

**Denver Fire Department
Engineer
Job Description, April 1998
Revised November 30, 2005, January 14, 2008, and December 8, 2011**

General Statement of Duties

An Engineer is responsible for maintaining and operating assigned fire apparatus. Engineers maintain apparatus readiness by performing daily checks and minor repairs/preventative maintenance on apparatus (e.g., greasing the engine, tightening or replacing screws etc.). An Engineer drives the assigned apparatus in emergency and non-emergency situations. Engineers operate pumps and controls to perform pumping and/or aerial operations. An Engineer may serve in the capacity of firefighter in emergency or non-emergency situations when not performing tasks associated with operating the apparatus.

Supervision

Engineers are responsible to a Fire Department Company Officer at the rank of either a Lieutenant or Captain, and receive general direction in the performance of their duties. Engineers will consult with their Lieutenant or Captain regarding day-to-day operations, emergency operations, equipment and apparatus readiness, and unusual events at the station regarding personnel, apparatus, equipment, etc.

Engineers have no formal supervisory responsibilities.

Interpersonal Relationships

Engineers interact with Fire Department staff (e.g., firefighters, other engineers, supervisors, etc.), the public (e.g., motorists, home owners, business owners, homeless individuals, etc.), and with representatives of other agencies (e.g., police, members of other fire departments, ambulance operators, etc.). These interactions occur during routine day-to-day operations, educational or informational presentations, inspections, and during emergency operations.

Complexity

An Engineer's job involves complex emergency scene tasks, which must be accomplished correctly and rapidly, often without taking the time to reference procedures and policies, or to repeat tasks once they are accomplished. Errors may lead to life safety hazards and property loss.

Typical Working Conditions

Engineers live and work in a fire station on 24 - hour shifts. This work environment includes many of the same amenities of a home, including kitchens, showers, bed, etc. In this environment, Engineers will perform routine day-to-day activities, such as maintaining equipment and apparatus, meeting with supervisors and co-workers, planning and scheduling work, etc. Outside of the fire station, Engineers perform essential job functions in all weather, noisy conditions, and under extreme emergency conditions such as fires, hazardous materials, auto accidents, etc.

Primary Duties and Essential Functions

Drive Apparatus - Safely operate or drive any fire department apparatus or emergency vehicle. Specific tasks include:

- Adjust driving speed for weather, traffic, and other road conditions.
- Utilize defensive driving techniques while driving apparatus.
- Drive apparatus in emergency situations.
- Utilize all required safety equipment (e.g., seat belts, mirrors) while driving apparatus.
- Observe, where applicable, all traffic laws while driving apparatus.
- Drive apparatus through spaces with limited clearance (e.g., narrow streets or alleys).
- Alter route to adjust for traffic or other conditions.
- Drive apparatus in non-emergency situations.
- Drive apparatus knowing when to shift utilizing automatic transmission.
- Park apparatus by backing into the station house with spotters.
- Proper application of appropriate tire chains for road conditions.

Spot Apparatus - Properly spot various apparatus (engine, aerial ladder, rescue, etc.) at fire and emergency scenes. Specific tasks include:

- Spot aerial apparatus for rescue operations.
- Spot pumping apparatus as a first responding unit.
- Spot aerial apparatus for firefighting operations.
- Spot pumping apparatus for high-rise operations.
- Spot aerial apparatus for water tower operations.
- Spot aerial apparatus for high-rise operations.
- Spot trucks or rescue vehicles at emergency scenes.
- Spot pumping apparatus as a second or later responding unit.
- Spot pumping apparatus near fire hydrant or other water source.
- Set brakes on all apparatus.
- Set the high RPM toggle switch when applicable.

Perform Pumping Operations - Operate the various equipment associated with pumping apparatus and perform pumping operations at the fireground. Specific tasks include:

- Conduct daily functional safety check of apparatus.
- Read gauges and adjust controls to develop and maintain desired pressure and volume.
- Determine hydraulic calculations to set pump pressure.
- Prime pump.
- Determine pressures required for proper hose appliance, including adapters.
- Analyze and correct malfunctions of pumping apparatus at fire scene.
- Monitor pumping apparatus during pumping operations.
- Recognize engine capacity limitations.
- Operate hydraulic pumps.
- Open and close valves on the engine.
- Determine pressures required for a given operation using rule of thumb.
- Operate pump in relay as supply or attack engine.
- Set up and perform foam education operations.

Primary Duties and Essential Functions, Continued

- Determine available flow from water source.
- Determine best method of hook-up to hydrant with or without four-way hydrant (humat) valve.
- Attach and understand the use of the four-way hydrant (humat) valve, gate valve, etc.
- Flush and refill pump and booster tank.
- Assist in conducting hose tests.
- Set relief valve or pressure governor.
- Operation of manual overrides.

Respond to Alarms - Prepare for and respond to fires, medical emergencies, traffic accidents, and other emergency situations. Specific tasks include:

- Ensure that necessary personnel are safely on apparatus before responding to alarm.
- Select the best route to a scene using information such as maps, traffic reports, street cards, etc.
- Determine where to spot apparatus prior to arriving at an alarm scene.
- Prepare for response by ensuring that all required and needed equipment is loaded.
- Study maps to determine water supply, building, streets, and target hydrant locations.

Perform Aerial Ladder/Platform Operations - Operate the various equipment associated with aerial ladder/platform apparatus and perform aerial ladder/platform operations at the fireground. Specific tasks include:

- Set up aerial ladder/platform for rescue operations.
- Read and understand gauges on aerial apparatus.
- Extend and retract outriggers on aerial apparatus.
- Set up aerial ladder/platform for firefighting operations.
- Raise, rotate, and extend aerial ladder/platform safely and smoothly.
- Correct angle and extension of aerial ladder/platform.
- Extend, and retract fly section of aerial ladder.
- Set up and perform water tower operations.
- Set up aerial ladder pipe for operation.
- Climb aerial ladder platform and/or aerial ladder.
- Ensure that the aerial ladder/platform is operational.
- Chock wheels for aerial/platform apparatus if applicable.
- Use over-ride system and be familiar with emergency over-ride procedures.
- Operate safely within apparatus limitations.

Protect Exposures - Recognize potential danger of fire spread and take steps to protect life, property, equipment, and apparatus from exposure to fire or other dangers. Specific tasks include:

- Park apparatus or other vehicles in safe and appropriate location.
- Protect firefighters and equipment by applying water.
- Evacuate people from exposed structures.
- Recognize possible avenues of fire spread.
- Protect the outside of exposed structures by applying water.

Perform Hose Operations - Perform various hose operations such as line advancement, coupling and uncoupling hoses, attaching hose appliances, determining required pressures, and replacing damaged hose. Specific tasks include:

- Connect to standpipe or sprinkler connection.

Primary Duties and Essential Functions, Continued

- Hook up five-inch hose or other supply hose.
- Attach and operate various hose appliances to hose (e.g., nozzles, wyes, siamese, foam eductors, etc.).
- Open and close hose clamps.
- Advance charged hose lines.
- Advance rolled or folded sections of hose.
- Open and close hydrants.
- Couple and uncouple hoses.
- Advance dry hose lines.
- Operate charged hoselines.
- Operate deck gun, monitor or other master stream appliances.
- Replace damaged hose sections.
- Test and inspect hose sections.
- Load or unload hose sections from apparatus.
- Use hose jacket or clamp on burst or damaged hose.
- Inspect and maintain hose couplings.
- Maintain hoses on apparatus.

Conduct Initial Size-up at Fire or Rescue Scene - Upon arrival, analyze emergency situations and appropriate responses to those situations. Specific tasks include:

- Assess navigational problems, such as narrow alleys, at fire scene and assist with solutions.
- Relay verbal reports of fire conditions to officers and other firefighters.
- Analyze the fire situation to determine what equipment and extinguishing agents to use.
- Adapt firefighting strategies to changing conditions at the fire scene.
- Assess effects of weather, wind, humidity, and other conditions on the fire.

Inspect, Inventory, and Maintain Apparatus and Equipment - Examine equipment and apparatus to ensure proper functioning and/or adequate supply. Make or recommend necessary minor repairs and report loss, damage, or theft. Specific tasks include:

- Replenish supplies, such as foam, AFFF extinguishers, medical supplies, etc.
- Test and maintain communication, protection, and rescue equipment.
- Check and report operational condition of tools, equipment, and apparatus.
- Inspect and maintain ladders.
- Report lost, stolen, or damaged tools and equipment.
- Inspect fire extinguishers.
- Ensure tools and equipment are on apparatus before leaving fire or emergency scenes.
- Turn in tools and equipment in need of repairs.
- Properly stow equipment on apparatus for storage and transport.
- Perform minor repairs/preventative maintenance and maintenance of tools, equipment, and apparatus.
- Inspect, clean and polish tools, equipment, and apparatus.

Perform Other Fire or Emergency Scene Tasks - Perform various suppression and rescue tasks, including RIT, when not performing the duties of an Engineer. Specific tasks include:

- Properly use personal protective equipment.
- Monitor radio communications during emergency incidents.
- Rescue victims overcome with hazardous chemicals and/or gas.

Primary Duties and Essential Functions, Continued

- Ventilate structures using appropriate tools and equipment.
- Make forcible entries into grounds/buildings, using appropriate tools and techniques.
- Carry, raise, and lower ground ladders.
- Report, and assist in preservation of, evidence of suspicious fire origin or arson.
- Conduct salvage and overhaul operations.
- Tie and untie ropes and webbing.
- Temporarily fulfill responsibilities that are usually handled by other ranks.
- Carry out RIT functions as assigned by Incident Commander.
- Carry out search operations if assigned.
- Locate and control utilities.

Interact with Co-workers and Superiors - Interact and work together with other firefighters and supervisors on a regular basis. Specific tasks include:

- Listen and respond to verbal orders from fire officer/incident commander at an emergency scene.
- Maintain good working relationships with other firefighters, superiors and repair shop personnel/mechanics.
- Work and get along with others in a community living situation.
- Communicate with fire officer/incident commander or other firefighters using the radio.
- Offer suggestions on tactics to fire officer/incident commander or other firefighters.
- Participate in analysis or critique of firefighting or other emergency activities.

Interact with the Public and Other Agencies - Interact and work with businesses and citizens in the community. Coordinate and cooperate with other agencies such as fire departments, police departments, and sheriff's departments. Interact with victims, family members, and witnesses at emergency scenes. Seek opportunities to provide service to the community.

Perform Public Education and Services - Make presentations to schools, businesses, and other community groups. Conduct station tours. Engage in prevention activities.

Other - Perform additional primary duties and essential functions that may be identified.

Secondary Duties

Perform Emergency Medical Services and First Aid - Perform triage, cardiopulmonary resuscitation, wound evaluation and treatment, and other first aid and life-saving techniques.

On-site Emergency Scene Duties

Maintain and Expand Job Knowledge - Study, practice, and maintain a working knowledge of up-to-date, job-related techniques through formal and informal classwork, training sessions, and on-the-job experience.

Interact with Co-workers and Superiors - Interact and work together with other firefighters and supervisors on a regular basis.

Provide Training and Instruction - Provide formal or informal instruction, training, or guidance to firefighters and others.

Secondary Duties, Continued

Maintain Physical Condition - Participate in department sponsored physical training to maintain adequate physical condition to perform the job.

Perform Fire Inspections, Code Enforcement and Fire Drills - Inspect buildings or structures to become familiar with potential fire hazards, conduct pre-incident planning, and identify code violations. Conduct fire drills at target hazards.

Perform Routine Station Chores - Perform standard station chores, including shopping, cooking, cleaning, and general station upkeep.

Less Critical Duties

Write Reports and Correspondence - Complete forms and reports to document such things as inspection results, vehicle accidents, and actions taken at fire incidents. Write letters, memos, and other correspondence.

Perform Office Duties - Perform miscellaneous office tasks such as work with computers, maintain files, take notes, talk on the phone, and schedule meetings or other activities.

Knowledge, Skills, Abilities and Personal Characteristics

Driving Ability - The ability to safely operate various vehicles while applying knowledge of traffic laws, department policies, and defensive driving skills in both emergency and non-emergency situations.

Knowledge of Hydraulics Principles - Knowledge of the principles of fireground hydraulics, as well as the ability to apply this knowledge to calculate the required pressures and volumes for various hoses, nozzles, and connections.

Knowledge of Response Area - Knowledge of local streets, traffic patterns, building layouts, pre-incident plans, as well as hydrant and other water source locations within local response area.

Awareness - The ability to remain mentally focused and aware of one's surroundings, avoiding distractions, and concentrating on the tasks at hand.

Knowledge of Fire Apparatus - Knowledge of the various controls, gauges, clearances, and operating techniques, as well as manufacturer's specifications of various fire apparatus (engines, rescue vehicles, aerial apparatus, etc.). Maintain proficiency in new and/or updated equipment.

Effectiveness Under Stress - The ability to remain calm, think clearly, and function effectively while under stressful conditions.

Knowledge of Firefighting Equipment - Knowledge of proper use and care of equipment used in emergency response situations (protective gear, breathing apparatus, extinguishers, ladders, hoses, rescue equipment, etc.).

Ability to Spot Apparatus - The ability to properly spot apparatus at emergency scenes to provide water supply, allow for effective advance of fire hose lines, perform aerial placement and permit access of other fire department vehicles and equipment at the scene.

Knowledge of Building Fire Extinguishment Systems - Knowledge of the various extinguishing systems found in buildings (standpipes, sprinklers, etc.) as well as knowledge of how to supply these systems.

Dependability and Reliability - The ability to consistently meet obligations and commitments, regardless of the circumstances.

Teamwork and Cooperation - The ability to work as a member of a team, doing one's fair share of work, using input and assistance from others, and putting group goals above individuals goals.

General Physical Characteristics - Having acceptable levels of eyesight and hearing with corrections, as well as other general physical characteristics required to perform the job.

Decision Making and Decisiveness - The ability to develop and consider alternatives for dealing with situations, and to readily make a decision or render a judgment.

Knowledge of First Aid and Emergency Care - Knowledge of techniques for providing first aid, stabilizing victims, and providing first responder care before hospital transport.

Respect for Rules and Authority - The ability to follow orders, rules and regulations, and to show respect toward those with more experience or those in positions of authority.

Knowledge of Firefighting Tactics - Knowledge of firefighting tactics such as extinguishment, forcible entry, rescue, safety, overhaul, etc.

Knowledge, Skills, Abilities, and Personal Characteristics, Continued

Problem Analysis - The ability to recognize problems, effectively seek out and identify relevant information, and determine causes of problems.

Attention to Detail - The ability to recognize and attend to the details of tasks and situations, and to demonstrate a commitment to accuracy.

Flexibility and Adaptability - The ability and willingness to adapt easily and quickly to changing environments, work duties, or other job requirements.

Knowledge of Department Policies and Procedures - Knowledge of the fire department's operating procedures for a variety of work situations (emergency response procedures, station rules, chain of command, paperwork, etc.).

Spatial Orientation and Direction - The ability to know where one is in relation to the surrounding environment, visually locate objects and persons, accurately estimate distances and heights, and get from one place to another, even under adverse conditions.

Judgment and Reasoning - The ability to use common sense and logic to recognize, understand and form sensible and accurate relationships and conclusions.

Mathematical Ability - The ability to perform the basic mathematical calculations that are used on the job in a timely and accurate manner.

Knowledge of Fire Behavior - Knowledge of fire behavior, fire chemistry, physics, hazards, causes, etc.

Mental Visualization - The ability to develop and use mental representations or mental pictures of such things as fire scenes, routes, and building layouts based upon descriptions and past experience.

Motivation and Initiative - The ability to develop and maintain an interest in work-related activities without prompting, and to willingly take on tasks and responsibilities.

Learning and Memory - The ability to learn, retain, recall, and apply information that is essential to the job, such as pre-incident plans and routes, verbal instructions and commands, as well as information from reference materials such as codes and policies.

Mechanical Comprehension - The ability to understand basic mechanical principles, and apply those principles on the job.

Physical Strength - The ability to use leg and upper body strength for such activities as lifting, carrying, climbing, pushing, pulling, and related physical activities.

Oral Communication - The ability to speak effectively, articulately, and tactfully, to clearly convey thoughts and ideas, to use good listening skills, and to understand the meaning of words and phrases.

Interpersonal Skills - The ability to relate well and get along with others, and respond to people in an appropriate manner.

Reading Comprehension - The ability to read and understand written materials such as reference manuals, training materials, and correspondence.

Manual Dexterity - The ability to use hand-eye coordination and fine muscular control to perform small or precise movements.

Knowledge, Skills, Abilities, and Personal Characteristics, Continued

Perseverance - The ability to demonstrate perseverance, thoroughness, and follow-through when working on difficult or lengthy tasks.

Knowledge of Water Supplies - Knowledge of the most efficient ways to use available water supply systems, as well as knowledge of suitable emergency water sources.

Physical Coordination and Balance - The ability to remain agile and use well-coordinate movements, even under physically stressful conditions.

Physical Stamina and Endurance - The ability to perform a variety of physical activities in succession and to exert oneself physically over long periods of time without giving up.

Knowledge of National Incident Management System - Knowledge of the basic terminology associated with the Incident Management System, as well as the ability to carry out the functions of an incident commander at small scale incidents.

Ability to Train and Instruct - The ability to provide formal or informal instruction, training, or guidance to firefighters and others through demonstration and explanation.

Construction Knowledge - Knowledge of basic building construction and electrical principles, and the ability to apply those principles on the job.

Writing Ability - The ability to write legibly and to express oneself clearly and accurately in writing, using proper grammar, punctuation, and spelling.

Physical Requirements

An Engineer must be able to perform the essential physical functions of a firefighter as determined by Stanard & Associates, Inc. These requirements went into effect in May of 2001. (See attached).

Experience/Education Requirements

Minimum Education Requirements

Graduation from high school or possession of a GED certificate as required by Civil Service Rules and Regulations.

Minimum Experience Requirement

As required by the Civil Service Rules and Regulations.

Necessary Special Requirements

As required by Civil Service Rules and Regulations

Typical Career Path for Fire Engineer

FIREFIGHTER

ENGINEER

Essential Physical and Mechanical Functions
Denver Fire Department
(By Stanard & Associates, Inc. – May, 2001)

Physical Functions

- Put on and wear protective equipment
- Open hydrant to charge the hose
- Use 1-3/4 inch hose as an attack line
- Use equipment (e.g., ax, sledge hammer, etc.) to make forcible entries
- Enter smoke filled buildings/rooms with a hose in hand while wearing full protective clothing
- Crawl on a floor and if you cannot see, feel for the heat of the fire source
- Systematically search for trapped persons
- Drag victims with the help of another firefighter
- Screw the hose connection to the hydrant
- Drag charged 1-3/4 inch hose up stairs and around furniture when fighting a fire
- Carry victims with the help of another firefighter
- Use a hose clamp to clamp a charged/uncharged hose
- Wrap a hose around a hydrant to stretch it out and ensure it reaches the plug
- Climb stairs wearing full equipment while responding to a call for service
- Carry heavy equipment (hose pack, medical box, air bottles) up stairs while wearing full equipment
- Support a ladder, and raise the halyard to extend to the desired length, then lower into objective
- Climb an aerial ladder wearing full equipment
- Hold a charged 1-3/4 inch hose unassisted and open the nozzle
- Drag a victim out of a building unassisted while wearing full turnout gear
- Drag accordion folded or flat load, uncharged 2 1/2 or 3 inch hose until it is fully extended
- Drag charged 1-3/4 inch hose unassisted
- Reload hose and put it back onto the engine/quint
- Remove heavy equipment (i.e., ejector, positive pressure fan, fan, medical box) from the truck; transport and place it in operation unassisted
- Use a pike pole to pull down a ceiling
- Carry a victim out of a building unassisted while wearing full turnout gear
- Carry people unassisted down ladders wearing full turnout gear
- Carry people unassisted via stairs wearing full turnout gear
- Carry a section of rolled hose unassisted
- Lower ladders and re-bed them onto the truck/quint
- Remove an extension ladder from the apparatus unassisted and carry it to its destination
- Operate a charged line from confined spaces
- Operate foam equipment
- Operate a line from heights (e.g. rooftops)
- While on a ladder, direct water at fire
- Operate the ladder pipe from an aerial platform
- Extend the booster line to a fire
- Hoist equipment to upper levels by a rope

Mechanical Functions

- Make and unmake coupling connections
- Operate power tools (e.g., chain saw, circular saw, etc.) during the course of firefighting activities
- Remove the hydrant cap with a wrench

- Safely shut off utility services to buildings in emergency situations
- Operate heavy equipment (e.g., "jaws-of-life", etc.) in response to an emergency
- Operate electrical/gas shut-off valves
- For aerial ladders, set up truck jacks, place chocks, and then position and raise ladder
- Make openings for ventilation using equipment (e.g., saws, axes, etc.)
- Drive firefighting/emergency equipment to and from a scene
- Respond to hazards related to electrical emergencies
- Operate a fire extinguisher
- Inspect an engine during operation; check gauges