnel to assist in the pull.

The hose will have to be uncoupled and attached to a pump discharge once the line has been stretched.

Hoselines shall be secured during all above ground operations.

Required engine pressure is based on CQ^2L formula or on current pump pressure calculator/chart in engineer's compartment.

References:

IFSTA *Essentials*
IFSTA Pumping Apparatus DRIVER/OPERATOR Handbook

Evolution: Sprinkler Connection, Supply Line, Distant Hydrant

Time Standard: XXX Minutes, 200 feet Supply Line, water to system at appropriate pressure

Description: The engine company lays a supply line from the designated remote hydrant and proceeds to the area of the fire department connection (FDC). The engine stops at a point of safe tactical advantage and connects a minimum of two 2.5-inch lines to the FDC (some FDCs have more than two inlets). Time starts when the engine stops at the hydrant.

Key Tasks:

1. All firefighters don structure PPE according to Agency and industry standard. Company officer and firefighter do not have to don SCBAs for this evolution.
2. All applicable industry safety standards, laws, and practices are followed.
3. Company officer selects appropriate hydrant and is ultimately responsible for the engine positioning at the fire scene.
4. Company officer clearly communicates tasks and goal to crew. The officer is ultimately responsible for the expeditious and fluid movements of the crew.
5. LDH supply line connection is completed to designated hydrant in a manner that maximizes the flow in the supply line.
6. Engineer engages pump, chocks apparatus wheels, sets appropriate engine pressure, sets relief valve, and assures engine radio is on the incident tactical net and is able to be monitored from exterior of cab. Class "A" foam is not pumped into the sprinkler system. Transfer valve on two-stage pumps are to be placed in "**PRESSURE**."
7. Engineer maintains an adequate and uninterrupted water supply to system.
8. Crew works to deploy 2.5-inch or larger hoseline(s) from the supply bed to the FDC
9. The hose is charged as soon as one line is completely connected.

Additional Information:

The first crewmember to reach the FDC (typically the company officer) shall bring tools to open the caps. Caps may be frangible and only require striking to break off. Other caps require an adjustable wrench or hydrant spanner to open. The inside should be inspected for clapper operation and debris.

Class "A" foam is not pumped into the system to assure against contamination of the domestic water supply.

Whenever possible, the company officers should choose hydrants that are not in use for other suppression operations or are the last in a "dead-end" water main.

Beginning water supply pressure (working fire confirmed) to FDC is 150 psi.

References:

***IFSTA** Essentials*
IFSTA Pumping Apparatus DRIVER/OPERATOR Handbook

Evolution: Standpipe Connection, Close Hydrant, Fire Attack

Time Standard: XXX Minutes, Short Supply (100 feet or less) with water into the system, Bundles/Midrise packs deployed

Description: The engine company proceeds to the location of the fire building which is in close proximity to a hydrant (less than 100 ft.) and the fire department connection (FDC). The company officer and firefighter deploy initial attack hose and forcible entry tools to the floor below the fire. A water supply to the FDC/standpipe is achieved with the nearby hydrant. Time starts when the engines sets the parking brake.

Key Tasks:

1. All firefighters don structure PPE according to Agency and industry standard. Company officer and firefighter from engine must be wearing SCBA by the time they leave the engine to enter the fire building. The attack crew must breathe SCBA air for this evolution prior to entering the door to the fire floor.
2. All applicable industry safety standards, laws, and practices are followed.
3. Company officer selects appropriate hydrant and is ultimately responsible for the engine positioning at the fire scene.
4. Company officer clearly communicates tasks and goal to crew. The officer is ultimately responsible for the expeditious and fluid movements of the crew and to determine that the engineer can complete the FDC evolution unassisted.
5. Supply line connection is completed to designated hydrant in a manner that maximizes the flow from the hydrant to the engine.
6. Engineer engages pump, chocks apparatus wheels, sets appropriate engine pressure, sets relief valve, and assures engine radio is on the incident tactical net and is able to be monitored from exterior of cab. **Class "A" foam is not pumped into the standpipe system**.
7. Engineer maintains an adequate and uninterrupted water supply to system.
8. Engineer approximates distance from nearest discharge to FDC and deploys corresponding 2.5 inch or larger lines from supply bed.
9. The hose is charged as soon as the first hose is connected to the FDC additional lines will be added as time permits.
10. Fire attack crew brings minimum of 2.5 inch to 1.5 inch gated wye, a 2.5" or 3" filler hose, bundles/ midrise packs, forcible entry tools, and a TIC (if available) to floor below fire.
11. 2.5 by 1.5 inch gated wye is connected directly to or via filler hose to standpipe gate valve and charged.
12. Bundles/Midrise packs are connected to the 2.5 to 1.5 inch gated wye and deployed.
13. The company officer and firefighter staff the line and flow water at the designated rate and pattern on the fire.

Additional Information:

The engineer shall bring tools to open the caps of the FDC. Caps may be frangible and only require striking to break off. Other caps require an adjustable wrench or hydrant spanner to open. The inside should be inspected for clapper operation and debris.

Required engine pressure is based on CQ^2L formula or on current pump pressure calculator/chart in engineer's compartment.

The engineer will typically be within 100 feet of the FDC for this evolution. The engineer can pull the first hundred feet of 2.5-inch or larger supply line (both bights) and disconnect the coupling at that point. It is a simple matter to grasp the male coupling of the deployed hundred feet and the male coupling from the hose remaining in the bed and proceed to the FDC. This way both lines may be connected at once, thus eliminating trips back and forth to the engine.

References:

IFSTA Essentials
IFSTA Pumping Apparatus DRIVER/OPERATOR Handbook

Evolution: Forward Lay Mounted Master Stream Attack

Time Standard: XXX Minutes, supply line and water to nozzle at appropriate pressure, flow, pattern. 200 feet LDH

Description: The engine company stops at a selected hydrant and completes a forward lay to a point of tactical advantage. The crew deploys a stream of water on the fire from the mounted deluge gun. Time starts when the engine stops at the hydrant.

Key Tasks:

1. All firefighters don structure PPE according to Agency and industry standard. Company officer and firefighter must be wearing SCBAs by the time they are ready to deploy water from the nozzle. The crew does not have to breathe SCBA air for this evolution.
2. All applicable industry safety standards, laws, and practices are followed.
3. Company officer selects appropriate hydrant and is ultimately responsible for the engine positioning at the fire scene.
4. Company officer clearly communicates tasks and goal to crew. The officer is ultimately responsible for the expeditious and fluid movements of the crew.
5. Supply line connection is completed to designated hydrant in a manner that maximizes the flow in the supply line.
6. Engineer engages pump, chocks apparatus wheels, sets appropriate engine pressure, sets relief valve, and assures engine radio is on the incident tactical net and is able to be monitored from exterior of cab.
7. Two stage pumps have transfer valves placed in "**VOLUME**."
8. The engineer will make use of largest and most direct pump suction inlet possible.
9. Firefighter directs the stream to the designated fire.

Additional Information:

Crewmembers shall don structure PPE prior to response. It is the company officer's discretion whether the firefighter will don SCBA prior to dismounting (enclosed cab engines) for the hydrant connection. If the firefighter dons SCBA in the cab prior to making hydrant connection, all efforts must be done from the sitting position while the engine is moving.

Required engine pressure is based on a nominal pump plumbing friction loss of 20 psi and appropriate master stream nozzle pressures (100 psi combination tip; 80 psi smooth bore)

Company officers are urged to avoid staffing the "nozzle" position on the deluge gun and to remain in a position where they can assess the fire and tactics.

Officers should consider power lines, collapse zones (rule of thumb is 1.5 times the height of the building), stream reach, penetration, and tactical objectives when positioning the engine.

References:

IFSTA Essentials
IFSTA Pumping Apparatus DRIVER/OPERATOR Handbook

Evolution: Extension Ladder, Two Person, Low Shoulder Carry, Beam Raise

Time Standard: XXX Minutes, ladder tip to appropriate location, halyard tied

Description: A Type I engine is staged near the fire building. A two-person crew removes the extension ladder and deploys it to an assigned location. Time starts when the firefighters touch the ladder.

Key Tasks:

1. All firefighters don structure PPE according to Agency and industry standard. All crewmembers are wearing SCBAs but do not have to don masks.
2. All applicable industry safety standards, laws, and practices are followed.
3. Lead firefighter is ultimately responsible for the ladder positioning. Every attempt shall be made to position the ladder correctly with the first raise and positioning.
4. Lead firefighter clearly communicates tasks and goal to crew. The lead firefighter is ultimately responsible for the expeditious and fluid movements of the crew.
5. Roof ladder is removed from the engine and placed on the ground to avoid causing a tripping hazard and exposure to heat (away from exhaust from engine)
6. Ladder is removed from apparatus and carried using the low shoulder method
7. In general, the ladder is led to the scene butt first
8. Placement and commands are delivered by the firefighter at the butt.
9. Ladder is raised to assigned position at an angle to the structure that is approximately 75 degrees with the fly section ultimately facing away from the building
10. Halyard is tied using a clove hitch and successive half hitches. The halyard is taught and excess line is avoided to remove any potential tripping hazards
11. Ladder is leveled so that equal loading will be placed on both beams and transmitted to the ground
12. When able, the tip of the ladder will be secured using means such as window sills or tying the tip of the ladder to a nearby stable object
13. One member of the crew will be assigned to stabilize the base of the ladder whenever it is mounted and the tip is unsecured. When possible, the ladder will be secured at both the tip and the base (butt).

Additional Information:

Ladders should be placed considering several elements: strong points of the building (ex., corners, hips, valleys, pilasters); access from the unburned side of the building; avoidance of electrical hazards; avoidance of laddering over windows or blocking door access; multiple points of ingress/egress using ladders.

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Halyards shall be tied using a clove hitch and successive half hitches to secure the clove and to remove excess halyard that could form a tripping hazard. The clove hitch should "capture" the halyard that is travelling up the ladder so that it is secure and taught.

Halyards shall be tied before the ladder is adjusted against a building (pivoted or moved laterally) to avoid the tripping hazard associated with excess line dragging on the ground.

Ladders are typically secured at the base by one firefighter under the ladder holding the rungs and facing forward or downward. Alternative methods include tying the base of the ladder into the building. In the event of a rescue, it is helpful if the butt firefighter secures the base from the side away from the building. In this case, it is highly desirable for that firefighter to observe what is occurring at the tip.

Clear commands are a key to efficient and fluid ladder raising movements. Personnel should use preparatory and action commands for the major components of the raise. Example:

"Prepare to remove" at the apparatus is the signal for personnel to position themselves for receiving the ladder. This is followed by "remove ladder" which is the action step. Simple directional commands such as move right, left, raise fly, or stop do not require preparatory statements because there is nothing for the crew to actually prepare for.

References:

IFSTA Essentials

Evolution: Extension Ladder, Three Person, Flat Raise

Time Standard: XXX Minutes, ladder tip to appropriate location, halyard tied

Description: The squad, truck or engine is staged near the fire building. A three-person crew removes the extension ladder from the apparatus and deploys it to an assigned location. Time begins when the firefighters touch the ladder.

Key Tasks:

1. All firefighters don structure PPE according to Agency and industry standard. All crewmembers are wearing SCBAs but do not have to don masks.
2. All applicable industry safety standards, laws, and practices are followed.
3. Lead firefighter is ultimately responsible for the ladder positioning. Every attempt shall be made to position the ladder correctly with the first raise and positioning.
4. Lead firefighter clearly communicates tasks and goal to crew. The lead firefighter is ultimately responsible for the expeditious and fluid movements of the crew.
5. Ladder is removed from apparatus and carried using the flat, shoulder carry
6. In general, the ladder is led to the scene butt first.
7. Placement and commands are delivered by the firefighter at the butt. This is generally the position of the officer or lead firefighter.
8. Ladder is raised to assigned position at an angle to the structure that is approximately 75 degrees with the fly section ultimately facing away from the building.
9. Halyard is tied using a clove hitch and successive half hitches. The halyard is taught and excess line is avoided to remove any potential tripping hazards.
10. Ladder is leveled so that equal loading will be placed on both beams and transmitted to the ground.
11. When able, the tip of the ladder will be secured using means such as window sills or tying the tip of the ladder to a nearby stable object
12. One member of the crew will be assigned to stabilize the base of the ladder whenever it is mounted and the tip is unsecured. When possible, the ladder will be secured at both the tip and the base (butt).

Additional Information:

Ladders should be placed considering several elements: strong points of the building (ex., corners, hips, valleys, pilasters); access from the unburned side of the building; avoidance of electrical hazards; avoidance of laddering over windows or blocking door access; multiple points of ingress/egress using ladders.

Halyards shall be tied using a clove hitch and successive half hitches to secure the clove and to remove excess halyard that could form a tripping hazard. The clove hitch should “capture” the halyard that is travelling up the ladder so that it is secure and taught.

Halyards shall be tied before the ladder is adjusted against a building (pivoted or moved laterally) to avoid the tripping hazard associated with excess line dragging on the ground.

Ladders are typically secured at the base by one firefighter under the ladder holding the rungs and facing forward or downward. Alternative methods include tying the base of the ladder into the building. In the event of a rescue, it is helpful if the butt firefighter secures the base from the side away from the building. In this case, it is highly desirable for that firefighter to observe what is occurring at the tip.

Clear commands are a key to efficient and fluid ladder raising movements. Personnel should use preparatory and action commands for the major components of the raise.

Example:

"Prepare to remove" at the apparatus is the signal for personnel to position themselves for receiving the ladder. This is followed by "remove ladder" which is the action step. Simple directional commands such as move right, left, raise fly, or stop do not require preparatory statements because there is nothing for the crew to actually prepare for.

Reference:

IFSTA Essentials

Evolution: Residential Vertical Ventilation

Time Standard: XXX Minutes, minimum 4 foot x 4 foot square hole cut and louvered

Description: A Type I engine, squad, or truck is staged near the simulated fire building. The crew works to access the roof with two means of identified egress, operate all appropriate tools, and achieve a vertical ventilation hole. Time starts when the apparatus parking brake is engaged.

Key Tasks:

1. All firefighters don structure PPE and truck belts according to Agency and industry standard. All crewmembers are wearing SCBAs and must be breathing air from masks by the time they access the roof deck.
2. All applicable industry safety standards, laws, and practices are followed.
3. Company officer clearly communicates tasks and goal to crew. The officer is ultimately responsible for the expeditious and fluid movements of the crew.
4. Minimum of two crew members access the roof with the remaining personnel to secure ladder base, monitor progress, and shuttle equipment.
5. Minimum equipment to the roof includes chainsaw, axe, and rubbish hook.
6. Ladder(s) raised according current adopted Agency standard.
7. Firefighters traverse strong portions of roof (ex., ridges, beams, hips, valleys, and roof perimeter)
8. Roof is "sounded" using tool such as rubbish hook as crew travels to ventilation point.
9. Inspection cut is completed (small heat hole or kerf cut) to determine heat/smoke production.
10. Crew proceeds with cuts working methodically and continuously from the burned to the unburned area of the building with consideration to wind direction
11. Initial cut made is a head cut (parallel and closest to the ridge) to determine rafter spacing and location.
12. Following cuts should be farthest away working back to your means of egress.
13. Sheathing is louvered. Decking that detaches is to be placed to the side and not passed through the hole or side of roof.
14. Punch a hole through the ceiling material using a rubbish hook.
15. Crewmembers immediately exit the area by travelling via strong sections of the roof deck to a ladder.

Additional Information:

Ventilation should be coordinated with interior firefighting operations.

A roof ladder shall be taken to roofs with slopes that will compromise footing due to roof covering, slope, or debris on roof.

To expedite, two crewmembers may carry the 24-foot extension ladder/14 foot roof ladder ensemble from a Type I engine to the building via the low shoulder carry method.

Chainsaws should be started and verified for operation prior to accessing roof. Chain saws engines must not be running while climbing ladders.

Reference:

IFSTA Essentials

Evolution: Commercial Vertical Ventilation

Time: XXX Minutes; Minimum 4 foot by 8 foot ventilation hole

Evolution: A Type I engine, squad, or truck is staged near the simulated commercial fire building. The crew works to access the roof with two means of identified egress, operate all appropriate tools, and achieve a vertical ventilation hole. Time begins when the apparatus engages parking brakes.

Key Tasks:

1. All firefighters don structure PPE and truck belts according to Agency and industry standard. All crewmembers are wearing SCBA and must be breathing air from masks by the time they access the roof deck.
2. All applicable industry safety standards, laws, and practices are followed.
3. The Company Officer communicates tasks and goal to crew. The officer is ultimately responsible for the expeditious and fluid movements of the crew.
4. Aerial and ground ladders are raised according Agency standard. A minimum of 2 ladders are deployed.
5. Minimum of four crew members access the roof.
6. Minimum equipment to the roof includes two chainsaw, axe, and two rubbish hooks
7. Firefighters traverse strong portions of roof (roof perimeter, Lam Beams(girders), Purlins, ridges, hips, valleys)
8. Roof is "sounded" with rubbish hooks as crew travels to ventilation point
9. Several inspection cuts are completed (small heat hole or kerf cut) to determine heat/smoke production as you travel on the roof.
10. The type of ventilation hole/cut is determined by the company officer dependent on fire activity and type of roof construction (Conventional vs. Lightweight)
    1. Center rafter louver
    2. Drop Method (Offensive)
    3. Pull back method (Offensive)
    4. Louver off of a Lam Beam/Main Beam (Defensive)
    5. Louver off of a Purlin (Defensive)
11. Crew works from the windward side of the roof and proceeds with cuts working methodically and continuously toward the unburned area of the building and means of egress.
12. Crewmembers immediately exit the area by travelling via strong sections of the roof deck to a ladder.

Additional Information:

Hoselines are not typically taken to a roof unless fire exposures exist.

Chainsaws should be started and verified for operation prior to accessing roof. Chain saws engines must not be running while climbing ladders.

When exposed to fire, roofs built with lightweight truss construction will fail at a very fast rate, resulting in a significantly reduced time for the roof team to operate. Firefighters should employ the practice of "trading space for time" so that they can complete the roof cutting operations prior to the fire impinging on a given ventilation hole.

When operating on a lightweight truss roof (or suspected lightweight truss), the ventilation team shall never conduct ventilation operations directly over the fire.

Conventional Construction:

Bridge Truss:

Truss members built from 2 x 12 inch lumber
Rafters are 2 x 6 inch or larger and covered by 1 x 6 inch sheathing (diagonal/straight), plywood utilized on top of sheathing for earthquake retrofit.

Bowstring Arch Truss:

Truss members made of 2 x 12 or 2 x 14 inch lumber
Rafters are 2 x 6 inch or larger with 1 x 6 inch sheathing (diagonal/straight), plywood utilized on top of sheathing for earthquake retrofit.

Flat Roof:

Rafters are 2 x 6 inch or larger lumber 24 inches on center with 1 x 6 inch sheathing or 4 x 8 foot plywood.

Lightweight Construction:

Flat Roof:

Rafters can be constructed from wooden "I" beam, open web, or metal gusset plate truss covered by 4 x8 foot plywood.

Panelized Roof:

They can be found on masonry or concrete tilt up buildings.
Four major components:

1. Beams are laminated wood or steel (6 x 36 inch are common) 12 to 40 foot span. Beams may be bolted together to provide lengths in excess of 100 ft.
2. Purlins (4 x 12 inch) installed on metal hangers 8 feet on center
3. 2 x 4 inch joists installed on metal hangers 24 inches on center
4. 2 inch plywood decking.

Reference:

IFSTA Essentials

Evolution: Aerial Ladder Positioning

Time Standard: 5:30 Minutes, ladder to four story roof, personnel in PPE and axe belts on roof

Description: The truck arrives at the scene of a structure fire and positions considering roof area to be laddered, fire exposures, and ambient hazards. The crew dons all appropriate equipment, extends outriggers, and positions ladder to roof. The crew then mounts ladder and proceeds to roof for tasks assigned by I/C.

Key Tasks:

1. All firefighters don structure PPE and axe belts prior to arrival. SCBAs are donned prior to crew mounting ladder. The decision to breather SCBA air is made by the officer who assesses the likelihood and location of entering an IDLH atmosphere.
2. All applicable industry safety ordinances and practices are followed.
3. Company officer clearly communicates tasks and goal to crew.
4. The officer is ultimately responsible for the expeditious and fluid movements of the crew and the tactical positioning of the truck.
5. Truck stops at a position of tactical advantage, considering area to be laddered, exposures and direction of potential fire spread, strong points of building and areas for potential collapse, and other ambient hazards.
6. Engineer (driver) engages brakes, front axle brakes, master switch, PTO and transfer valve.
7. Crew works to deploy chock blocks, outrigger pads, outrigger pins, and cones to deny access to the area to the rear of the truck (to allow access for ground ladder deployment).
8. All manufacturers' safety recommendations for outrigger positioning and chassis leveling/ladder loading are observed.
9. Company officer and firefighter assemble equipment to go aloft including appropriate saw
10. Ladder is raised to the roof with tip positioned to facilitate ease of crew access to roof.
11. Once crew has accessed roof and no further positioning is required, ladder operator disengages the aerial system lock valve on the pedestal

Additional Information and References:

Chassis is leveled and ladder loading is accomplished bearing in mind these manufacturer's surface level corrections (reference *Truck Manual*):

0 to 3.5 degrees: no restrictions (400 pound tip load with 1000 GPM flowing)
3.5 to 5 degrees: nozzle operation limited to 60 degrees from centerline of ladder, 400 pound tip load, 1000 GPM
5 to 8 degrees: nozzle operation limited to 30 degrees from centerline of ladder, 200 pound tip load, 1000 GPM

Correction not attainable to within 8 degrees should require the ladder to be moved to a more level surface

When positioned lengthwise on a hill, the turntable of the ladder should be on the downhill side.

It is illegal to operate the ladder any closer than ten feet to power lines.

Evolution: Ladder Pipe Operation

Time Standard: xxx Minutes, ladder to four-story elevation, water at appropriate pattern and flow-rate.

Description: The truck arrives at the scene of a structure fire and positions for use of the ladder pipe considering the current location of the fire and its likely progression, exposures, and ambient hazards. A type I engine is assigned to pump the ladder pipe from a nearby available hydrant.

Key Tasks:

1. All firefighters don structure PPE prior to arrival at incident. Personnel don SCBAs but do not have to breathe air unless in IDLH atmosphere.
2. All applicable industry safety ordinances and practices are followed.
3. Company officer clearly communicates tasks and goal to crew.
4. The officer is ultimately responsible for the expeditious and fluid movements of the crew and the tactical positioning of the truck.
5. Truck stops at a position of tactical advantage, considering stream deployment area, exposures, strong points of building and areas for potential collapse, and other ambient hazards.
6. Engineer (driver) engages brakes, front axle brakes, master switch, PTO, and transfer valve.
7. Crew works to deploy chock blocks, outrigger pads, outrigger pins, and cones to deny access to the area to the rear of the truck (to allow access for later ground ladder deployment).
8. All manufacturers' safety recommendations for outrigger positioning and chassis leveling/ladder loading are observed.
9. Engine company completes LDH supply line lay to the proximity of the five-inch intake of the truck
10. The engine and truck engineers work to establish and LDH supply line from the engine to truck
11. The engine supplies water to the truck at the required pressure and flow as determined by the truck's flowmeter
12. The truck officer assists in initial positioning of the stream from the ladder pipe

Additional Information and References:

Assuming there are no additional complications, the officer and firefighter from the engine and the remaining engineer and officer from the truck are available for additional assignments as determined by the I/C.

It is possible that the supplying engine complete a reverse lay from the truck to a remote hydrant. However, the engine officer must consider the friction loss and the engine pressures (appliance losses, elevation, and nozzle tip selection) required to pump over great distances. Current District five-inch LDH can only be pumped to a maximum of 180 psi.

The truck carries 50 feet of five-inch LDH and should be considered for the connection between engine and truck.

Evolution: Low Angle Rescue/RPM System

Time Standard: XXX Minutes, patient secured in Stokes basket, interior and exterior lashing, pre-rig/RPM system in place for vertical pickup

Description: Engine, rescue, medic, or truck/squad arrives at a scenario requiring the extrication of a patient using a "low-angle/RPM" system. All units position at a point of safe tactical advantage considering access to patient, the need for anchors/system development, and disruption of the terrain surrounding the scene. The crews work to rapidly access the patient, perform life threatening injury stabilization, and remove the patient to a location appropriate for transportation. Time begins after assignment is given by the IC.

Key Tasks:

1. All firefighters don helmets and remaining PPE, including chest and seat harness that will provide optimum protection and ability to work in the rescue environment. Gloves must be ready to protect the hands from sharp or abrasive objects.
2. First in company officer sizes up scene and spots apparatus with consideration to equipment staging area, anchors (especially if using apparatus), stability of work area, and clear area to operate haul lines.
3. Initial company officer establishes command and gives consideration to ordering sufficient personnel to operate the subsequent system (hauling lines, etc.)
4. Initial company officer (Incident Commander) clearly communicates goals and objectives to crew and incoming resources. Company officers are responsible for the smooth and efficient operation of their crew.
5. Following positions should be created for ease of operation:
    1. Rigging Group (manages entire rigging system)
    2. Extrication group (renders PT care and packaging)
6. Equipment necessary for the rescue (software and hardware from the rope caches) are staged in an area quickly accessible to system riggers but clear of debris and sharp/abrasive objects. It is suggested that equipment be staged on a salvage cover or disposable vinyl cover.
7. Rigging Group works to provide a lowering system to access the patient. The system should utilize a "bombproof" anchor with a friction device and safety line to provide as rapid an access as possible to the patient.
8. Equipment for PT packaging (stokes, backboard, webbing, medical gear) are lowered with the initial rescuers.
9. Stokes/mechanical advantage system (RPM) should be assembled and/or completed simultaneous with PT packaging.
10. Rigging Group Supervisor (or delegates to firefighter with the greatest expertise) completes safety inspection on system prior to loading with personnel or patient
11. Sufficient personnel are present to operate haul lines and brakes prior to loading with personnel or patient(s)

12. Rigging Group Supervisor/Safety Officer remain in free of focused details of the operation so that they can clearly coordinate the movement of crews and the patient. This generally requires the officer to be in a position to visualize the patient, remote operating crews, and the personnel on the hauling/braking crew.
13. Prior to operation of the system, the Incident Commander/Rigging Group Supervisor assures the goals and operation of the system is clearly communicated to the crews. A simple and clear system of rope identification (haul line versus safety line) and raising/lowering commands must be agreed upon.

Additional Information:

A dedicated radio channel (Hi-Band or MERA conventional) is recommended for communications between the Rigging Group and Extrication Group to avoid delays in radio traffic.

Reference:

CFSTES: Rescue Systems 1 Manual, Current Edition

Evolution: Patient Packaging in Stokes Basket

Time Standard: XXX Minutes, patient secured in Stokes basket, interior and exterior lashing, pre-rig in place for vertical pickup

Description: Engine, ambulance, or truck crew work to secure a patient on a backboard into a Stokes basket. Time begins after assignment is given.

Key Tasks:

1. All firefighters don helmets and remaining PPE that will provide optimum protection and ability to work in the rescue environment. Gloves must be ready to protect the hands from sharp or abrasive objects.
2. Patient is secured to a backboard using most current securing method adopted by the agency
3. Patient is moved and placed into Stokes using safe body mechanics
4. Only major structural members of Stokes are used to attach vertical pre-rig, external/internal lashing
5. Backboard is secured to Stokes using webbing
6. Webbing is fastened to Stokes using a round turn and successive half-hitches
7. Excess slack must be removed from exterior lashing and lashing must not pass over top rail of Stokes basket (to avoid abrasion).
8. Company officer (or delegates to firefighter with the greatest expertise) completes safety inspection on system prior to loading with personnel or patient. All knots completed to industry standard and carabiners in locked position.

Reference:

CFSTES: Rescue Systems 1, Current Edition

Evolution: Salvage Operations

Time: XXX Minutes; Salvage covers deployed

Description: An Engine, Truck, or Rescue Squad is assigned salvage operations in a simulated fire building. The crew works to deploy salvage covers to cover the contents of one room and construct a water chute to divert water out of a window. Time begins after assignment is given.

Key Tasks:

1. All firefighters don structure PPE and SCBA according to Agency and industry standard. Crew must breathe air via SCBA mask if they are entering an IDLH environment.
2. All applicable industry safety standards, laws, and practices are followed.
3. Company officer clearly communicates tasks and goal to crew. The officer is ultimately responsible for the expeditious and fluid movements of the crew.
4. Obtains and deploys the appropriate number of salvage covers to completely cover the contents of one room.
5. Obtains salvage cover(s) and equipment necessary to construct a water chute
    i. Pike poles
    ii. Ladder (A frame if available)
6. Fully extend salvage cover and roll pike poles into the cover. Start from the edge and work in.
7. Deploy the chute, securing the pike pole hooks on ladder rungs as high as possible.
8. Extend opposite end of the chute out of a nearby window.
9. Unroll the salvage cover to the width of the window.
10. Secure chute to the ladder.

Reference:

IFSTA Essentials

Evolution: Positive Pressure Ventilation

Time: XXX Minutes, Building Cleared of Smoke

Description: A simulated fire building charged with smoke will be systematically cleared utilizing positive pressure ventilation. Time begins after assignment is given.

Key Tasks:

1. All Firefighters will don structure PPE according to Agency and industry standards. All crewmembers are wearing SCBA and breathing air via masks prior to entering the smoke filled building.
2. All applicable industry safety standards, laws, and practices are followed.
3. Company officer clearly communicates tasks and goal to crew. The officer is ultimately responsible for the expeditious and fluid movements of the crew.
4. Consideration is made to wind direction working from the windward side (air in), to the leeward side (smoke out).
5. The blower is set up several feet from the door so that the cone of air from the fan completely covers the door opening.
6. Systematically clear the building of smoke one room at a time.

Additional Information:

Communication is vital when using PPV. Improper use/timing can increase fire activity and endanger interior firefighting crews.

Multiple blowers can be used to clear large buildings. They can be set up in series or parallel.

Reference:

IFSTA Essentials

Evolution: Progressive Hoselay

Time Standard: 100 feet of hose deployed every 2 minutes (700 feet for a 3-person crew, includes crosslay)

Description: A Type I or III engine stops at a safe, tactical area for initiation of hoselay. All crewmembers don wildland hose packs and begin a progressive hoselay from an appropriate anchor point. The wildland preconnect is used as the initial section of the hoselay. The engineer may be released from the hoselay to return to the pump panel per Agency standard. A water supply is secured as soon as possible to provide an uninterrupted flow of water. Time begins when the apparatus engages the parking brake.

Key Tasks:

1. All firefighters don wildland fire PPE, web gear/belt, and/or brass belts according to Agency and industry standard.
2. All applicable industry safety ordinances and practices are followed **(LACES, 10 Standard Fire Orders, 18 Watch Out Situations).**
3. Company officer clearly communicates tasks and goal to crew.
4. Engineer engages pump, chocks apparatus wheels, sets appropriate engine pressure, sets relief valve, and assures engine radio is on the incident tactical net able to be monitored from exterior of cab.
5. Engines with dual-stage pumps have transfer valve in "pressure" position.
6. The officer is ultimately responsible for the crews operations including clamping, nozzle removal, and method of hose pack deployment on the line to meet the designated time standard and produce an efficient, fluid movement of equipment and personnel.
7. Nozzle pattern and flow should match the fuel and expected (developed) flame lengths
8. Water is applied to the flame/fuel interface; wasted water use is minimized
9. Personnel are spaced on the hose to minimize crowding and facilitate pulling of hose
10. Hose is maintained/deployed in the unburned fuel (green)
11. A forestry tee should be placed every 200 ft.
12. A water supply is secured as soon as possible that meets the constraints of the deployment location. (Hydrant, Water Tender)
13. The company officer minimizes nozzle time and maintains control and direction of the operation.

Additional Information and References:

Required engine pressure based on CQ^2L formula, (1.5 inch forestry hose FL= 3 psi per 100 ft.) or on current pump pressure calculator/chart in engineer's compartment.

Crewmembers shall don all wildland fire PPE (exception; web gear/belts) prior to response. This diminishes reflex time once a company arrives at the scene.

When utilizing a hydrant, consider a 2.5 inch Siamese at the hydrant to allow for augmenting pressure, if needed; by another pumping engine (relay operation).

Reference:

IFSTA Essentials
CAL FIRE 4300 Manual

Evolution: Mobile Attack

Time Standard: XXX Minutes, water to nozzle, anchor point established, 100 ft of continuous wet line

Description: A Type III engine stops at a point of tactical advantage next to a wildland fire flank and prepares to undertake a mobile attack. The firefighters and/or company officer staff the front bumper jump line while the engineer navigates the engine along the flank. Time starts when the engine engages the parking brake.

Key Tasks:

1. All firefighters don wildland fire PPE prior to arrival at the scene. Wildland web gear/belts may also be donned prior to arrival by firefighters. Company officer immediately dons wildland belt upon arrival at scene. All PPE donned to Agency and industry standard.
2. All applicable industry safety ordinances and practices are followed. **(LACES, 10 Standard Fire Orders, 18 Watch Out Situations).**
3. Company officer clearly communicates tasks and goal to crew.
4. Engine stops at a position that is safe from fire impingement while crew sets up for fire attack
5. Four-wheel drive engaged and in appropriate drive gear prior to fire attack and negotiating off-road terrain. Engine is not driven for appreciable distance on roads with four-wheel drive engaged.
6. Fire pump engaged (Pump and Roll) and throttle discharge pressure set at approximately 80 psi*
7. Class "A" foam is engaged at a concentration consistent with the current fuel and tactical operation.
8. Crew operates with one member operating the nozzle and the other working to prevent hose from coming in contact with rotating Type III tires.
9. Attack crew strives to keep and maintain a lateral position to the engine.
10. Water flow and pattern is consistent with the current expected fire behavior for the given fuel and terrain
11. Mobile attack begins at suitable anchor point
12. Consistent wet line established along burned edge of flank

Additional Information:

Novato: *U2-Pump and Roll switch engaged; automatically provides required discharge pressure.

Crewmembers shall don all wildland PPE (exception; web gear/belts) prior to response. This diminishes reflex time once a company arrives at the scene.

Reference:

CAL FIRE 4300 manual

Evolution: Structure Protection; Engine Preparation

Time Standard: XXX Minutes

Description: A Type I or III engine crew receives the assignment that they will be used to provide structure protection within the next few minutes (**PRE DEPLOYMENT ONLY, do not delay response to set up engine**). The goal is to ready the engine and crew with 1.5-inch forestry hose loaded for rapid deployment, drip torch assembled, and crew members in wildland fire PPE. Time starts after assignment is given.

Key Tasks:

1. All firefighters don wildland fire PPE and web gear/belts according to Agency and industry standard.
2. All applicable industry safety ordinances and practices are followed. **(LACES, 10 Standard Fire Orders, 18 Watch Out Situations).**
3. Company officer clearly communicates tasks and goal to crew.
4. Two separate 100-foot lengths* of 1-1/2 inch forestry hose are formed into shoulder (horseshoe) loads or loops. Ensure that they do not extend below the level of the tailboard when mounted on the engine
5. Each hoseload is attached and secured to the rear portion of the engine. Structurally sound high points (structure hooks) of the engine are chosen as the attachment point.
6. Proper body mechanics are maintained while attaching hose to engine.
7. Female couplings are connected to a gated wye placed on a rear facing discharge
8. Protection lines are fitted with Agency approved nozzles set at a minimum of 30 GPM.
9. Drip torch is assembled and placed in a location for rapid access. (Drip torch is not ignited at this time)

Additional Information:

*Protection lines are not to exceed 200 feet in length if possible.

Do not use double jacket structure hose for this evolution. Structure hose is unable to sustain the same pressures as forestry hose and would be a detriment in the event that a progressive hoselay had to be extended from one of the protection lines.

Crewmembers shall don all wildland PPE (exception; web gear/belt) prior to response. This diminishes reflex time once a company arrives at the scene.

Reference:

CAL FIRE 4300 manual

Evolution: Structure Protection Deployment

Time Standard: XXX Minutes, Initial Attack Scenario

Description: A Type I or III engine receives the assignment to provide structure protection with an immediately approaching fire. The crew positions the apparatus for maximum safety and shielding, hose lines are deployed around the rear perimeter of the structure, and additional protective measures are completed within a short timeframe. Time begins when the engine engages the parking brake.

Key Tasks:

1. All firefighters don wildland fire PPE, web gear/belts according to Agency and industry standard.*
2. All applicable industry safety ordinances and practices are followed. **(LACES, 10 Standard Fire Orders, 18 Watch Out Situations)**
3. Engineer engages pump, chocks apparatus wheels, sets appropriate engine pressure, sets relief valve, and assures engine radio is on the incident tactical net able to be monitored from exterior of cab.
4. Windows, cabinets and doors on cab are closed. Headlights and red emergency lights are on. Spotlights are on and turned upward.
5. Company officer clearly communicates tasks and goal to crew and performs a safety briefing.
6. A predetermined meeting location is identified in case of an evacuation order is given.
7. Radio traffic is kept to a minimum. Company officer and crew have mutually agreed signals to charge and shut down lines.
8. Two separate 100-foot lengths** of 1.5 inch forestry hose are deployed on opposite sides of the structure toward the rear so that their streams have the ability to cross
9. On site (preferred) or engine ladder is raised to roof
10. Water supply is considered including garden hoses, pools, or short runs of hose to a nearby hydrant may be used. The key is to stay mobile.
11. An engine/crew protection line is placed in service and is readily available.
12. All crew-members work together to achieve goals with efficiency and smooth, fluid movement.
13. Crew-members are flowing water from the structure protection lines by end of evolution with flow rate consistent with expected flame lengths from fuels and weather conditions

Additional Information:

*Crewmembers shall don all wildland fire PPE (exception; web gear/belt) prior to response. This diminishes reflex time once a company arrives at the scene.

**Protection lines are to not to exceed 200 feet in length.

Personnel should maintain at least 100 gallons of water in the engine's tank (1/4) for personal protection.

Do not use double jacket structure hose for this evolution. Structure hose is unable to sustain the same pressures as forestry hose and would be a detriment in the event that a progressive hoselay had to be extended from one of the protection lines.

Crew should not assemble/deploy structure hooks until it is time to pick up and move to the next structure. The goal is to deploy the hoselines and prepare to protect a structure as quickly as possible.

Reference:

CAL FIRE 4300 Manual

Evolution: Wildland Water Supply; Type I Shuttle to Type III Engine

Time Standard: 5:00 Minutes, Type I pumping progressive hoselay

Description: The crew of a Type III engine has begun a progressive hoselay from a roadside anchor point. A Type I engine is assigned to take over the pumping and supply of the hoselay so that the Type III engine is available to proceed to a mobile attack assignment. During the process, the Type I engine secures a hydrant supply if available.

Key Tasks:

1. All firefighters don wildland PPE and web gear/belts according to Agency and industry standard.*
2. All applicable industry safety ordinances and practices are followed. **(LACES, 10 Standard Fire Orders, 18 Watch Out Situations)**
3. Engine is placed in position to avoid exposure of crew and apparatus to fire, provide for passage of other apparatus, and be accessible to the gated wye on Type III progressive hoselay
4. Type I forestry preconnect is deployed and connected to gated wye on Type III hoselay
5. Type I engineer determines progressive hoselay engine pressure and charges Type I feeder to progressive
6. Wye is manipulated so Type I is supplying hoselay and Type III supply is shut off. There must be no disruption of water flow or nozzle pressure.
7. Hydrant water supply is secured for the Type I with 2.5 inch hose and all appropriate adapters and appliances**

Additional Information:

Starting Engine Pressures: 125 psi, flat terrain; 140 psi, slopes

*Crewmembers shall don all wildland PPE (exception; web gear/belts) prior to arrival at the evolution. This diminishes reflex time once a company arrives at the scene.

**It is strongly suggested that the 2.5-inch supply line be utilized

Evolution: Handline Construction

Time Standard: 1 chain (66 feet) per hour per person (Fuel Model 1, short grass, 3 ft wide line)
3 chains per hour per three person crew, initial attack only
The crew will cut 1 chain of line (20 minutes).

Description: A three-person crew is assigned to cut hand line in grass that will later be used as a control line for firing. Tools include Pulaskis, McLeods, and shovels typically found on the engines.

Key Tasks:

1. All firefighters don wildland PPE, web gear, and brass belts according to Agency and industry standard.*
2. All applicable industry safety ordinances and practices are followed. **(LACES, 10 Standard Fire Orders, 18 Watch Out Situations).**
3. Company officer will clearly communicate goal and tasks among crew. The officer is ultimately responsible for the expeditious and fluid movements of the crew.
4. Tools are deployed and carried according to established safety standards (as explained in NWCG S130, Basic Wildland Firefighting).
5. Crewmembers maintain ten feet of spacing. "*Keeping Your Dime*"
6. Aggressive cutting tools generally lead smaller scraping tools (e.g., Pulaski leads McLeod)
7. Line construction should begin at a secure anchor point.
8. A termination point should be established to measure progress
9. Take advantage of terrain and fuel, keeping lines as straight as possible.
10. Line is cut to mineral soil and along designated perimeter. 1- ½ times wider than the height of the fuel. (18 inches minimum regardless of the height of the fuel)
11. All burned/charred material should be thrown well into the burn. All green fuels should be scattered on the unburned side of the line. ***"black to the black, green to the green"***

Additional Information and References:

*Crewmembers shall don all wildland PPE (exception: web gear/belt and/or brass belts) prior to response. This diminishes reflex time once a company arrives at the scene.

Crew will maintain the hand tools sharp, free from debris and rust, and handles intact and tight to the tool head

References*:*

NWCG S130 Basic Wildland Firefighting
CAL FIRE 4300 Manual

Evolution: Mop Up; Wildland

Time: Mop up, grid, or patrol after a wildland fire.

Description: A three person crew will mop up after a wildland fire using hand tools, bladder bags, and/or hose lines.

Key Tasks:

1. All firefighters don wildland PPE, web gear, and brass belts according to Agency and industry standard.
2. All applicable industry safety ordinances and practices are followed. **(LACES, 10 Standard Fire Orders, 18 Watch Out Situations).**
3. Company officer clearly communicates tasks and goal to crew.
4. The crew will mop up for a designated distance (example; 100 feet in from the control line or 100% of the fire)
5. Extent of the mop up is dependent on:
    a. Fuels involved
    b. Weather conditions
    c. Topography
    d. Size of the fire
    e. Resource availability
6. Seek out hot spots
    a. Flames
    b. White ash areas
    c. Wisps of smoke
    d. Burned out stumps
    e. Burned logs and other heavy fuels
    f. Glowing embers during night operations
7. Use hand tools in conjunction with water
    a. Rake, scrape, and chop until hot spot is located
    b. Apply small amounts of water, water conservation is important
    c. Use foam whenever possible
8. Fell all snags or burning trees:
    a. Present a safety hazard to firefighters or the general public if left standing.
    b. Spot or fall across the control lines
9. Remove or reposition heavy fuels within the control lines.
10. Improve control lines where needed.
11. Repeat the above steps until the fire is extinguished.

Reference:

Cal Fire 4300