

# SAN DIEGO FIRE-RESCUE DEPARTMENT

## **FIRE ACADEMY SPIEL BOOK**



TRAINING & EDUCATION DIVISION

**“QUALITY AND CONSISTENCY THROUGH ON-GOING  
TRAINING, EDUCATION, AND SAFETY”**

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# FIRE ACADEMY SPIEL BOOK

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## **SPIEL #1 SELF-CONTAINED BREATHING APPARATUS (SCBA)**

- 1. DESCRIPTION: Scott Air-Pak X3 Pro Self-Contained Breathing Apparatus**
  
- 2. USAGE: Protects user from:**
  - 2.1. High Heat**
  - 2.2. Smoke**
  - 2.3. Toxic Gases**
  - 2.4. Deficiency in Atmospheric Oxygen**
  
- 3. SPECIFICATIONS:**
  - 3.1. Back Frame and Harness Assembly:**
    - 1. Solid, lightweight, one piece, polycarbonate and plastic frame**
    - 3. Will allow for connection to 30, 45, or 60-minute cylinders**
    - 4. Made of heavy braided webbing with no screws or bolts**
    - 5. Quick release buckles**
    - 6. Double locking latch and Kevlar retention strap**
    - 9. Dual Emergency Breathing Support System (EBSS)**
    - 10. Battery holder carries 6 "AA" batteries**
    - 11. Snap-Change cylinder connection**
    - 12. Drag Rescue Loop (DRL)**
  
  - 3.2. Air Cylinder and Valve Assembly:**
    - 1. Lightweight, composite cylinder made of an aluminum alloy inner shell, with a total over wrap of carbon fiber, fiberglass and an epoxy resin**
    - 2. 45-minute bottle holds 1,800 liters of air**
    - 3. 99.9% certified grade D breathable air**
    - 4. Working pressure= 4,500 psi**
    - 5. Cylinder Rupture Pressure= 13,500 psi**
    - 6. Frangible disc burst pressure= 7,500 psi**
    - 7. Quick connect fitting**
    - 8. Dual Window Pressure Gauge with elastomeric bumper**
    - 9. Ratchet Cylinder Valve Hand wheel:**
    - 10. Straight CGA inlet for charging cylinders (covered)**
    - 11. Tank Information:**
      - a. DOT #**
      - b. Last hydro test date**
      - c. Manufacture date**
      - d. Serial Number**
    - 12. Maintenance:**
      - a. Hydrostatic testing: Every 5 years**
        - i. When subjected to extreme heat**
        - ii. Dents or gouges**
        - iii. Deformation**
        - iv. Or any suspected damage**

- b. **Checked:**
    - i. **Monthly**
    - ii. **Daily**
    - iii. **Before and after each use**
  - c. **15-year life expectancy**
13. **Do not open bottles unless attached to a regulator or pressure reducer**

3.3. **Sensor Module Assembly:**

- 1. **Mounted on back frame (adjacent to pressure reducer)**
- 2. **Powered by 6 "AA" batteries (in the battery pack mounted on the back frame)**
- 3. **Alerts of downed firefighter**
- 4. **Mounted LEDs and sounders**
- 5. **Automatic activation upon system pressurization**
- 6. **Activation:**
  - a. **Green flashing LED**
  - b. **Activation chirp**
- 7. **Pre-Alarm:**
  - a. **Motionless for 20 sec**
  - b. **Red flashing LED**
  - c. **Reset- move BA or press yellow reset button on side of control console**
- 8. **Full-Alarm:**
  - a. **10-12 sec after pre-alarm**
  - b. **Red flashing LED**
  - c. **Reset- Press yellow reset button twice on side of control console**
- 9. **Turning Off:**
  - a. **Bleed air from system**
  - b. **Press yellow reset button on side of control console twice**
  - c. **Listen for confirmation of deactivation chirp**
- 10. **Low Battery:**
  - a. **Orange flashing LED**
  - b. **Accompanied by a chirp every two sec**

3.4. **Remote Gauge Assembly:**

- 1. **Mechanical gauge reads within 250 PSI of primary cylinder gauge**
- 2. **Measures Empty, 10, 20, 30, Full**
- 3. **Red= 1/3 cylinder**
- 4. **Green= Full cylinder**
- 5. **Red Button: Manual alarm**
  - a. **Will work even when system is not pressurized (As long as batteries are in good condition)**
- 6. **Yellow button: Push twice to reset**

3.5. **Pressure Reducer Assembly:**

- 1. **Primary reducing valve:**
  - a. **Mounted on the back frame (adjacent to sensor module)**
  - b. **Reduces pressure from 4500 psi to between 85-110 psi**

2. **Secondary reducing valve:**
    - a. **Functions if primary reducer fails**
    - b. **Activates Vibralert**
  3. **Automatic transfer valve:**
    - a. **Transfers air from the primary to the secondary reducer**
    - b. **Activated if the secondary is in use**
  4. **Low cylinder transfer valve:**
    - a. **Will activate Vibralert: At approximately 33% of full rated cylinder pressure (1500 psi) or if secondary is in use**
- 3.6. **Mask Mounted Regulator Assembly:**
1. **Supplies and maintains air to the face piece**
  2. **Attached to low pressure hose**
  3. **Positive pressure**
  4. **Regulator starts upon inhalation**
  6. **Red purge valve:**
    - a. **Allows air to bypass if regulator fails.**
    - b. **Defogs mask via the spray bar.**
  8. **Houses Vibralert**
  9. **Regulator Failure:**
  10. **DO NOT FLUSH OR SUBMERGE REGULATOR IN WATER!**
- 3.7. **Face Piece Assembly:**
1. **Kevlar head harness with flame resistant straps**
  2. **High-temperature Polycarbonate lens with abrasion resistant and anti-fog coatings**
  5. **Fit Test: Performed yearly by personnel at Station 36**
  6. **Cleaning:**
    - a. **Mild soap and water**
    - b. **Disinfect with hypochlorite solution or 2 tablespoons bleach / 1-gallon water**
- 3.8. **Visualert Heads-Up-Display Assembly: HUD**
- 3.9. 2. **Keeps user informed of air and battery status:**
- 3.10. **Dual Emergency Breathing Support System (EBSS) / Buddy Breathing Hose:**
1. **Allows user to connect to another user without having to disconnect the regulator supply hose**
- 3.10. **Rapid Intervention Crew (RIC) - Universal Air Connection (UAC):**
1. **Allows for air to be supplied to a down or trapped firefighter**
  2. **Located on the FF's left side of pressure reducer housing block ("left for life")**
  4. **For emergency use only (works with RIC bags on Trucks, USAR 2 and USAR 41)**
  5. **Always keep fitting covered**

## **SPIEL #2 THERMAL IMAGER**

1. **DESCRIPTION:** FLIR K65 Thermal Imaging Camera (TIC). Detects and converts thermal energy radiated/generated from surrounding objects into a visual image.
2. **USAGE:**
  - 2.1. Search & Rescue
  - 2.2. Size-up and Scene Assessment
  - 2.3. Locate seat of fire and extension
  - 2.4. Identify potential flashover
  - 2.5. Determine entry and ventilation points
  - 2.6. Overhaul
  - 2.7. Hazmat Incidents
3. **SPECIFICATIONS:**
  - 3.1. Weighs 2.4 lbs.
  - 3.2. Powered by Rechargeable Lithium Ion Batteries
  - 3.3. 4-hour operating time
  - 3.4. 2x digital zoom
  - 3.5. Image modes:
    1. Basic mode
    2. Black & white mode
    3. Fire mode
    4. Search & rescue mode
    5. Heat detection mode
4. **ADDITIONAL EQUIPMENT:**
  - 4.1. Retractable lanyard
  - 4.2. Apparatus charging system
  - 4.3. Additional battery
  - 4.4. Star screwdriver
5. **SAFETY PRECAUTIONS:**
  - 5.1. Do not rely on the Thermal Imaging Camera as the sole means of navigation or deviate from Standard Operating Practices during use.
  - 5.2. Thermal energy is not transmitted through glass/water and may be reflective off of smooth surfaces.
  - 5.3. Intrinsically safe.
  - 5.4. Clean with mild soap and water, wipe down with soft terry cloth towel.



### **SPIEL #3 ELECTRIC RAMFAN**

1. DESCRIPTION: 805-Watt, 110/220 Volt, 2 Horsepower, high velocity flow, stackable, RAMFAN turbo ventilator.
2. USAGE: Ventilation
3. SPECIFICATIONS:
  - 3.1. 16-inch diameter fan with 21 cast aluminum turbo blades
  - 3.2. Weight 49 pounds
  - 3.3. Free flow equals 3,000 cfm
  - 3.4. Duct flow equals 2,375 cfm
  - 3.5. Non-sparking Lexan polycarbonate housing
  - 3.6. Uses 12- or 16-inch duct for confined space
  - 3.7. Motor is intrinsically safe for confined space use:
    1. Class I, Group D = Gas & Vapors
    2. Class II, Groups E, F, G = Combustible Dust
4. ADDITIONAL EQUIPMENT:
  - 4.1. Source of power
  - 4.2. Extension cord
  - 4.3. Electrical adapters
5. SAFETY PRECAUTIONS:
  - 5.1. Wear full protective safety gear and eye protection
  - 5.2. Keep hands away from grill
  - 5.3. Keep curtains and other objects away from intake side of blower
  - 5.4. Only use department generator or properly tested house current

## **SPIEL #4 GAS RAMFAN**

1. DESCRIPTION: One cylinder, 4-stroke cycle, Honda 5.5 horsepower, gasoline powered, 5 position, rapid tilt, RAMFAN turbo ventilator.
2. USAGE: Ventilation
3. SPECIFICATIONS:
  - 3.1. Unleaded fuel only
  - 3.2. 16-inch diameter fan with 21 cast aluminum turbo blades
  - 3.3. Weight 84 pounds
  - 3.4. Air flow:
    1. Actual = 6,500 cfm
    2. V pattern = 13,000 cfm
  - 3.5. Oil alert protection system
  - 3.6. Full width locking handle
  - 3.7. Heavy duty wheels and rock guard for use in rough terrain
  - 3.8. Run time 58 minutes
4. ADDITIONAL EQUIPMENT:
  - 4.1. Unleaded fuel and filter funnel
  - 4.2. Deodorizer, "Smoke-O"
5. SAFETY PRECAUTIONS:
  - 5.1. Wear full protective safety gear and eye protection
  - 5.2. Keep hand away from grill
  - 5.3. Keep curtains and other objects away from intake side of blower
  - 5.4. Position ejector so that it will not obstruct ingress or egress of personnel
  - 5.5. Do not move while in operation
  - 5.6. Wear hearing protection when in close proximity to ejector

## **SPIEL #5 PORTABLE GENERATOR**

1. DESCRIPTION: One cylinder, 4-stroke cycle, Honda 13.0 horsepower gasoline powered generator
2. USAGE: Provide electrical power to equipment
3. SPECIFICATIONS:
  - 3.1. 120/240-volt AC current
  - 3.2. 6500-watt output
4. ACCESSORIES:
  - 4.1. 4 three prong outlets
  - 4.2. 1 three prong twist lock outlet
  - 4.3. 1 four prong twist lock outlet
5. ADDITIONAL EQUIPMENT:
  - 5.1. Unleaded fuel and filter funnel
  - 5.2. Extension cord
  - 5.3. Electrical adaptors
6. SAFETY PRECAUTIONS:
  - 6.1. Never ground generator
  - 6.2. 20 amp fuse for overload
  - 6.3. Switch to turn electricity on and off
  - 6.4. Never start or stop motor with load on it (equipment attached)

## **SPIEL #6 GROUND EXTENSION LADDERS**

1. DESCRIPTION: 24, 28, 35- & 40-foot Ground Extension Ladders, 12 to 16-foot Roof Ladders, 20-foot Wall Ladder
2. USAGE: Ingress and egress above and below ground
3. SPECIFICATIONS:
  - 3.1. Beam
  - 3.2. Bed
  - 3.3. Bottom/Butt
  - 3.4. Fly
  - 3.5. Guides
  - 3.6. Halyard
  - 3.7. Heat Sensors
  - 3.8. Hooks
  - 3.9. Locks
  - 3.10. Pulley
  - 3.11. Rungs
  - 3.12. Spurs
  - 3.13. Stops
  - 3.14. Top
  - 3.15. Truss
  - 3.16. Truss Blocks/Rung Plate
4. SAFETY PRECAUTIONS:
  - 4.1. Wear helmet
  - 4.2. Watch hand placement when extending and retracting fly
  - 4.3. Lift ladder with legs and not back
  - 4.4. Tie excess halyard off to prevent tripping
  - 4.5. Tie beam off to solid surface to stabilize ladder
  - 4.6. Watch for under and above ground sources of electricity
5. MAINTENANCE:
  - 5.1. Every Saturday and after each use inspect ladders for:
    1. Loose bolts or rivets
    2. Damaged hardware
    3. Damage to structural components
    4. Heat sensor label discoloration
    5. Worn Halyard
  - 5.2. CLEANING:
    1. Clean with clear water (dry with chamois)
    2. Lube pulley and locks with light weight oil (as needed)
    3. Lube guides with paraffin wax

## **SPIEL #7 CHAINSAW**

1. DESCRIPTION: One cylinder, two-stroke cycle, gasoline powered, chain saw
2. USAGE: Ventilation, Forcible Entry, Rescue
3. SPECIFICATIONS:
  - 3.1. 3.72 cubic inch engine
  - 3.2. 12,000 rpm max. speed
  - 3.3. 20".063" guide bar with RDR chain or 24"0.050" guide bar with RSF Brush chain
  - 3.4. Hand guard with chain brake
  - 3.5. 50:1 Fuel oil mixture
  - 3.6. Lubricate chain with 30 wt. oil
  - 3.7. Weight - 19 lbs.
4. ACCESSORIES:
  - 4.1. Slot screwdriver/socket tool (Scrench)
5. ADDITIONAL EQUIPMENT
  - 5.1. TruFuel 50:1 Mix
  - 5.2. Spare chain
6. SAFETY PRECAUTIONS:
  - 6.1. Wear work gloves, safety gear, and eye protection while working on the saw and full PPE for ventilation operations
  - 6.2. Never lug or bind chain
  - 6.3. Change chain when any teeth are missing
  - 6.4. Avoid cutting with tip to prevent kick-back.
  - 6.5. Set the chain brake when traveling with a running saw and when in close proximity to other personnel.

## **SPIEL #8 RESCUE SAW**

1. DESCRIPTION: One cylinder, 2-stroke cycle, gasoline powered rescue saw.
2. USAGE: Ventilation, Forcible Entry, Rescue
3. SPECIFICATIONS:
  - 3.1. 5500 RPM max. speed
  - 3.2. 14-inch diamond tip combination blade carried on saw
  - 3.3. 50:1 Fuel oil mixture
  - 3.4. Equipped with adjustable blade guard
4. ACCESSORIES:
  - 4.1. Blade: Carbide tip, Wood and Masonry
  - 4.2. Tools for changing blades
5. ADDITIONAL EQUIPMENT:
  - 5.1. Slot screwdriver/socket tool (Scrench)
  - 5.2. Star tool
  - 5.3. TruFuel 50:1 Mix
  - 5.4. Extra blades
6. SAFETY PRECAUTIONS:
  - 6.1. Wear full protective safety gear and eye protection
  - 6.2. Ensure RPM rating on blade is higher than the saw's RPM
  - 6.3. Check for proper blade direction
  - 6.4. Clear area of unnecessary personnel when starting saw
  - 6.5. Check and clear area of flammable objects
  - 6.6. Be cautious of sparks and the possibility of blade disintegration
  - 6.7. Never lug or bind the blade
  - 6.8. Never adjust blade guard while blade is spinning

## **SPIEL #9 RECIPROCATING SAW**

1. **DESCRIPTION:** Milwaukee 28 Volt Lithium Ion M28 Sawzall reciprocating saw, uses high powered Milwaukee built motor to deliver faster cutting and performance
2. **USAGE:** Vehicle extrication, Overhaul, Ventilation, Forcible Entry
3. **SPECIFICATIONS:**
  - 3.1. Lithium Ion Batteries
  - 3.2. Keyless blade change
  - 3.3. 1-1/18 in stroke length
  - 3.4. 3000 strokes per minute
4. **ACCESSORIES:**
  - 4.1. Demolition blade carried on saw
5. **ADDITIONAL EQUIPMENT:**
  - 5.1. Battery charger
  - 5.2. Extra batteries
  - 5.3. Extra blades
6. **SAFETY PRECAUTIONS:**
  - 6.1. Wear full protective safety gear and eye protection
  - 6.2. Adjust blade depth guide if needed

## SPIEL #10 AIRBAGS

1. DESCRIPTION: Maxi-force Airbag Systems are a multi-application inflation system
2. USAGE: Lifting and displacement of heavy rigid objects
3. SPECIFICATIONS:
  - 3.1. Piston type high pressure regulator:
    1. Reduces inlet pressure from 4500 PSI to 135 PSI
    2. Working pressure of system is 118 PSI
    3. Relief valve is factory set at 150 PSI
  - 3.2. Dual (Dead man) Safety Relief and Control:
    1. Single input/dual output
    2. 118 PSI relief valve
  - 3.3. Interconnecting Hoses:
    1. Three 16' sections of hose
    2. Color coded & interchangeable
  - 3.4. Airbags:
    1. Neoprene, reinforced with three layers per side of Kevlar reinforced fabric
    2. 118 PSI working pressure
    3. Sizes range from 6 x 6 up to 36 x 36 inches
    4. Common Bag Specifications:

	<u>Model</u>	<u>Size</u>	<u>Capacity (tons)</u>	<u>Height</u>
a.	KPI-12	15" x 15"	12	8.2"
b.	KPI-17	15" x 21"	17	9.2"
c.	KPI-22	20" x 20"	21.8	11.1"
4. ADDITIONAL EQUIPMENT:
  - 4.1. Cribbing
  - 4.2. Crowbar
5. SAFETY PRECAUTIONS:
  - 5.1. Wear full protective safety gear and eye protection
  - 5.2. Never stack more than two bags



## **SPIEL #11 AMKUS**

1. **DESCRIPTION:** High-powered, self-contained, hydraulic, spreading, pushing, pulling and cutting device. It operates without flames or sparks, is a one-person operation, handheld, and completely portable.
2. **USAGE:** Vehicle Extrication, Forcible Entry
3. **SPECIFICATIONS:**
  - 3.1. **Power Unit:**
    1. Weight - 100 lbs. w/ hose, hydraulic oil and fuel
    2. 1 cylinder, 4-stroke cycle, 3.5-4.5 horsepower engine
    3. 2-gallon hydraulic reservoir
    4. 2 - 20' sections of hydraulic hose
    5. Hydraulic pump operates at 10,500 PSI and delivers a constant flow of non-toxic mineral base fluid to the rescue tool
  - 3.2. **Spreader Tool:**
    1. Weight - 44 lbs. w/ hose oil and tips
    2. 20,000 lbs. pressure/force at the tips
    3. 24" spreading distance
    4. Aluminum alloy arms with titanium tips
  - 3.3. **Cutter:**
    1. Weight - 46 lbs.
    2. 200,807 lbs. cutting force
    3. 360° rotating handle
  - 3.4. **Rescue Rams:**
    1. 30,000 lbs. pushing
    2. 15,000 lbs. pulling
    3. 20" Ram: Extends from: 14"-20", Weight: 23 lbs.
    4. 40" Ram: Extends from: 24"-40", Weight: 33 lbs.
    5. 60" Ram: Extends from: 34"-60", Weight: 43 lbs.
    6. 10" Extension
4. **ADDITIONAL EQUIPMENT:**
  - 4.1. Grab hooks and chains
  - 4.2. Shackle hooks
  - 4.3. Re-enforcement plate
  - 4.4. Unleaded fuel and filter funnel
5. **SAFETY PRECAUTIONS:**
  - 5.1. Wear full protective safety gear and eye protection.
  - 5.2. Use as a one-person operation
  - 5.3. Never handle the inside of the spreaders or cutters when in operation

- 5.4. Keep area clear of debris, which may become projectiles
- 5.5. Protect victims from flying debris
- 5.6. Never stand between tool and vehicle
- 5.7. Stabilize vehicle prior to operation
- 5.8. Ensure scene safety



## **SPIEL #13 RESCUE 42 STRUTS**

1. DESCRIPTION: Rescue 42 Struts and Straps
2. USAGE: Stabilization of vehicles, heavy machinery and structures
3. SPECIFICATIONS:
  - 3.1. Telescoping composite struts
  - 3.2. 2 long struts (3' to 8')
  - 3.3. 2 short telescoping composite struts (2' to 5')
  - 3.4. Struts have rust and chemical resistant coating
4. ACCESSORIES:
  - 4.1. 4 Red ratcheting straps (27' lengths)
  - 4.2. A-Frame head
  - 4.3. Combi-head
  - 4.4. Screw jack head
  - 4.5. Cinch ring
  - 4.6. Composite and metal pins
  - 4.7. Hook cluster
  - 4.8. Spike foot
  - 4.9. Chains
5. ADDITIONAL EQUIPMENT:
  - 5.1. Battery pack
  - 5.2. Cribbing
6. SAFETY PRECAUTIONS:
  - 6.1. Strap factory rating = 10,000lbs
  - 6.2. SDFD working = 3,335 lbs. (3:1 safety ratio)
  - 6.3. Struts rating = refer to chart on struts
  - 6.4. Wear full protective safety gear and eye protection
  - 6.5. Ensure metal pins in baseplate only and composite pins are set prior to operation
  - 6.6. After operation loosen straps slowly with handles released. If unable to release handle a screwdriver may be used to release drum.
  - 6.7. Keep struts between 45-70 degrees for safety (45 degrees preferred)
  - 6.8. Can be used for lifting and stabilization of objects
  - 6.9. DO NOT extend past orange marking
7. MAINTENANCE:
  - 7.1. Clean with mild soap and water
  - 7.2. Inspect for cracks, dents, splintering or bowing

## **SPIEL #14 PERSONAL ESCAPE SYSTEM (PES)**

1. **DESCRIPTION:** A five-piece kit containing a belt, tether, hook, rope and descent control device. PES is an integral part of Structural PPE.
2. **USAGE:** Used for firefighter emergency escape from upper floors.
3. **SPECIFICATIONS:**
  - 3.1. Extreme-Rescue belt, Class I Harness, equipped with additional D ring.
  - 3.2. Safe-D carabiner has 3 stage self-locking design, captive eye pin prevents side loading
  - 3.3. Sterling Lightning GT hook with gated hitching slot and attached pull strap
  - 3.4. Escape Rope: 50' 7.5mm Technora sheath with nylon core, 3,900 lbs. breaking strength and heat resistant to 930\* F.
  - 3.5. Halo descent control device with auto stopping feature
  - 3.6. Total system weight: 2lbs 14oz
4. **ADDITIONAL EQUIPMENT:**
  - 4.1. Full Structural PPE and Portable Radio
  - 4.2. Forcible Entry/Exit tool
5. **SAFETY PRECAUTIONS:**
  - 5.1. Wear full PPE and SCBA
  - 5.2. Call a Mayday to notify personnel of your situation
  - 5.3. Ensure hook is properly placed and set prior to exiting window
  - 5.4. Ensure two raps through hitching slot on remote anchor
  - 5.5. Ensure PES is properly inspected and repacked after each use

## **SPIEL #15 ROPES/KNOTS/WEBBINGS AND HARDWARE**

1. DESCRIPTION: Various length and dimensions of rope, webbing and hardware used for life, utility and training lines.
2. USAGE: Set up rescue systems
  - 2.1. Software:
    1. **1/2" nylon static kernmantle rope: Constructed of nylon**
      - a. Lengths of 10-600'
      - b. Factory rating (breaking strength) – 9,600lbs
      - c. SDFD working rating – 640lbs (15:1 working ratio)
      - d. Strengths: Kern (core) – 75%, Mantle (sheath) – 25%
      - e. SDFD Classifications:
        - i. Lifeline: 0-5 years
        - ii. Training Line: 5-10 years
        - iii. Utility Line: 10-15 years
    2. **1/2" polypropylene rope: Used for water rescue**
      - a. Located on US&R 4 and USAR 41
      - b. Factory rating (breaking strength) – 4,000lbs
      - c. SDFD working rating – 260lbs (15:1 working ratio)
    3. **Rope Identification Markings:**
      - a. SDFD (agency name)
      - b. Length
      - c. Use
      - d. Company
      - e. Identification number
      - f. Date placed into service
    4. **Proper Care of Ropes:**
      - a. Pad ropes
      - b. Wash ropes as needed
      - c. Inspect ropes
      - d. Avoid sharp bends
      - e. Do not stand or step on ropes
      - f. Do not leave in sunlight for extended time
      - g. Do not expose to chemicals
      - h. Do not expose to hydrocarbons (including exhaust)
      - i. Do not overload
    5. **8mm prusik cord**
      - a. 1/3-1/2 diameter of rope
      - b. Lifeline: 0-5 years

- c. Uses:
  - i. Breaking Cam
  - ii. Pulling/Hauling Cam
  - iii. Gain Saver
  
- 6. **1" nylon tubular webbing**
  - a. Constructed of monofilament nylon
  - b. Factory rating – 4,000lbs
  - c. SDFD working rating – 800lbs (5:1 working ratio)
  - d. Lifeline: 0-5 years
  - e. Uses:
    - i. Harnesses
    - ii. Anchors
    - iii. Stokes tie-in
  - f. Webbing Identification:
    - i. Green – 5' (anchors)
    - ii. Yellow – 12' (chest harnesses, anchors)
    - iii. Blue – 15' (seat harnesses, swami belt, anchors)
    - iv. Red – 16' (personal use)
    - v. Orange – 20' (stokes tie-in, anchors)
  
- 2.2. Hardware:
  - 1. Alloy carabiner:
    - a. Factory rating – 6,900lbs
    - b. SDFD working rating – 460lbs (15-1 working ratio)
    - c. Personal use ONLY
  
  - 2. Steel carabiner:
    - a. Minimum rating of 40kN
    - b. General use (used in systems)
  
  - 3. Pulley:
    - a. 2" or 4" Diameter
    - b. Minimum rating of 36kN
  
  - 4. 8 plate:
    - a. Steel or Aluminum
    - b. Minimum rating of 22kN
    - c. OOS when 15% of original diameter is worn away
  
  - 5. Edge protection:
    - a. Edge roller
    - b. Aluminum wheels and frame. Frames connect together in series
    - c. Edge Guard
    - d. Canvas
    - e. Fire hose

- f. Plastic
- 6. Steel Ring: Rated @ 44.5kN
- 7. Anchor Plate:
  - a. Steel or aluminum
  - b. Minimum rating or 36kN

### 2.3. Knot Characteristics

- 1. Easily tied and untied
- 2. Easily identified
- 3. Minimum strength loss

### 2.4. Knots & Hitches

- 1. Family of 8's:
  - a. Stopper
  - b. Bend
  - c. Follow through
  - d. On-a-bight
  - e. Double loop
- 2. Other Knots:
  - a. Overhand bend
  - b. Overhand safety
  - c. Bowline
  - d. Running Bowline
  - e. Half hitch
  - f. Clove hitch
  - g. 3-wrap prusik
  - h. Truckers hitch



## METRO COMMAND CENTER

<u>STATION</u>	<u>STREET</u>	<u>CROSS STREET</u>
Emergency Command & Data Center (ECDC)	Kearny Villa Rd	Aero Dr

## AIR OPERATIONS

<u>STATION</u>	<u>UNITS</u>	<u>STREET</u>	<u>CROSS STREET</u>
Air Operations	Copter 1, Copter 2	Ponderosa Ave	Balboa Ave

## BATTALION 1

<b><u>STATION</u></b>	<b><u>UNITS</u></b>	<b><u>STREET</u></b>	<b><u>CROSS STREET</u></b>
Airport	R1, R2, R3, R5 (ARFF)	Pacific Highway	Washington St
FS 1	E1, E201, T1, LA1, MAST, CU1, XR-1, XR-2, U81 (EDT)	First Ave	B St
FS 2	E2, B1, USAR2 (TRT)	W Cedar St	Pacific Hwy
FS 3	E3 (ARFF)	W Kalmia St	State St
FS 4	E4	Eighth Ave	J St
FS 7	E7	Cesar E. Chavez Pkwy	National Ave
FS 11	E11, T11	25 <sup>th</sup> St	Broadway

## BATTALION 2

<b><u>STATION</u></b>	<b><u>UNITS</u></b>	<b><u>STREET</u></b>	<b><u>CROSS STREET</u></b>
FS 5	E5, B2	9 <sup>th</sup> Ave	University Ave
FS 8	E8 (ARFF)	Goldfinch St	Washington St
FS 14	E14, T14, BR14, SC1	32 <sup>nd</sup> St	Lincoln Ave
FS 18	E18, OES304	Felton St	Adams Ave
FS 23	E23, U82 (ALLIED EQUIP)	Comstock St	Linda Vista Rd
FS 28	E28, T28, WT28, CR28, FM28 (PUMP TESTING)	Kearny Villa Rd	Aero Dr
FS 36	E36 (SCBA)	Chateau Dr	Mt Abernathy Ave

### BATTALION 3

<b><u>STATION</u></b>	<b><u>UNITS</u></b>	<b><u>STREET</u></b>	<b><u>CROSS STREET</u></b>
FS 15	E15, U83	Voltaire St	Ebers St
FS 20	E20, T20, U20 (HOSE REPAIR)	Kemper St	Midway Dr
FS 21	E21, T21	Grand Ave	Mission Blvd
FS 22	E22	Catalina Blvd	Savoy St
FS 25	E25, B3	Chicago St	Napier St
FS 27	E27	Clairemont Dr	Cole St

## BATTALION 4

<b><u>STATION</u></b>	<b><u>UNITS</u></b>	<b><u>STREET</u></b>	<b><u>CROSS STREET</u></b>
FS 10	E10, T10, BR10, CU10 (PAT)	62 <sup>nd</sup> St	Acorn St
FS 17	E17	Chamoune Ave	Orange Ave
FS 26	E26 (EMS)	54 <sup>th</sup> St	Krenning St
FS 31	E31, M99, U84	Camino Rico	College Ave
FS 34	E34, BR34	Cowles Mountain Blvd	Navajo Rd
FS 39	E39	La Cuenta Dr	Tierrasanta Blvd
FS 45	E45, T45, B4, HM1, HM2, ERT (HAZMAT)	Friars Rd	Mission Village Dr

## BATTALION 5

<b><u>STATION</u></b>	<b><u>UNITS</u></b>	<b><u>STREET</u></b>	<b><u>CROSS STREET</u></b>
FS 9	E9 (EMS)	La Jolla Pkwy	Torrey Pines Rd
FS 13	E13	Nautilus St	Fay Ave
FS 16	E16	Via Casa Alta	La Jolla Scenic Dr
FS 24	E24, BR24, M24	Hartfield Ave	Del Mar Heights Rd
FS 35	E35, T35, BR35, U85	Eastgate Mall	Genesee Ave
FS 41	E41, USAR41 (TRT)	Carroll Canyon Rd	Scranton Rd
FS 47	E47	Edgewood Bend Ct	Carmel Valley Rd
FS 50	E50, B5	Shoreline Dr	Nobel Dr

## BATTALION 6

<b><u>STATION</u></b>	<b><u>UNITS</u></b>	<b><u>STREET</u></b>	<b><u>CROSS STREET</u></b>
FS 6	E6	Twining Ave	Palm Ave
FS 12	E12, T12, BR12, B6, U86	Imperial Ave	Willies James Jones Ave
FS 19	E19, WT19	Oceanview Blvd	35 <sup>th</sup> St
FS 29	E29, T29, BR29, U29	W San Ysidro Blvd	Cottonwood Rd
FS 30	E30	Coronado Ave	Hollister St
FS 32	E32	Briarwood Rd	Paradise Valley Rd
FS 43	E43, BR43, CR43	La Media Rd	Otay Mesa Rd
FS 51	E51 (PAT)	Skyline Dr	Sychar Rd
Squad 55	Squad 55	Imperial Ave	61 <sup>st</sup> St

## BATTALION 7

<u>STATION</u>	<u>UNITS</u>	<u>STREET</u>	<u>CROSS STREET</u>
FS 33	E33, OES8631	Bernardo Center Dr	Rancho Bernardo Rd
FS 37	E37, BR37	Spring Canyon Rd	Blue Cypress Dr
FS 38	E38	New Salem St	Camino Ruiz
FS 40	E40, T40, BR40, WT40, LA40, U40 (LADDER REPAIR)	Salmon River Rd	Paseo Montalban
FS 42	E42	World Trade Dr	Highland Ranch Rd
FS 44	E44, T44, BR44, B7, U87 (PAT)	Black Mountain Rd	Maya Linda Rd
FS 46	E46	Lazanja Dr	Camino Del Sur
Squad 57	Squad 57	San Pasqual Valley Rd	Academy Rd