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PXT
Mission Statement

To build on our skills and knowledge in vehicle & heavy rescue extrication so that we may share information with all rescuers to meet our common goal—
"Saving Lives" …

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Vehicle Extrication Classroom Notes

Contents:

- **NFPA 1670**
- **Vehicle Anatomy/Terminology/Construction**
- **Crash Types**
- **Rescue Action Plan**
- **Scene Safety Considerations**
- **Initial Activities Common To Most Rescues**
- **Vehicle Stabilization**
- **Disentanglement Evolutions; Doors, Roof, Dash**
- **Patient Removal Techniques**
- **World Rescue Organization Facts**
- **First Due Engine Company PBT**
- **Extrication Terms & Definitions**
- **Preformance Based Training benchmarks**
- **PXT legal waiver**

NFPA 1670, – The short version

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Awareness Level Competencies

- Sizing up existing and potential conditions
- Identifying resources needed
- Implementing agency response
- Controlling and managing the scene
- Implementing initial traffic control

Operations Level

- Identifying victim locations/survivability
- Making the scene safe (isolation/stabilization)
- Identifying and controlling fuel leaks
- Patient protection/packaging
- Gaining access to trapped patients
- Use of hand tools to access/disentangle
- Mitigating scene hazards
- Gathering necessary resources
- Additional traffic control measures
- Establishing operational work zones; hot, warm, cold
- Recognizing and working around Supplemental Restraint Systems
- Understanding vehicle design and construction features
- Knowledge of crash types/ mechanisms of injury
- Basic vehicle stabilization techniques

Technical Level Competencies

- Extrication/disentanglement from large vehicles – bus, trains, truck
- Advanced stabilization – vehicles not on their wheels
- Use of air lifting bangs
- Use of chains, wire rope, winches
- Utilization of heavy wreckers for rescue
- Use of power tools – hydraulic, pneumatic, electric

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Vehicle Anatomy/Terminology

Use driver and passenger side as opposed to left and right when referring to vehicle

- **Roof components**
  - Roof posts – A to Z from front to rear
  - Roof rail
  - Roof rib

- **Doors**
  - -Safety latch assembly
  - -Nader pin assembly
  - -Side impact bars

- **Rocker channel**

- **Dash/firewall assembly**
  - -Steering column
  - -Dash support bar/pipe
  - -Top rail/strut tower landmarks

- **Front/rear quarter panels**

- **Laminated safety glass** – used in windshields and throughout in some vehicles, must saw

- **Tempered safety glass** – used in side and rear windows, can break with tool

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Vehicle Construction

Body On Frame (BOF) Construction

It's the mounting of a separate body to a rigid frame which supports the drive train. In 1997 regulations changed BOF vehicles and how impact forces travel through them.

Newer BOF designs are intended to react to a collision in much the same way as a UNI-body, however there are several differences that must be considered.

- BOF Vehicles have separate frames that are made of thicker, heavier metal.
- Weight and mass of larger BOF bodies will affect channeling of impact energy differently than UNI-body.
- BOF bolted body sections absorb energy differently than welded structures.
- Impact energy will telescope further along the BOF frame.

UNI-body Construction

Is in which the body is integrated into a single unit with the chassis rather than having a separate body-on-frame. The welded "Unit Body or Uni-Body" is the predominant automobile construction technology today.

UNI-body vehicles are designed to fold and collapse as they absorb the impact of the collision and protect the passenger compartment.

The front and rear body portions are designed to:

- Deform easily
- Collapse in a predetermined fashion (crush zones)
- Form a structure that absorbs initial impact energy and directs remaining damage through the vehicle.
- Preserve the passenger compartment.

For the most part all of today's passenger vehicles are made of a form of UNI-body construction.

Space Frame

Cage like steel structure from BOF or UNI-body designs in that is uses steel frame members to form a load-bearing cage that carries vehicles stresses and holds vehicles together.

Passive Safety Design

Modern vehicle design incorporates a number of built-in safety features, which are referred to as passive safety.

Passive Safety is meant to maximize passenger protection by channeling and absorbing impact forces throughout the entire vehicle and by creating a protective shell for passengers.

Example: A head-on collision with a barrier at 20 mph may cause the engine to move as much as 2-4 inches, while the passenger compartment may compact by as little as 1 to 2% of its length.

While passive safety design was originally a major feature of only UNI-body construction, many passive safety features have now been incorporated into the design and construction of newer BOF vehicles.

Newer BOF designs incorporate holes, convolutions, and other shapes which absorb energy.

Vehicle Materials and Processes

High-Strength Steel - Specially formulated steel used to reinforce selected areas of vehicles.

High-Strength, Low Alloy (HSLA) - Specially formulated steel designed to be lightweight yet strong enough to reinforce selected areas of a vehicle, 40,000-70,000 psi tensile strength.

Micro Alloy Steel - Specific steel designed to be lightweight yet structurally sound, 110,000-215,000 psi tensile strength.

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Boron Steel - This metal is extremely strong, due in part, to its high phosphorous micro alloy content making it resistance to bending or crushing. Recip saws, air chisels, will not work. Hydraulic tools will squeeze the Boron and could twist/scissor or shatter the hydraulic cutter blades.

Aluminum - Lightweight metal used to form vehicle frames and outer body panels.

Aluminum Alloy - Special mix of chemical ingredients added to aluminum to increase the strength of aluminum.

Ultra Light Steel Auto Body Construction (ULSAB) - Unique new manufacturing process in which large sections of the vehicle body are manufactured as a single unit. This results in fewer presses and pieces during manufacturing. ULSAB bodies are lighter, stronger, and less expensive to manufacture. The full implication of this new design is still being learned.

Hydro forming - Allows steel to be preformed to "near design" in a die or mold, and allows the manufacturer to form more complicated designs using one piece of material.

Plastic Materials - Components of a vehicle that consists of various types of synthetic materials.

Collision Types

- Head on accident
  - Frontal vs. Offset frontal collision
- T-bone/ broadside
- Rear end
- Rollover onto side
  - Resting on tire edge
  - Resting on roof edge
- Rollover onto roof
  - Pancake from crushing roof posts
  - Engine down is most common position

- Vehicle under-ride/ over-ride
  - Normally smaller vehicle trapped under larger object
  - Example of car vs. semi trailer

Rescue Action Plan

- Arrival/Positioning/ICS
  - Create safe work zone with parking of rigs
  - Uphill, upwind, shield work area
  - Establish extrication, medical sectors, safety officer as needed

- Scene size-up and survey

- Scene stabilization
  - Fire protection, dry chem. And hose line
  - Hazards located and mitigated
  - Vehicles stabilized

- Patients accessed and triaged

- Disentanglement (tool work)
  -Relieve entrapments and create removal pathway

- Extrication (removal) of patient from vehicle and transport

Size-up Considerations

- **Can start en-route** to call with dispatch info
  - Number and type of vehicles?
  - Confirmed entrapment? People not getting out of vehicles?
  - Power poles involved/ lines down?

- **Standard crew assignments** to avoid confusion and save time
  - Size-up and walk around 360 done by officer
  - Initial vehicle stabilization and patient contact by firefighter
  - Hose line/lighting/tool staging by driver

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- **Outer/ Inner circle** survey techniques
  - Outer – additional vehicles, walk away or ejected patients, hazards, back up for inner circle firefighter
  - Inner – hot zone survey to check for hazards, number of patients, severity of injuries, entrapment, fluid leakage

Common Scene Hazards

- **From the vehicle**
  - Silent running hazard (Hybrid & EV Vehicles)
  - Leaking fluids – fuel, battery acid
  - Blood – sharps from jagged metal and broken glass
  - Un-deployed airbags
  - Hood and hatch struts
  - Compressed strutted bumpers
  - Hazmat
  - Weapons/Pets

- **From the surroundings**
  - Traffic/ distracted drivers
  - Wires down – park 1 span length away, call power company
  - Electrical transformers
  - Broken power poles
  - Trip hazards
  - Water, slippery terrain

Vehicle Stabilization

- Any crash damaged vehicle considered unstable
- Stabilization must be maintained and rechecked
- Minimizes vehicle reaction to rescue efforts and painful movements for patient

- Upright vehicle
  - Chock wheels, set brake – horizontal stabilization
  - Block, step chock occupant compartment at minimum of 2 points – vertical stabilization
- Side resting vehicle
  - Crib voids with wedges, step chocks
  - Lock in place with jacks, struts, straps, chains

- Inverted vehicle
  - Wedges at front end
  - Fill voids with cribbing
  - Struts, jacks at rear of vehicle

Patient Contact/Access

- Make verbal contact with patient as soon as possible and give instructions, ie: "Don't move your head/neck" – calm and reassure pt.
- Initial C-spine from outside vehicle, with entry made as soon as it's stabilized
- Order of simple access (no tools required)
  - -Door
  - -Window – break furthest one from patient to gain entry
- Complex access requires heavy tools
  - -Example – undercarriage breach on pan-caked car in a ditch
- Jobs of interior rescuer
  - - Set brake, lower power windows, unlock doors, move power seats shutoff ignition, and turn on 4-way flashers
  - -Cover patient
  - -Position away from un-deployed airbags
  - -C-spine, ABC's, comfort and reassure patient
  - -Keep outside rescuers informed of patient condition

Scanning for Airbags

- Quick scan of interior for airbag location identifiers
  - -Steering wheel hub, dashboard
  - -Opposite side A, B, C post trim panels
  - -Opposite side door panels
  - -Near side seatback uprights
- Announce location and status to crew
- Maintain 5, 10, 20 Rule for rescuers and patients
  - -5" from side impact systems
  - -10" from drivers front airbag
  - -20" from passengers front bag

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Disconnect Electrical System

- Use power to your advantage first – windows, locks, seats
- Disconnect or cut negative cable (black) before positive cable (red)
- If multiple batteries, do both black cables, then both red
- Confirm power shutdown by checking lights, flashers
- Unplug any after market accessories
- May have to remove battery if housing breached by metal of engine compartment
- Battery may be located in trunk, under rear seat, in wheel wells
  -If so, disconnect jump start connection points
- Trunk opening – good habit to ensure no hidden patients or hazards

Tool Staging Area

- Lay out small tool cache on tarp
- 5-10 yards away, position so it's not a trip hazard
- Officer should anticipate rescue needs to avoid having to stop extrication while someone runs back to rig for a piece of equipment

Disentanglement

- Remove the vehicle from around the patient

- Two (2) considerations during plan formation
  -Is there anything pinning the patient?
  -What path is patient going to be removed from vehicle?

- Protect patient with soft and hard protection as needed
  -Cover with tarp to keep glass shards and dust off patient
  -Hard protection between tool/material being cut and patient
  -No hard protection in front of un-deployed airbags

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Opening Doors

- **Size up, Set up, Open up**

- Size-up for crash damage, purchase points, door mounted airbags

- Set-up of door
  - -Unlock, Nader bypasses techniques
  - -Remove side window glass
  - -Create purchase points

- Opening up
  - -Hinge attack
  - -Latch attach
  - -Through the window spread (vertical crush)

- Complete side removal – both doors and B post
  - -Maxidoor
  - -Side lay down
  - -Front pop, rear drop
  - -3rd door conversion (for 2 door vehicles)

Strip trim (Peel & Peek) to locate and avoid pre-tensioners, curtain airbag inFLators and reinforced areas.

Roof Options

- Very effective for accessing multiple patients
- Strip trim to expose before making any cuts
- Allows vertical, inline removal of patients
- Rear window spread
  - -Break glass, single spread, recline seat, remove patient on long backboard
- Rear half roof flap/removal
- Flap to side, front, or rear
- Complete roof removal
- Trench cut of vehicle roof
- Be sure to cut seatbelts and cover patient if sawing out windshield

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Dash Displacement

- Cut or tilt steering wheel/column

- Recline or slide back seats

- (Peel and Peek) Relief cuts in top rail, mid A pillar, disconnect roof and windshield

- **Options**
  - -Dash jack with spreader
  - -Modified dash roll with spreader
  - -Dash roll with ram
  - -Center console spread
  - -Column pulling with pulling device and chains – hi-lift jack, spreader, Column-master tool
  - -Inverted floorboard flip – for roof resting vehicles
  - -Use of Halligan bar as push point

- Pedal manipulation to free foot entrapment

Patient Removal (Extrication)

- Removal method based on patient condition and not personnel preference

- Make sure all extremities free before attempting removal
  - -Example, foot stuck behind gas pedal

- Normal extrication – stable patient with good vitals, main concern is potential spinal injury
  - -Slow, controlled removal
  - -Should cause no further harm and minimal pain
  - -Time for thorough assessment and packaging

- Rapid extrication – critical patient needing surgical intervention at trauma center
  - -Unconscious, decreased mental status
  - -No radial pulse, symptoms of shock
  - -Respiratory or cardiac arrest

-Stable patient blocking access to critical patient
-Hazardous condition to us or them, ie: engine compartment fire

- Rapid extrication with C-collar, manual stabilization, speed board (if available), onto long backboard

- Begin transport ASAP
  -IV's started en-route to hospital

- Use of hose strap techniques to assist with sliding patient onto backboard

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World Rescue Organization Facts

- Today 3,205 people will die as a result of a motor vehicle accident.
- Every week 22,435 people will die on the world's roads – almost 100,000 every month.
- In addition to the 1.17 million people killed each year on the world's roads a further 35 million are estimated to be injured.
- World Health Organization projections indicate that by 2020 road traffic injuries could rank 3rd among causes of death and disability ahead of other health problems as malaria, tuberculosis and HIV/AIDS.

United States Vehicle Accident Facts

- Traffic accidents are the leading cause of death for children ages 6-14.
- Over 41,500 people die annually on U.S. highways.
- Over 9,000 fatalities annually are the result from rollovers.
- Over 8,500 fatalities are the result from offset crashes.
- Over 2000 deaths and 950,000 injuries result from rear end collisions each year.
- A person is injured every 10 seconds and killed every 13 minutes.

PUYALLUP EXTRICATION TEAM

Initial Actions: First Due Engine Company at an MVA

Reference: NFPA 1006 and 1670

Performance Objective: While operating under the direction of the company officer, the 1st arriving crew quickly and efficiently achieves the following benchmarks: safe positioning of the apparatus, scene lighting, initial size-up and scene survey, hazard detection and fire protection, patient contact, initial vehicle stabilization, equipment staging.

Conditions: Given a staged vehicle accident, with assigned crew and equipment normally carried, a recommended method is:

	Objectives	OIC's Initials	Date
1.	Driver positions engine in angled position to protect the work area. Starts in cab procedures.		
2.	Officer gives initial 'windshield survey' over radio.		
3.	Driver places engine in pump and chocks rig's wheel. He then extends light mast, places cones &/or flares to divert traffic. Driver pulls protection line and places near crashed vehicle. Driver stages any additional equipment as needed. Driver stages cribbing bag and step chocks at crash area. Driver contacts officer for re-assignment.		
4.	Officer or assigned performs an **"outer circle"** 360 survey – using a T.I.C. and flashlight. Officer provides update to dispatch and instructions to arriving units **following** outer and inner circle		
5.	3rd FF performs a *rapid* "**inner circle"** survey using an extinguisher, chocking wheels (or wedges key points for car on side or top) of involved vehicles to prevent movement. 3rd FF checks for number of patients and hazards. DO NOT TOUCH VEHICLE		
6.	Officer gives update to dispatch and instructions to arriving units.		
7.	Additional assignments: Refer to **SHADE** acronym. See attached.		
8.	After completion of Inner and Outer 360 surveys- A "**Rapid"** and extrication **plans "A" & "B"** need to be identified to all involved in the extrication.		
	Recommended benchmark time for steps 1-6 is 2:00 or less.		

Crew Members: _____

_____

_____

PUYALLUP EXTRICATION TEAM

SHADE ACRONYM

S

Safety (crew / scene).**S**ize Up and
Survey Inner & Outer Survey (360 circles)
For:
1. Hazards & Patients
2. **S**tabilization & Fire Control
3. Triage / Ejections / Witnesses
Extrication Plans

H

Hazard location / **H**ose Line placement
Hybrid / Alternative Fuel Badging

A

Access Patients
Immediate **A**id and **A**irway

D

Disconnect Batteries / **D**isentanglement

E

Extricate & Remove From Vehicle

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What Grade of Chain for Rescue Use?

Answering the question of which grade of chain to use for rescue applications is not so cut and dry. Chains come in various strengths depending on intended usage. Grade 70 chains for example are typically used in towing applications. Grade 80 or better are the only chains rated for overhead lifting. Some say that since Grade 70 chains are used by tow operators to pull and load vehicles onto a flatbed tow truck than rescuers can use them. Others say that you need a chain that is rated for overhead lifting. Firehouse Expo HOT instructor Billy Leach, recommends that only Grade 80 or better should be used for extrication. My department has Grade 70 chains on the heavy rescue. What does your department use? A more important question is what chain should you use?

"Working load limit" "Proof test" and "Minimum break load"

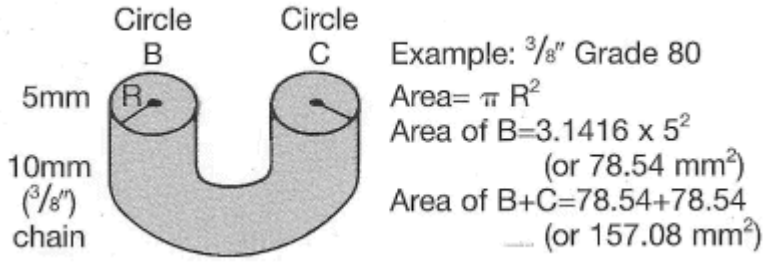
- Weight Load Limit (WLL) is the maximum working load designed by the manufacturer.
- Proof Test is where a load is applied to the newly produced chain as a quality control measure. The proof test is not a performance measure; it is only intended to draw the manufacturer's attention to any flaws in the chain. The common load applied is twice the WLL, or half the expected break load.
- Minimum Break Load (MBL) is the minimum force which chain or components must withstand before failure.
- Safety Factor (SF) is the structural capacity of a chain beyond the expected loads or actual loads. The safety factor is a ratio of maximum strength to intended load for the actual item that was designed. The design load being the maximum load the part should ever see in service. Commonly shown in a ratio like 4:1.

$$\text{Factor of Safety} = \frac{\text{Material Strength}}{\text{Design Load}}$$

The Meaning of Chain Grade Numbers

The chain grade numbers which manufacturers use are actually one tenth of the actual grades. Therefore, our grade 80 is 800; grade 70 is 700, and so on.

The grade refers to the tensile strength of the chain. This is expressed in newtons per square millimeter (a newton is approximately 0.224805 lbs). The tensile strength is calculated by multiplying the grade times the area of the two cross sections of a link.



(Area) 157.08 mm^2 x 800 n (Grade) =125,664 newtons ultimate breaking strength
125,664 newtons x .224805=28,250 lbs ultimate breaking strength
125,664 newtons÷1000=125.66 kn (Kilonewtons)

Is there a strength difference between Grade 70 and 80? Compare a 3/8" Grade 70 that has a working load of 6,600 Lbs with a 4:1 safety factor with a 3/8" Grade 80 that has a working load of 7,100 Lbs with a 4:1 safety factor. The higher grade 80 chain only gives you a 7% gain in strength going from Grade 70 to 80.

So which chain should you use? I referenced a post from Firehouse.com University of Extrication forum named Overhead Lifting and Chain Grade posted by Tim O'Connell. Tim just happens to be the Owner/President of Rescue 42.

Grade 70 chain is made from heat treated Carbon steel which produces a more closed surface porosity as well as removing the high susceptibility to Hydrogen embrittlement. Grade 70 chains are galvanized, Zinc Chromate or treated with some other corrosion resisting sacrificial anode material. They survive the salt spray test for many days (instead of hours for 80/100). They are MUCH tougher than the 80/100 chains. They resist battery acid extremely well due to their sacrificial anode coating as well as their resistance to Hydrogen embrittlement.

Grade 70 chain is the correct choice for extrication. Grade 70 chain is called "Transport" chain. It is made of heat treated Carbon steel. It is still incredibly strong, and the lack of the special alloys both produces a more closed surface porosity as well as removing the high susceptibility to Hydrogen embrittlement. Grade 70 chains are galvanized, Zinc Chromate or treated with some other corrosion resisting sacrificial anode material. They survive the salt spray test for many days (instead of hours for 80/100). They are MUCH tougher than the 80/100 chains. They resist battery acid extremely well due to their sacrificial anode coating as well as their resistance to Hydrogen embrittlement.

Make sure you read the complete post that Tim wrote on FireHouse.com. He contacted several engineers at the two largest chain manufacturers in the US and got their professional opinions.

PUYALLUP EXTRICATION TEAM

Hooks and Clusters

Mini J-Hook

Grab Hook

T-Hook

Mini R-Hook

Large J-Hook

Cluster: Mini J-Hook, T-Hook & Grab Hook

PUYALLUP EXTRICATION TEAM

DISIPLINE:VEHICLE AND MACHINERY RESCUE TECHNICIAN

Command & Control

- ☐ **Two Minutes Out** – Communication from responding units to command of a Motor Vehicle Accident (MVA) indicating the unit is two minutes from reaching the scene looking for instructions.

- ☐ **Defensive Parking** – The appropriate positioning of responding apparatus once on scene "blocking" the accident scene to maintain a safe work zone around the accident.

- ☐ **I/C** – A position typically held by a fire officer and one that is ion control of the "entire" accident scene and a resource manager. Typically this position is different then the Extrication Leader.

- ☐ **Extrication Leader**- The rescuer with the most extrication experience who is charge of the plan development & actual extrication.

- ☐ **Bring Something to the Party** – Do not come forward to the scene of an MVA empty handed. Bring equipment based on needs outlined by the I/C. If the I/C cannot be reached via radio officer to determine what is needed by order of arrival and what equipment is already at scene.

- ☐ **Outer Circle** – A rescuer performing a rapid 360 around the vehicle involved in the MVA staying 10-15' maximum in front of the Inner Circle. Outer takes a T.I.C. and a flashlight (night) performing outer circle duties as follows;

    1. Noting hazards
    2. Number of vehicles
    3. Ejections
    4. Witnesses
    5. Vehicle & Victim position
    6. Communicate with Inner Circle as well as I/C

- ☐ **Nose, Belly Button, Toes** – The direction a victim is designed to be extricated from a vehicle. The initial position of a victim in an MVA aids in determining the manual extrication plans.

- **Inner Circle** – A rescuer performing a rapid "tight" 360 around the vehicle involved in the MVA approaching from the patient side going same direction as Outer Circle. Inner Circle takes extinguisher and minimum cribbing. Vehicle is NOT touched by either Outer or Inner do to potential electrical hazards. Duties of Inner as follows:

1. Immediate Victim contact –determine if Rapid Extrication is warranted
2. Place minimal cribbing to stop vehicle movement
3. Mitigate any immediate hazards
4. Gain information from entrapped victim
5. Note deployed or non deployed SRS – 5/10/20 Rule
6. Determine level of victim entrapment
7. Hazzard lights activated once deemed safe to do so
8. Victim positioning for Extrication Plans
9. Convey ALL findings to I/C and Outer

S.H.A.D.E.

S – Size Up & **S**urvey
Inner & Outer Survey (360 circles) for

H – **H**azard location / **H**ose line placement
Hybrid / Alternative Fuel Badging

A – **A**ccess Patients –
Immediate **A**id & **A**irway

D – Disconnect batteries
Disentanglement

E – **E**xtricate & remove from vehicle

Extrication Terms

- ☐ **Manual Extrication –** The systematic removal of vehicle components / parts by using manpower and/or tools. Safety is first and foremost for rescuers as "*The Art of Making Space"* is being performed. Remember to *"Try before you pry"*.

- ☐ **Rapid Extrication** – Entrapped victim is considered a "**Red** / ALS" patient and not extricated within the 0-10 minute window once units are on scene pt. may expire in vehicle

- ☐ **Standard Extrication** – Entrapped victim is not considered "Rapid" so the extrication timeline goal is 0-20 minutes

- ☐ **Cutter Person** – Rescuer assigned to hydraulic cutters

- ☐ **Spreader Person** – Rescuer assigned to hydraulic spreaders

- ☐ **Saw-Zall** (Reciprocating Saw) **Person** – Same as above…..Saw-zall

- ☐ **Air Chisel Person** – Same as above….Saw-zall

- ☐ **Basic Stabilization** - Wood or synthetic cribbing used to provide the first "grip" or "hand hold" of the involved vehicle(s). 4 and 6 point stabilization is comprised of Basic Stabilization.

- ☐ **Advanced Stabilization** – Commercial struts, chain, airbags, First Responder Jacks ect…used in the second "grip" or "hand hold" of the involved vehicle(s) in order to provide advanced stabilization.

- ☐ **Interior Stabilization Stabilizer (I/S) –** If possible this position should be filled by a fire based Paramedic and preferably started on the outside of the vehicle by making verbal and or visual contact with the victim(s). The Interior Stabilizer transitions into the inside of the vehicle through an opening created by the vehicle (crash) or through one created manually. Once inside the vehicle the I/S performs the necessary visual, verbal and manual functions assigned to that position.

- ☐ **12 Volt (battery) mitigation –** The systematic disconnecting of the vehicles 12 volt battery system. Once located disconnect or cut the negative cable first followed by the positive. If the cables must be cut remove a "section" of each

of the cables to eliminate the cables abilities to reconnect. By activating the vehicles hazard lights prior to D/C'ng the battery the rescuer(s) can determine the deactivation of the 12 volt system

☐ **Debris Pile –** A set geographic location away from the vehicle where the extrication is being performed to place the debris and parts of the vehicle that are being removed. Typically a minimum of 20' away preferred.

☐ **Glass Management –** When it is determined that "Manual Extrication" is needed their needs to be a systematic removal of the vehicles glass. There should be of placing soft protection over the victim(s) prior to glass removal.

☐ **Patient Landing Zone – In the absence of a gurney -**Two 4x4's are placed approx 36" apart and located close to the vehicle. Placement should be in the direction of the victims egress from the vehicle. The 4x4's offer an elevated platform to aid in securing the patient to a backboard as well as keeping them off wet, hot and cold surfaced.

☐ **Cut & Cover –** Following the removal (cutting) of the affected vehicles components the sharp edges left behind on the vehicle should be covered for security reasons with soft protection or dedicated "sharps covers"

☐ **Soft Protection –** Items such as tarps, blankets, clothing, car mats, and liners ect… used to cover sharps as well as the entrapped victims in an order to reduce further injury to the victim or rescuers.

☐ **Hard Protection –** Rigid yet thin sheet metal & plastic components with hand holds cut in used for patient protection from sharps, tools, blades ect.. Backboards also work well for Hard Protection.

Extrication Plans / Maneuvers

(Plans A, B, C Etc…)

☐ **Trunk Tunnel** – Removal of trunk lid, tension (spring steel) rods, hat/package rack and back of rear seat.

☐ **Rear Hatch Removal** – Removal of hatch (door) followed by seat manipulation or removal for in-line victim removal.

☐ **Rear Window Tent** – Enlarging the opening in the center of the rear window using hand tools such as a First Responder Jack or Hydraulic spreaders.

- ☐ **Roof Flap** – Removal of a portion of the vehicles roof by making relief cuts as well as cutting vehicles A, B, C, D post(s).

- ☐ **Roof Trench Cut** – Making two parallel cuts into the roof of the vehicle using pneumatics (air chisel) or saw-zall (consider inside/out cutting operation) rear window to windshield approx 6" to 8" in from each side.

- ☐ **Roof Pivot** – Once roof posts are stripped completely cut through all but the designated "pivot" post. This post will only need to be cut ½ way through the roof can then be pivoted on that post away from the entrapped victims. Roof can be set onto trunk or hood area.

- ☐ **Roof Removal** – With all posts stripped use appropriate cutting tools to sever all posts as low as possible with the exception of the post closets to the victim(s). This post should be the last post to cut and should be cut as high as possible using hydraulics or the least obtrusive cutting tool.

- ☐ **Door Removal** – The opening and removal of a single door on a vehicle

- ☐ **Third Door Conversion** – With the plan to remove a single door on a two door vehicle strip then cut the B-post of the removed door. Next strip and cut the panel directly behind the B-post making a vertical cut as far back as needed. Next cut the bottom of this panel along the rocker panel. Once completed the opening will resemble a "Third Door" making the exit hole for patient removal much larger

- ☐ **Maxi Door** – This maneuver can be completed starting from either the rear or front door of a four door vehicle. Performing the proper strip, cutting and opening techniques both doors will swing open or be completely removed exposing the entire side of the vehicle

- ☐ **Steering Column Lift –** In an order to make additional space use a grade 70 or stronger chain of appropriate length as well as manual (such as the First Responder Jack) or hydraulic tools the steering column is lifted away from the entrapped victim. Assure that the 12 volt system has been D/C'd if there is non-deployed SRS (airbags). Make sure hard protection is used for patient protection

- ☐ **Steering Wheel Cut –** Using manual, electric or hydraulic (preferred) tools cut the "spokes" of the steering wheel in an order to remove it entirely. Assure that the 12 volt system has been D/C'd if there is non-deployed SRS (airbags).

- ☐ **Dash Roll –** This maneuver is used when there is victim lower extremity entrapment by way of dash, steering wheel/column or other vehicle components. Using hard protection, manual (such as the First Responder Jack) or hydraulic tools and appropriate cribbing the dash is "rolled" off of the entrapped victim once the necessary cuts are made in the upper and lower "A" post and fender support.

- ☐ **Dash Lift –** Same as above but the dash is lifted in a vertical fashion.

- ☐ **Center Dash Lift –** Once the center dash supports has been severed make a purchase point in the center of the dash with hydraulic spreaders (closed) positioned in a vertical fashion. With the bottom spreader arm/tip on the transmission tunnel and the upper arm/tip placed under the horizontal bar/support of the upper dash. Activate the spreaders to lift the dash.

- ☐ **Reverse Hood Removal –** Using a pry tool, Haligan bar and/or 4x4 wedges force the hood open as close to the hinges as possible. Once exposed cut the hinges and force the hood open.

- ☐ **Seat Push Down –** Once manual or electrical options have been exhausted remove the adjoining window then place a 48"or 60" First Responder Jack base on the top of the seat to be pushed down and the lifting nose placed under the roof with the handle of the FRJ facing out. With the victim supported "off" the seat operate the FRJ until the seat is lowered to the desired location.

PUYALLUP EXTRICATION TEAM

10 GENERAL REQUIREMENTS
10.1 GENERAL SKILL REQUIREMENTS – Vehicle Rescue
Standard Area: General Skill Requirements –Level I

Firefighter: _____ **Date:** _____

ID#: _____

STANDARD: Chapter 10.1.1 thru 10.1.10 NFPA 1006, 2013 Edition	**TASK:** Perform Technical Vehicle Rescue using rescue equipment.

PERFORMANCE OUTCOME: Perform to the NFPA 1006 standards for Level I Vehicle Rescue.

CONDITIONS: Using Vehicle Rescue equipment perform in a class room, apparatus bay, drill ground or actual emergency the following NFPA 1006 objectives.

NO.	OBJECTIVES	PERFORMED	OBSERVED
1.	**Plan for a vehicle incident, and conduct an initial and on-going size-up:** • Ability to apply operational protocols. • Select specific planning forms based on the type of vehicle. • Identify and evaluate various types of vehicle within the AHJ boundaries. • Request support services and resources. • Identify vehicle anatomy. • Determine the required fire suppression and safety measures.		
2.	**Establish "scene" safety zones:** • Ability to select and use PPE. • Apply traffic control concepts. • Position traffic control devices. • Identify and mitigate existing or potential hazards. • Apply zone identification and personal safety techniques.		
3.	**Establish fire protection:** • Identify fire and explosion hazards. • Operate within the incident management system. • Use extinguishing devices. • Apply fire control strategies. • Manage ignition potential.		
4.	**Stabilize a common passenger vehicle:** • Apply and operate stabilization devices. • Entry, exit and tool placement points are not compromised. • Stabilization points are structurally sound. • Monitor stabilization equipment. • Risk to rescuers is minimized.		
5.	**Isolate potentially harmful energy sources:** • Ability to select and use task- and incident-specific PPE. • Identify hazards. • Operate beneficial systems in support of tactical objectives. • Operate tools and devices for securing and disabling hazards.		

PUYALLUP EXTRICATION TEAM

NO.	OBJECTIVES	PERFORMED	OBSERVED
6.	**Determine the common passenger vehicle access and egress points:** • Ability to identify entry and exit points and probable victim locations. • Assess and evaluate impact of vehicle stability of the victim. • Time constraints are factored. • AHJ safety and emergency procedures are enforced.		
7.	**Create access and egress openings for rescue from a common passenger vehicle:** • Ability to identify common passenger construction features. • Select and operate tools and equipment. • Apply tactics and strategy based on assignment. • Technique chosen is expedient. • Victim and rescuer protection is afforded. • Apply victim care and stabilization devices. • Perform hazard control based on techniques selected. • Demonstrate safety procedures and emergency evacuation signals.		
8.	**Disentangle victims:** • Ability to operate disentanglement tools. • Initiate protective measures. • Identify and eliminate points of entrapment. • Maintain incident stability and scene safety.		
9.	**As a member of a team, remove a packaged victim to a designated safe area:** • Use of immobilization, packaging, and transfer devices for specific situations are used. • Victim is removed without compromising victim packaging, undue injury is prevented. • Stabilization is maintained.		
10.	**Terminate a Level I vehicle incident:** • Party responsible for the operation, maintenance, or removal of the affected vehicle is notified of any modification or damage created during the extrication process. • Scene control is transferred to a responsible party. • Potential or existing hazards are communicated to that responsible party • Command is terminated.		

Evaluator/Firefighter Comments: _____

_____

Evaluator	Date	Firefighter	Date

PUYALLUP EXTRICATION TEAM

10 GENERAL REQUIREMENTS
10.2 GENERAL SKILL REQUIREMENTS – Vehicle Rescue
Standard Area: General Skill Requirements –Level II

Firefighter: _____ **Date:** _____

ID#: _____

STANDARD: Chapter 10.2.1 thru 10.2.5 NFPA 1006, 2013 Edition	**TASK:** Perform Technical Vehicle Rescue using rescue equipment.

PERFORMANCE OUTCOME: Perform to the NFPA 1006 standards for Level II Vehicle Rescue.

CONDITIONS: Using Vehicle Rescue equipment perform in a class room, apparatus bay, drill ground or actual emergency the following NFPA 1006 objectives.

NO.	OBJECTIVES	PERFORMED	OBSERVED
1.	**Plan for a commercial heavy vehicle incident, and conduct initial and ongoing size-up:** • Ability to apply operational protocols. • Select specific planning forms based on the types of commercial/heavy vehicles. • Identify and evaluate various types of commercial/heavy vehicles within the AHJ boundaries. • Request support and resources. • Identify commercial/heavy vehicles anatomy. • Determine the required fire suppression and safety measures.		
2.	**Stabilize commercial/heavy vehicles:** • Ability to apply and operate stabilization devices. • Entry, exit and tool placement points are not compromised. • Stabilization points are structurally sound. • Monitor stabilization equipment. • Risk to rescuers is minimized.		
3.	**Determine the heavy vehicle access and egress points:** • Ability to identify entry and exit points and probable victim locations. • Assess and evaluate impact of heavy vehicle or large machinery stability on the victim(s). • Equipment and victim stabilization are initiated. • Time constraints are factored. • AHJ safety and emergency procedures are enforced.		

PUYALLUP EXTRICATION TEAM

NO.	OBJECTIVES	PERFORMED	OBSERVED
4.	**Create access and egress openings for rescue from heavy vehicle:** • Ability to identify heavy vehicle construction features. • Select and operate tools and equipment. • Apply tactics and strategy based on assignment. • Technique chosen is expedient. • Victim and rescuer protection is afforded. • Apply victim care and stabilization devices. • Perform hazard control based on techniques selected. • Demonstrate safety procedures and emergency evacuation signals.		
5.	**Disentangle victims:** • Ability to operate disentanglement tools. • Initiate protective measures. • Identify and eliminate points of entrapment. • Maintain incident stability and scene safety.		
6.	**Isolate potentially harmful energy sources:** • Ability to select and use task- and incident-specific PPE. • Identify hazards. • Operate beneficial systems in support of tactical objectives. • Operate tools and devices for securing and disabling hazards.		

Evaluator/Firefighter Comments: _____

_____

Evaluator	Date	Firefighter	Date

PUYALLUP EXTRICATION TEAM

RELEASE, HOLD HARMLESS, AND AGREEMENT NOT TO SUE

I_____, fully understand that my participation in the "_____ Extrication Training" (hereinafter "Event") exposes me to the risk of personal injury, death, or property damage. I hereby acknowledge that I am voluntarily participating in this Event and agree to assume any such risks.

If I have any physical ailments or conditions which might affect my health by participating in the Event, I have consulted my personal physician or other medical authority and received their permission to participate. I have read and understand the refund policy. I further agree that pictures taken during the Event may be used for future promotional purposes.

I hereby release, discharge and agree not to sue the Puyallup Extrication Team (hereinafter "Hosts") for any injury, death, or damage or loss of personal property arising out of, or in connection with, my participation in the Event from whatever cause, including the active or passive negligence of the Hosts or any other participants in the Event.

In consideration for being permitted to participate in the Event, I hereby agree, for myself, my heirs, administrators, executors and assigns, that I shall indemnify and hold harmless the Hosts from any and all claims, demands, actions, or suits arising out of or in connection with my participation in the Event.

I HAVE CAREFULLY READ THIS RELEASE, HOLD HARMLESS AND AGREEMENT NOT TO SUE AND FULLY UNDERSTAND ITS CONTENTS. I AM AWARE THAT IT IS A FULL RELEASE OF ALL LIABILITY AND SIGN IT ON MY OWN FREE WILL.

Participant Signature

_____

Printed Name

Date: _____