



## **FLUSAR Structural Collapse Rescue Operations and Technician: Equipment List**

**Effective May 1, 2016**

1. Have a classroom with adequate lighting, heating, cooling and ventilation.
2. When needed, have access to a rubble pile suitable for structural collapse training.
3. Have the equipment cache listed.

**All items must meet current NFPA standards, where applicable.**

**Equipment quantities are scalable to student number provided all course objectives are met by each student.**

<b>Station 1: Hydraulic tool and Electrical tool</b>	<b>Qty</b>
concrete slabs, minimum size 4'x4'x4''	3
36'' concrete pipes	2
Hydraulic Rescue Systems to include: power plant, chainsaw, breaker etc.	1
Dedicated water supply with manifold for Hydraulic systems	1
Electric rebar cutters, and/or hydraulic rebar cutter	2
Electric chainsaws with spare chains and tool for bar adjustment	2
Electric demolition hammer kits complete with various tip attachments	2
Reciprocating Saw complete with metal and wood cutting blades	1
Scrap wood large enough for students to practice cuts	
#4 rebar or larger for practice cuts	
Toolbox and rags to support tool maintenance and clean up.	
Dedicated electrical supply and cords/junction box to support tools and lighting if required.	
Lighting if required to support stations	
Work tables to support station	
Fluids to support power units, ie: fuel, oil etc.	
Safety components, ie: fire extinguisher, first aid kit, eye wash kit, PPE,	
Approved eye and ear protection	
Tarps for tool staging	

<b>Station 2: Gasoline powered tools</b>	
concrete slabs, minimum size 4'x4'x4"	3
36" concrete pipes	3
coring drills with spare drill bits and accessories, service kits with spare plugs	2
rotary cutoff saws complete with spare diamond segmented blades, abrasive and carbide tipped blades, tools for blade changes, field service kit and spare plugs	5
chainsaws complete with spare chains, tools for guide bar/chain replacement, spare plugs	5
reciprocating saw kits (if available) complete with spare blades, tools for blade changes etc.	2
Enough scrap wood for students to practice cuts	
Fluids to support power tools: gas, oil, mixes etc.	
Tarps for tool staging	
Dedicated water supply with manifold for tools with garden hoses	
Tool box and rags to support tool maintenance and clean up	
Work tables to support station	
Safety components: fire extinguisher, first aid kit, eye wash kit, PPE, approved eye and ear protection	
Lighting if required to support station	
<b>Station 3: Powder actuated tool, Anchor kit and Pneumatic nailers</b>	
concrete slabs, minimum size 4'x4'x4"	2
electrical drill kits for anchoring exercises	2
Dedicated electrical supply divided with junction box and extension cords	
Powder tool kits complete with enough extra loads and anchors for each student to complete task	2
Anchor kits complete with anchors, tools, including proper torque wrench	2
Pneumatic nail guns complete with air lines, regulators and air supply	2
Wizzer saw kits complete with extra blades, tools for exchange, air lines/supply, regulators, electric power source, extension cords	2
Rebar or other material for Wizzer saw practice cuts	
Air supply for tools: compressor, air cart etc.	
Lumber to properly demonstrate Pneumatic nail guns: gussets, 4"x4"s etc.	
Tarps to stage tools	
Work tables to support station	
Tool box and rags to support tool maintenance and clean up	
Safety components: fire extinguisher, first aid kit, eye wash kit, PPE, approved eye and ear protection	
Lighting if required to support station	

<b>Station 4: Oxy/Acetylene torches, Mapp gas tool, exothermic torches and Oxy/Gasoline torches</b>	
Stationary Oxy/Acetylene cutting torch kits complete with extra tips, cleaners, strikers, hammers, regulators, hoses, and tools for work station	2
Stationary Oxy/Gasoline torch kits complete with all accessories	2
Exothermic cutting torch kits	2
Oxy/Gasoline torches	2
Steel material for practice cutting: beams, sheets etc.	
Steel work/burn stations	8
protective eye wear, preferable to goggles with flip up lenses	12
protective leather jackets	6
sets protective gloves	12
Enough spare gas so each student can complete a burn: oxy/acetylene, oxy/gasoline	
Exothermic rods ¼" x4' if available	100
Extra batteries for exothermic starter	
Safety components : fire extinguisher, first aid kit, eye wash kit, PPE, approved eye and ear wear	
Lights if required to support the station	
Hand truck to assist moving cylinders	
Tool box and rags to support maintenance and clean up	
<b>Shoring Logistics List</b>	
<b>Lumber</b>	
6" X 6" X 16'	28
4" X 4" X 16'	50
4" X 4" X 12'	100
4" X 4" X 8'	48
2" X 6" X 16'	60
2" X 4" X 12'	30
2" X 4" X 8'	60
<b>Cribbing</b>	
4" X 4" X 18"	48
2" X 4" X 18"	24
Cleats 2" X 4" X 12"	60
Plywood Gussets 12" X 12" X 3/4" 200	200
Plywood Sheets 4' X 8' X 3/4"	12
Wedges 4" X 4" X 18"	36 pair
Wedges 2" X 4" X 12"	100 pair
Wooden Pallets	6
Radios	9
Water Jug, 5 gal.	2
Cups	200

<b>Shoring Logistics List (continued)</b>	
Dust Masks 1 Case	1 case <sup>1</sup>
Single Jack Hammer, 3 lb.	8
Sledge Hammer, 10 lb.	4
Framing Hammer, 22 oz.	24
Crow Bars	16
Carpenter Belt w/ lumber pencil	24
Level, 3' - 4'	2
Level, 6"	12
Tape Measure - 25'	24
Speed Square	12
Steel Framing Square	8
Chalk Lines	8
Utility Razor Knife	24
Cats Paw Nail Puller	12
Container for pulled nails- can, box	3
Ellis Clamps	12
Ellis Jacks	2
Ellis Post Screw Jacks	4
Shovel, Round Point	2
Pipe Cutter, 2" capability	1
Nails, 16d Duplex	200 lbs
Nails, 8d Duplex	200 lbs
Rotary Hammer	2
Rotary Hammer Masonry Bit, 1" X 18"	4
Rebar or Steel Pickets, 1"	36
Chain Saw, Gasoline	3
Chain Adjustment Tool	2
Spare Chain	4
Spare Bar (at the Base of Ops)	1
Spare Spark Plug (at the Base of Ops)	1
Rotary Saw, Gasoline w/ Carbide Tip	3
Belt Adjustment Tool	1
Spare Blade, Carbide Tip (at the Base of Ops)	4
Spare Belt (at the Base of Ops)	1
Spare Spark Plug (at the Base of Ops)	1
Gas Can, 5 gal. w/ pre-mix for saws	3
Chain Saw, Electric	2
Spare Chain	2
Chain Adjustment Tool	1
Bar oil	1
7 1/4" Circular Saw, Electric	2

<b>Shoring Logistics List (continued)</b>	
Spare Blade, Carbide Tip, 7 1/4"	1
Wrench to replace blade	1
Spare Blade, to Tip, 7 1/4" (at the Base of Ops)	2
10 1/4" Circular Saw, Electric	4
Spare Blade, Carbide Tip, 10 1/4", 40 tooth	2
110 Volt Power Supply (tower outlets OK)	1
Extension Cords	400'
Hilti Kwik Bolt or Ramset Trubolt	6
Hilti or Ramset Tool w/ kit	3
Hilti or Ramset Powder Charges	30 strips
Hilti or Ramset Pins, 3" w/ washers	2 boxes
Paslode Nail Gun (when available)	2
Paslode Nail Gun, gas canisters	6
Paslode Nail Gun, 16d nails	3 cases
Paslode Nail Gun, 8d nails	3 cases
Pneumatic Nail Gun	1
Pneumatic Nail Gun hose & regulator	1 each
SCBA Bottle, full	3
SCBA Back Pack	1
Pneumatic Nail Gun Nails, 16 d	1 case
Pneumatic Nail Gun Nails, 8 d	1 case
Pneumatic Nail Gun Oil	1
Pneumatic Nail Gun Nails, Duplex 16 d (Duofast M#CN350 SP)	1 case
Pneumatic Nail Gun Nails, Duplex 8 d (Duofast M#CN350 SP)	1 case
Pneumatic Shore, 2' - 6' (when avail.)	3 each
Pneumatic Shore regulator & hose	3
Pneumatic Shore ends & extensions	3
A-Frame Ladder, 6' minimum	4
<b>Breaching and Breaking</b>	
Concrete	
6'X6'X6" with #3 Rebar 12" on center grid pattern (2500 psi, 5 Sack mix)	56
4'X4'X3" with #3 rebar 12" on center grid pattern (2500 psi, 5 Sack mix)	69
48" x 8' concrete pipe	4
Double T's minimum 30 ft run	3
Steel	
steel plates 1/4", 4'X8' (can be scrap)	14
Steel I-beams various lengths (scrap)	14
Spool wire rope 1/2" 50'	1
trench box	1

<b>Breaching and Breaking (Continued)</b>	
10' x 2' x 20 gauge Q decking	4
Ancillary support	
automobiles (GAS TANKS REMOVED)	4
Old refrigerators or some other nuisance appliance (freon removed)	8
Wood	
4X4X8' dunnage	28
4"X4"X24" cribbing	20
Tools	
Complete heavy hydraulic concrete cutting systems including 90 lb. breakers, 40 lb. breakers, hydraulic rail saw, and concrete cutting diamond chain saws	2
Sections 100' hose for hydraulic system	4
Extra chain saw blades, and guide bars	2
Water sources for hydraulic concrete cutting system	2
100' sections of garden hose	2
Garden hose to 1 ½" adapters	2
Gasoline power rotary cutoff saws with 16" diamond blades	2
Gasoline powered rotary cutoff saws with 14" diamond blades	2
Extra 16" & 14" diamond cut off blades	2
Water pump can type sprayers	2
Core drills with diamond blades and water attachments	2
Rotary hammers with 3/8" bits	3
3/8" Rotary hammer bits	2
½" Rotary Hammer Bits	2
Box 3/8" anchor bolts with eyes or hangers (at least 50)	2
Torque wrenches with socket sets	2
Electric or pneumatic demolition hammers with moil points and chisel point bits	2
Sawsalls with spare 50 blades both wood and metal	3
Exothermic torches	2
Bottles extra oxygen (K tanks) for exothermic torches	3
Boxes ¼" X 36" exothermic rods 50/bx	9
Oxy/acetylene or mapp torches	2
Oxy/Gasoline torch set	1
Extra tips	1
Strikers	3
Tip cleaning tools	3
Extra O2 tanks (K tanks)	3
Extra acetylene tanks	2
Burner's goggles	4

<b>Breaching and Breaking (Continued)</b>	
Burner's gloves	4
Burner's jackets	4
Chainsaw, electric or gasoline	1
Rebar cutter	1
Respirators for dust	24
Tarpaulins 24 x 24	6
Confined space blower, intrinsically safe	1
Confined space tripod	1
Sections 100' rescue quality (NFPA) 1983 rope	2
5:1 mechanical advantage system	1
Manikins adult 185 lbs.	1
Patient retrieval system, Sked or stokes	1
Sledge hammers minimum 10 lb.	4
Mauls	4
Pinch bars 60"	4
Bolt cutters	4
Carabiners	10
1" or 2" webbing 16' lengths	8
2500 kW generators	3
ABC fire extinguishers	2
Water extinguishers	2
2.5 ton come-along (cable)	1
Atmospheric monitor	1
12-3 – 100' Set extension cords	6
Set lighting	1
<b>Support Equipment:</b>	
Forklift with capability of lifting and placing slabs	
<b>Manual Lifting and Moving Station</b>	
Backhoe , track loader or fork lift (15,000 lbs min)	1
"Jersey Rail" barriers 4 to 6 feet in length minimum	6
Sufficient chain, nylon rigging and shackles to lift and place Jersey rails	
Reinforced concrete slabs 8' X 8' (6" to 8" thick)	5
Reinforced concrete culvert pipe 8' long X 20" diameter	1
7' pinch bars	8
8' X 3" steel or galvanized roller pipes	16
14' X 6" X 6" wood timbers	4
14' X 4' X 4" wood timbers	8
Wood wedges 24" X 4"	30
Wood cribbing 24" X 4" X 4"	48
Wood cribbing 24" X 2" X 4"	24
Wood cribbing 24" X 6" X 6"	24

<b>Manual Lifting and Moving Station (Continued)</b>	
16" X 6" X 6"	2
5:1 rope and pulley Mechanical advantage system (200' rope)	1
3 ton come-a-long	1
Steel carabiners	6
Utility rope (200')	1
Utility ropes (15 to 50 feet in length)	4
36" pickets	6
Chain saw with fuel, oil and spare chain	1
Cans orange spray paint	2
can green spray paint	1
42" x 42" x 42" Concrete Block (Big Mo)	1
8' x 5' concrete pipe * for estimating weight	1
Entrenching or spade shovels	2
PPE: helmet, eye protection, steel toed boots	
<b>Crane Operations - Vertical Lifting and Rigging</b>	
Crane * 14 ton rough terrain (RT) recommended	1
Concrete / debris rubble pile	1
10' Steel "I" beams	2
4" x 4" cribbing	48
6" x 6" cribbing	24
4" x 4" wedges	24
Swivel hoist rings, ½" steel, Crosby or other USA equivalent	2
Eye nuts, ½" steel, Crosby or other USA equivalent	4
Wedge anchors, concrete, ½" x 5 ½"	24
Wedge anchors, concrete, ½" x 7"	24
Concrete Screws 3/8 x 6" (Simpson or Hilt)	24
Torque wrench, ½" drive, 250 lb. Capacity with sockets	1
Electric Roto-Hammer with 3/8" x 12 & ½" x 12 Bits	1
2000W (min) Gasoline Generator for Roto-Hammer	1
Chain, 10' x 3/8", grade 8, with clevis, slip hooks and latches	1
Chain, 20' x 3/8", grade 8, with clevis, slip hooks and latches	1
Shackles, 1 ¼", 12 ton, screw pins	4
Shackles, 5/8", 3 ¼ ton, screw pins	4
Choker, 20', 17,000 lb. polyester sling	2
Choker, 10', 17,000 lb. polyester sling	2
Choker, 7/16" x 8' wire rope, mechanical splice, 2400 lb. capacity	2
Slip hooks, clevis, with gates	4
Turnbuckles, 1", 12" take up, 10,000-lb. cap.	2
6' pinch point pry bars	2
4' wrecking bars (hook end)	2
8 lb. sledge hammer	2
Steel wedges	2



<b>Crane Operations - Vertical Lifting and Rigging (Continued)</b>	
Come-A-Long (2 ton minimum) Chain Type	2
30' tape measure	1
Oxy / acetylene cutting equipment	1
6,000 lb concrete slab * for estimating weight	1
8' x 5' concrete pipe * for estimating weight	1
Concrete block * for estimating weight	1
Odd shaped concrete object * for estimating weight	1
100ft of 3/8" wire rope (IWRC)	1
3/8" Crosby Clips	12
<b>Air Bag Work Station</b>	
5' minimum diameter x 8' minimum length concrete pipe	1
Rescue manikin	1
Salvage covers	2
High pressure air bag systems	2
Plywood squares for air bag protection	6
SCBA air cylinders	6
4" x 4" cribbing	48
4" x 4" wedges	24
Steel wedges	2
3 lb. sledge hammers (single jack)	2
8 lb. sledge hammers	2