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VEHICLE STABILIZATION (1.1)

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NFPA 1670

TASK SKILL DESCRIPTION AND DETAIL

This heading includes information about the following:

- Vehicle Stabilization is an essential first step in handling a motor vehicle accident scene.
- Vehicle accidents are sized up from a distance to determine possible stability issues before firefighters approach the vehicle or access patients.
- If a vehicle is on its side or top, it needs to be stabilized
- If a vehicle is on its wheels, it is evaluated for stability, and the wheels chocked at a minimum. The techniques below can be utilized for a vehicle on its wheels if the vehicle is unstable or on uneven terrain.
- This training manual page will discuss two different options for stabilization of vehicles: Paratech Gray Struts, Paratech Orange Struts, Hurst Quick Struts, Wood Cribbing, and Paratech Airbags.
- Stabilization address front to back and side-to-side movement.

PARATECH STRUT STABILIZATION

Loveland Fire Rescue Authority carries two types of Paratech struts, Grey and Gold.

Specifications and Safety

- Grey Struts
  - Max length for Paratech Gray Struts: **8 Feet**
  - 20,000lb capacity fully retracted. Capacity decreases with extension of the strut and addition of extensions. (see strut label for details)
  - Up to two extensions can be added to a strut with a maximum of three feet additional extension.
  -
- Gold Struts
  - Max length for Paratech Gold Struts: **16 Feet**
  - 44,000lb max capacity at a 2:1 safety factor. Capacity decreases with extension of the strut and addition of extensions. (see strut label for details)
  - One extension can be added to gold struts with a combined length not to exceed sixteen feet.
- Footpads and tips are interchangeable between all Paratech struts.
- Ensure not to side load the struts, the strength of the struts are inline not sideways. (failure may occur)

Paratech Strut Operation

- For a vehicle that is on its side, there are two options for stabilization: Paratech Gray Struts or Hurst Quickstruts.
    - Struts on each side
    - Two struts on one side with a tie-back
        - This is the preferred method. When using this method, all of the struts are on the bottom side of the vehicle and not in the way of removing the roof or doors, or blocking access to the patient on the top side of the vehicle.
- The steps for placing struts on both sides are:
    - Prepare the struts before approaching the vehicle. Attach the base, thread the strap through the loop on the base, and attach the tip (if not pre-rigged). Having the strut pre-rigged before approaching the vehicle limits the amount of time spent near the vehicle in a hazardous area.
    - Pre-select the purchase points where the strut will meet the vehicle from a distance. Again this limits the time spent near the unstable vehicle

- Prior to placing the stabilization struts, initial stabilization can be implemented by stabilizing the vehicle with wood step chocks or wood wedges. (See Figure 1)

Figure 1 – Initial Stabilization

- Finding purchase points on the vehicles should be strong, metal, non-moving, structural points on the vehicle frame, roof, door structure or the unibody (see Figure 2). You may need to break glass or plastic away to gain access to the structure (see Figure 3).

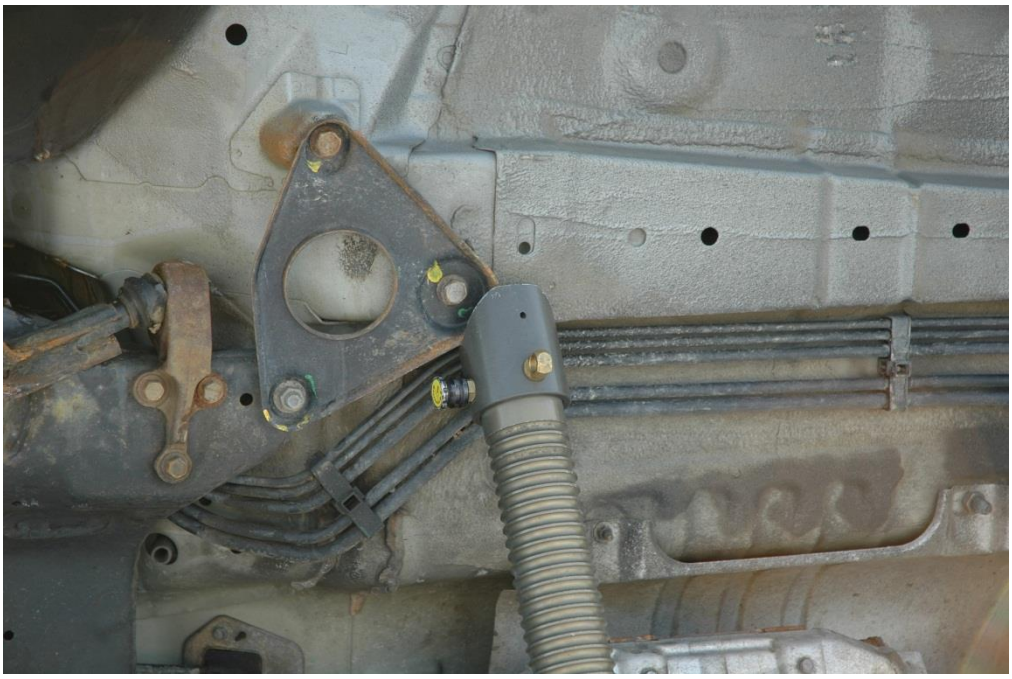

Figure 2 - Strut placed on a structural component of the vehicle

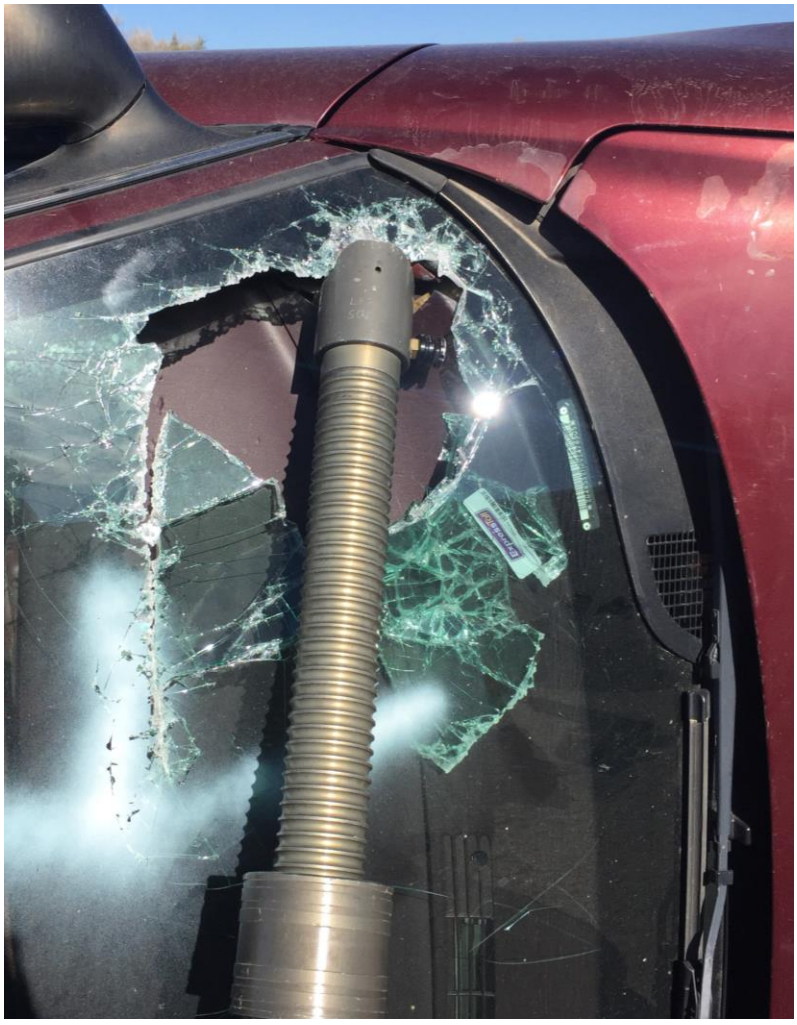

Figure 3 - Break glass to gain a purchase point if needed

- Pre-extend the strut to the approximate height before approaching the vehicle.
- If possible, have one person handle each strut so they are placed simultaneously.

- Move in on each side and place the strut under a strong, non-moving purchase point as close to the center of the vehicle as possible. Try to place the struts directly across from each other if possible.
- Locate attachment points for each end of the base strap.
  - An attempt should be made to maintain a right triangle between the two legs of the strap and the vehicle. The system will be strongest when all the angles of the struts and straps are as close to right angles as possible (see Figure 4)

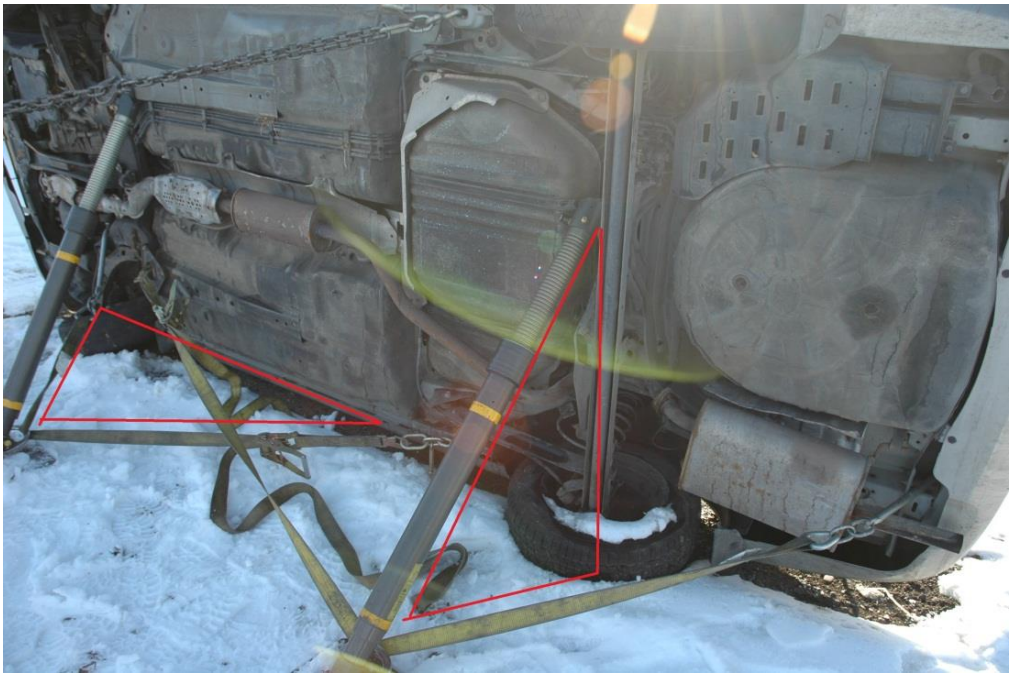

Figure 4 - Create right angle triangles if possible

- On unibody vehicles, utilize the small tie-down holes in the unibody structure as an anchor for your straps. You will need to use a towman's cluster to make the attachment (See Figure 5).

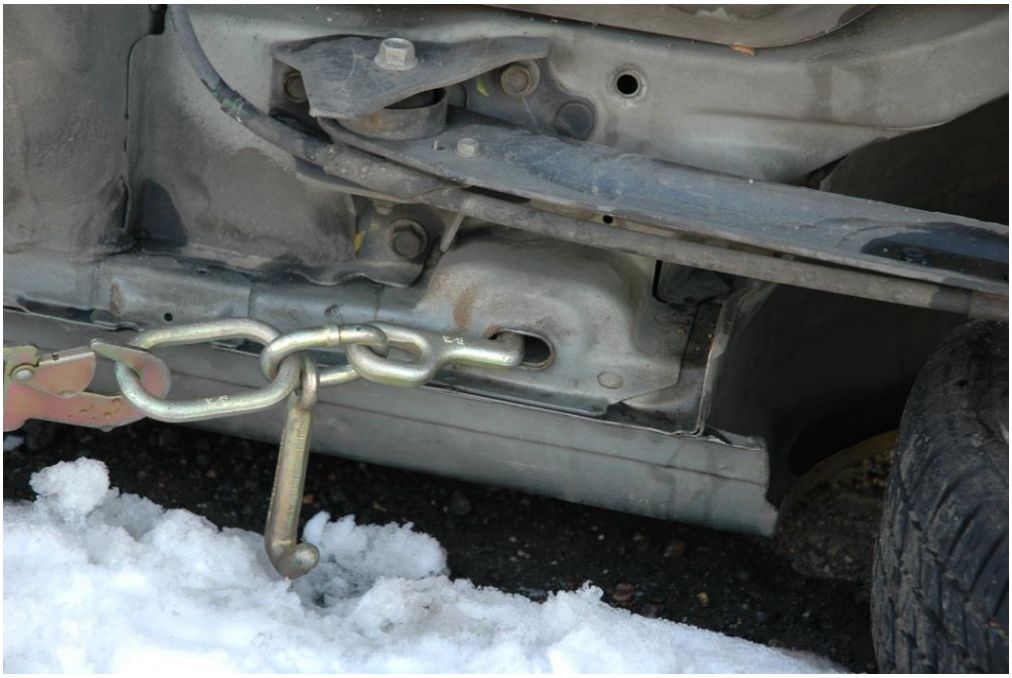

Figure 5 - Towman's clusters allow attachment to the unibody holes

- Attach both ends of the straps and take the slack out of the straps. Once both struts are in place, tighten both straps until the struts are snug.
- The vehicle is now stabilized. (see Figure 6).

Figure 6 – Completed two-sided stabilization

- The steps for placing two struts on the same side with a tie back are:
  - Size-up and pre-rig the struts in the same way as the previous method.
  - Pre-select the purchase points for the top of the strut as well as the attachment points for the straps.
  - Approach the vehicle and place the struts as quickly as possible.
  - Attach the ends of the straps to the vehicle, making sure to maintain proper angles.
  - Take the slack out of the straps but DO NOT tighten until the tieback is in place.
  - Attach a chain or strap in a triangle near the top of the vehicle. Make sure not to attach to moving parts such as suspension components (see Figure 7).

Figure 7 - Chain attached to the vehicle in a triangle formation

- Locate or place an anchor such as a vehicle, guardrail, utility pole, large tree, etc. If utilizing a vehicle, make SURE that the vehicle will not be moved (remove keys and mark steering wheel).
- Use a come-along to tie back the vehicle to the anchor. Use a chain or strap to extend the reach of the come-along if the distance is too great (see Figure 8).

Figure 8 - Come Along secured to the vehicle

- Tighten the tie-back. Only apply pressure until the vehicle becomes stable. DO NOT over tighten.
- Double check that the straps on the base of the struts are snug, DO NOT overtighten.
- To prevent an injury on scene, a salvage cover, bunker coat, or flagging be placed on the chain to help identify the hazard.
- The vehicle is now stabilized. (See Figure 9)

Figure 9 - Completed one-sided stabilizatio

- The steps for stabilizing a vehicle on its roof are:
  - Size up the vehicle in the same manner as the previous examples.
  - A vehicle on its roof is usually very stable when on flat ground. If the roof is removed, the structure of the vehicle will become compromised. The weight of the vehicle may cause the chassis to drop, causing a hazard.
  - The vehicle will need to be supported so that the frame or unibody are held motionless throughout extrication operations (see Figure 10).
  - Pre-rig struts and pre-select purchase points as described above.
  - Place struts on the high side or end of the vehicle. Place the struts to maximize lateral (side-to-side) stability. Avoid placing struts straight up and down.
  - Attach stability straps.


Figure 10 - Struts placed using the trunk opening for purchase points

- If additional lateral stability is necessary, utilize additional struts on the sides of the vehicle, secured with straps at the base.
- The vehicle is stabilized (see Figure 11).

Figure 11 - Completed stabilization for a vehicle on its roof.

- The steps for cradle stabilization with cross bracing
  - Initial Stabilization with step chocks or wedges
  - The estimated weight of the load should be quickly calculated to determine the use of the Paratech gold or gray struts
  - Consider the stability of the load now and when lifting
  - Use the front of the vehicle as the pivot point and apply wedges or picket stakes to prevent the vehicle from sliding forward
  - Apply a strut to each rear corner of the vehicle to create 3 points of contact
    - Be cognizant of the placement of these struts in case of a roof removal.
  - Secure a chain around the bottom of the vehicle and tie them into each strut
  - Secure the bases of the struts with 2 ratchet straps or 2 come a longs (See Figure 12)
    - This allows you to capture the progress with one device and lift with the other device
  - Once the vehicle is stabilized, you can begin the lifting sequence
  - Chase the load in case of strut failure
  - As the vehicle is lifted, the struts will suck into the vehicle and the car will want to shift and find its balance point (See Figure 13 and 14)
  - Consider utilizing cross bracing to better stabilize the vehicle under certain circumstances (See Figure 15)
  - Once the patient or object is removed, reverse order of the lift until the vehicle is returned to the ground
    - Consider leaving the load in place after the rescue is complete. A risk vs. benefit should be used to evaluate whether we should manually lower the load or wait for the tow truck to mechanically lower the load.

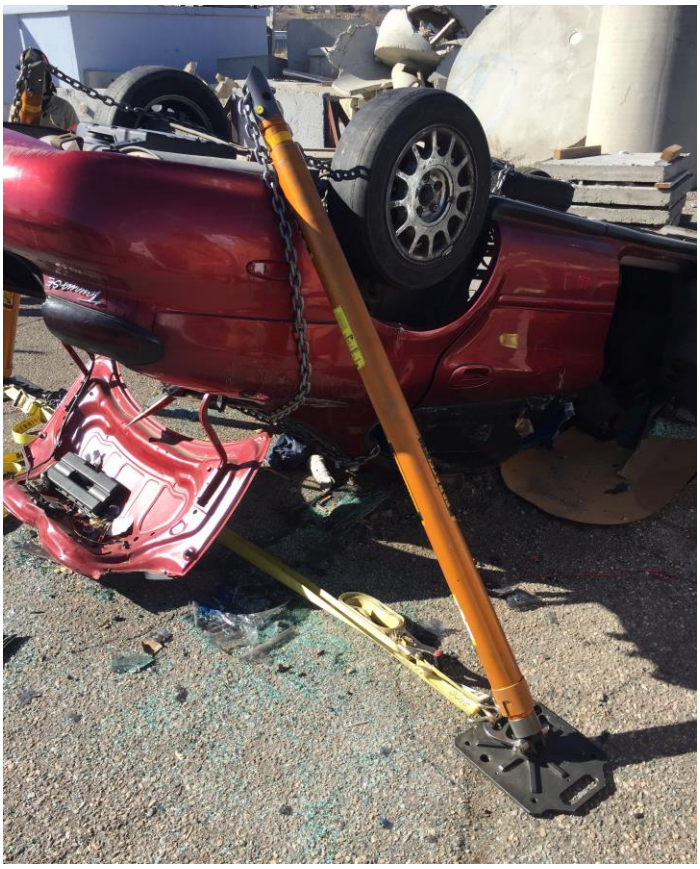

Figure 12 – Secured chain and bases of the Paratech struts

Figure 13 – Completed cradled stabilization

Figure 14 – Completed cradled stabilization

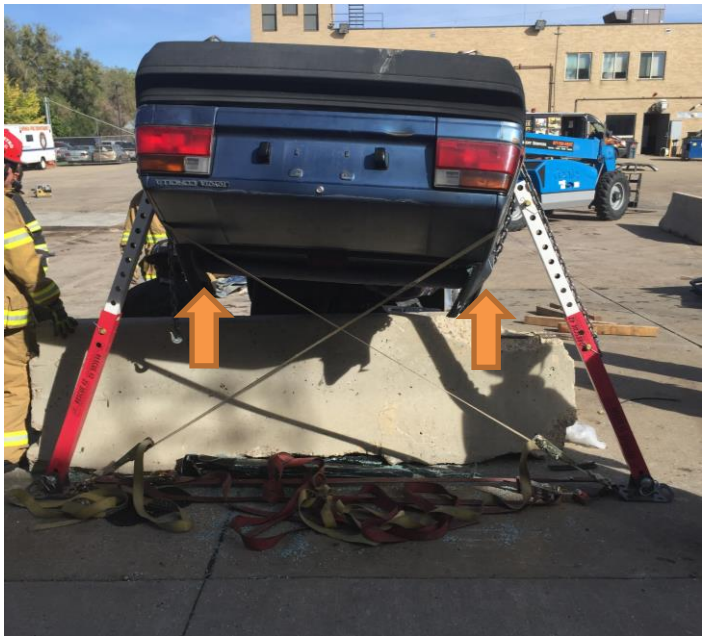

Figure 15 – Completed cradled stabilization with cross bracing

HURST QUICKSTRUT STABILIZATION

- The Kit consists of (Figure 16):
  - 2 Hurst Quickstruts
  - 2 Hand Tools
  - 2 Sets of Towmen's Clusters
  - 2 Sets of Blue Straps
  - Carrying Bag
- Locations of Quick Struts
  - Tower 6, Ladder 6, Rescue 2, and Rescue 6
- Primarily used for vehicle stabilization, it is also suited for temporarily supporting other objects (walls, beams, etc.)
- Struts can be used in a tie back operation
- Rating per strut is **2,200 LBS**
- The Working lengths of Quickstruts are **48" – 78"**
- The strut is designed to be used at an optimal installing angle of 25-35 degrees. Above 35 degree angle requires securing the base plate against possible slippage up to 70 degrees.
- Quickstruts are for stabilization only. DO NOT use the Quickstruts for lifting of any kind!

Figure 16 – The Hurset Quickstrut Kit

- Operating Quickstruts
    - Pull strap to get desired amount of slack (See Figure 17)

Figure 17

    - Extend the Quickstrut – Press handle down to allow the strut to extend to its desired position (See Figure 18 and 19)

Figure 18

Figure 19

- The base of the quick strut (marked with a red arrow) can be placed at the top or at the bottom per the manufacturer. The base down method is preferred because you have better leverage on the ratchet strap and the force applied is absorbed into the ground and not the car (See Figure 20)

Figure 20 – The base of the strut can be placed at the bottom or the top

- Place the Quickstruts against the vehicle (See Figure 21)

Figure 21

- Hook the strap to the vehicle
  - To complete the triangle, hook the strap at the bottom of the vehicle (See Figure 22)
  - If no attachment point is available, carefully make one with a halligan (This method is not advised due to the fact that the vehicle has yet to be stabilized. Striking the vehicle may shift the vehicle or further the injury of the patient or injure personnel on scene.)

Figure 22 – Hook the strap at the bottom of the vehicle

- Use caution when making purchase points to not compromise the stabilization of the vehicle (See Figure 23)

Figure 23

- Use caution when making purchase points to not compromise the stabilization of the vehicle (See Figure 24)

Figure 24

- Securing the Quickstrut to the vehicle
  - Take up extra slack in strap by using the hand crank (See Figure 25)

Figure 25

- When all the slack has been taken up, use the ratchet mechanism to tighten and secure the stabilization strut into position (See Figure 26)

Figure 26

- Using the hand tool, tighten the strut to the vehicle (See Figure 27)

Figure 27

- Lock the Quickstrut into position. Quarter turn to lock (See Figure 28)

Figure 28

- Optimum Installation angle: 25 – 35 degrees (See Figure 29)
- Above 35 degrees, secure base plate against possible slippage

Figure 29

- Repeat the set up process for the other Quickstrut on the other side of the vehicle.
- Place the Quickstrut close to in line with the other Quickstrut
- Position the heatshield when placing strut on underside of vehicle (See Figure 30)

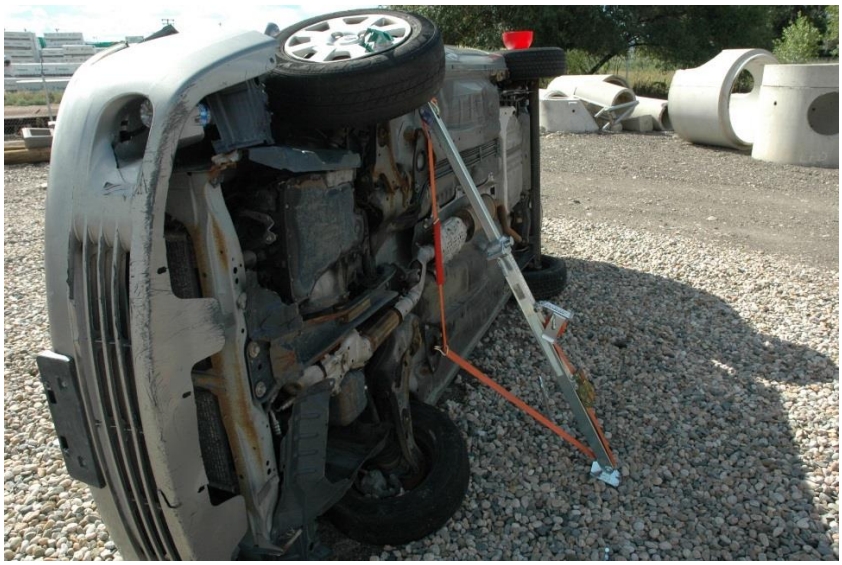

Figure 30

- Towmen’s clusters and straps
    - Different ways to attach straps to the underside of the vehicle
    - Blue Straps (See Figure 31)

Figure 31

    - Towmen’s Clusters (See Figure 32)

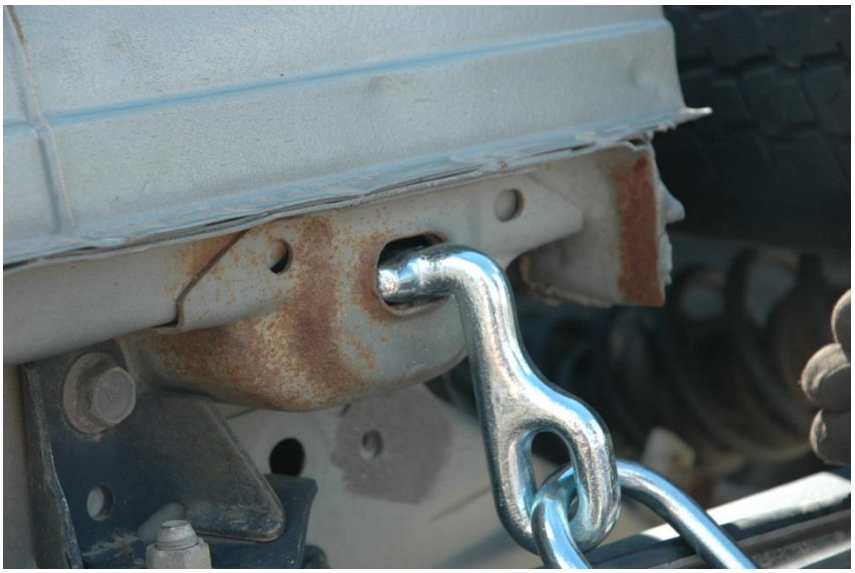

Figure 32

- Cribbing is essential in many extrication operations. Its most common use is to stabilize objects.
- Incidents that may utilize Cribbing for stabilization
    - Chocking Wheels
    - Vehicle on its side or top
    - Vehicle requiring extrication
    - Vehicle into building
    - Vehicle Fires
    - Industrial Accidents
    - Structural Collapse
    - Trench Collapse
- Wood selected for cribbing should be solid, straight, and free of major flaws as large knots or splits.
- Cribbing surfaces should be free of any paint or finish because this can make the wood slippery, especially when it is wet.
- The height should not be more than three times the width
- Wood can crush up to 20% before failure

- **Cribbing used by LFRA**
    - Soft wood 4 x 4
        - Width: 3 ½ Inches
        - Height: 3 ½ Inches
        - Length: 18 Inches
    - Untreated and Pine wood or Douglas Fir (See Figure 33)

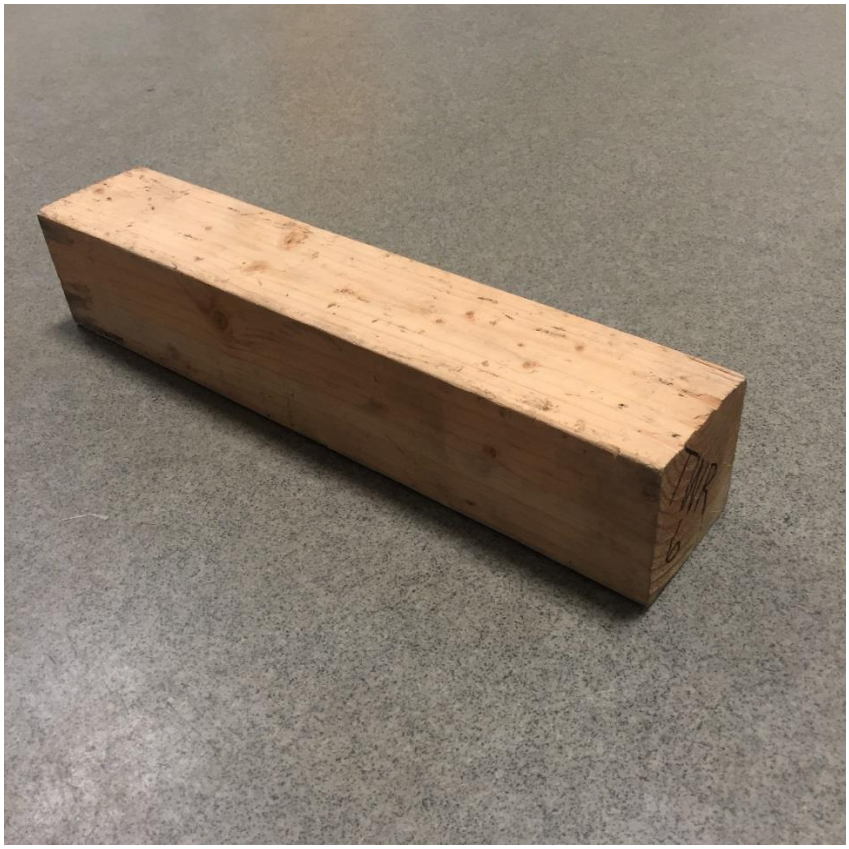

Figure 33

- Soft wood 4 x 2 (See Figure 34)
  - Width: 3 ½ Inches
  - Height: 3 ½ Inches
  - Length: 18 Inches

Figure 34

- Foot Print – Width of the bottom of the stack, gives you a basis on how tall your stack can be (See Figure 35)
  - The height should not be more than three times the width.
  - When setting up a crib box, it's important to ensure you have a solid foot print.

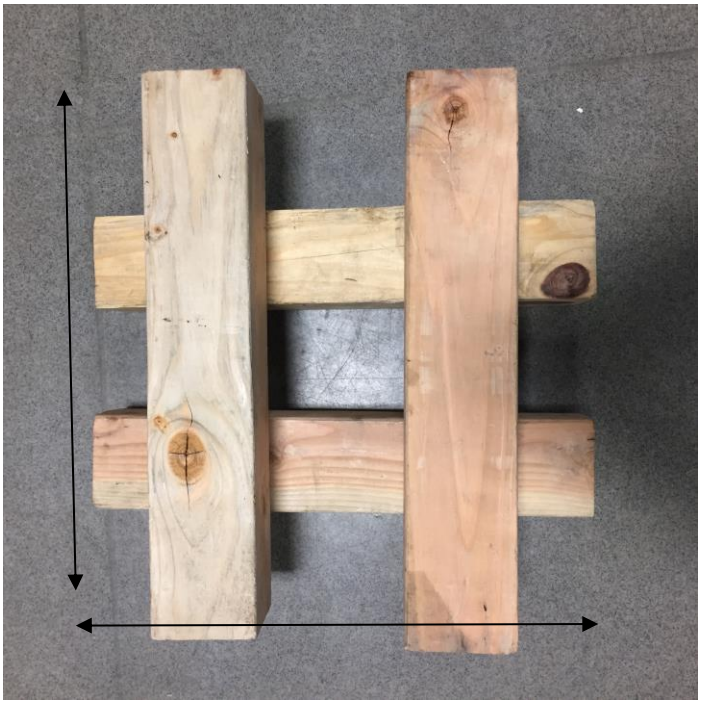

Figure 35

- Contact Points – Points on the stack that the weight of the load is transferred to the ground (See Figure 36)
    - Estimate 6000lbs per contact point when using 4 x 4's (3.5 x 3.5 x 500 psi)
        - 500 psi is when our wood starts to fail.
    - Estimate 15000lbs per contact point when using 6 x 6's (5.5 x 5.5 x 500 psi)
        - 500 psi is when our wood starts to fail.

Figure 36

- Over Lap Distance – Four inches is the minimum that cribbing should overlap (See Figure 37)

Figure 37

- 2 x 2 Box Crib (See Figure 38)
    - Typically made out of 4 x 4's but can be made out of any dimension lumber
    - 2 x 2 box crib made of 4 x 4's can support 24,000lbs with all contact points covered
    - 2 x 2 box crib made of 6 x 6's can support 60,000lbs with all contact points covered

Figure 38

- 3 x 3 Box Crib (See Figure 39)
    - 3 x 3 box crib made of 4 x 4's can support 48,000lbs with all contact points covered
    - 3 x 3 box crib made of 6 x 6's can support 120,000lbs with all contact points covered

Figure 39

- Box Cribbing Designs (See Figure 40 and 41)
    - You may need to construct these different boxes due to the situation and availability of space
    - **Cribbing which is not square is less stable. Height to width ratio should not be greater than 18 inches**

Figure 40

    - In this situation, the weight is limited to how much the timber can hold across a span
        - Stack is most efficient when weight is directed straight down the stack at all contact points

Figure 41

- When utilizing a crib box to help raise a Paratech Airbag, make sure to utilize a flat base (See Figure 42)

Figure 42

- Wood cribbing is also utilized for certain tactics in vehicle extrication
    - Miami Dade (See Figure 43)
    - Dash Lift (See Figure 44)
    - B-Post Blow Out

Figure 43

Figure 44

- Wood Cribbing Safety Concerns
    - Add appropriate cribbing as your lift. Chase the load
    - Use another piece of cribbing or tool to place cribbing, keeping your hands and body out of the fall area.
    - Have a stabilization plan and ensure everyone on scene is on the same page.
    - Never pull cribbing out from a supported load all at once.
    - Ensure you have enough cribbing and the right materials to get the job done safely and efficiently
    - Never place cribbing on top of an air bag.
    - Improper box crib stack – Weight is limited to how much the timber can hold across a span.
    - Never use more than one wedge in a vertical stack. Cribbing will become unstable. Always use wedges equally for safety

- Air bags work on a simple proven law of physics: for each pound per square inch psi of compressed air inflated into a bag, the force is multiplied over the bag's entire surface area, creating lifting force.
- High pressure air bags are not designed for lift height, but rather lift force.
- Crib underneath the bags (with a solid platform) in order to get them as close as possible to the object being lifted.
- Little bag, little lift, big bag, big lift

Paratech Airbags are comprised of 5 components

- Paratech Airbags
    - Paratech Airbags are made from 3 layers of Neoprene covered Aramid fiber reinforcement and has the power to lift, move or shift weights up to 89 tons (Our bags can lift 53 Tons)
    - Paratech air bags come in two different shapes: square or rectangular
        - Square bags offer the ability to stack bags on flat surfaces (See Figure 45), while rectangular bags (See Figure 46) provide an effective lift against linear loads and when lifting on hills or inclines

Figure 45

Figure 46

- All Paratech Airbags have the following data molded on to the bag (See Figure 47 and 48)
  - Model Number
  - Lift Capacity
  - Air Pressure
  - Lifting Height

Figure 47

Figure 48

- The yellow X on the airbag marks the center of the load
- Never exceed 118 psi on the Paratech Airbags

- <u>Paratech Controller</u>
  - The Paratech Controller that we utilize at LFRA is called the Duel Deadman Controller (See Figure 49)
  - The shoulder strap should be rested on the operators shoulder, not put over the user's head

Figure 49

- The controller system also includes an Inline relief Valve (See Figure 50)
  - **LFRA trains with the inline relief valve at the bag**
  - Paratech suggests using the inline relief valve at the controller
  - Allows for the removal of the hose from the controller without deflating the air lifting bags

Figure 50

- <u>Paratech Pressure Regulator</u> (See Figure 51)
  - Regulation from 135 psi to 5500 psi

- Paratech Air Hoses
  - The air hoses that we utilize at LFRA are 3/8 inch and 32 feet long (See Figure 52)
  - Paratech Air Hoses have a 300 psi capacity
  - When attaching the Air Hoses, ensure that locking mechanism is locked on the quick connect coupling

Figure 52

- Air Supply
  - LFRA utilizes a 30 minute Scott SCBA Cylinder to inflate the airbags

Paratech Airbags utilized by LFRA

- High Pressure Airbags (See Figure 53)
    - Tower 6 and Rescue
        - 1 – 28” x 28” – 52.7 Tons
        - 2 – 24” x 24” – 38 Tons
        - 2 – 20” x 20” – 20.2 Tons
        - 1 – 21” x 15” – 19 Tons (150 PSI)
        - 1 – 21” x 15” – 15 Tons (118 PSI)
        - 1 – 15” x 15” – 13.7 Tons
        - 1 – 12” x 6” – 3.5 Tons
        - 1 – 10” x 10” – 5.4 Tons
        - 1 – 6” x 6” – 1.5 Tons

Figure 53

Air Bag Setup

- Attach the SCBA to the designated airbag lifting air pack
- Attach the Pressure Regulator to the SCBA cylinder
- Attach an air hose (preferably black) to the Pressure Regulator
- Attach the above air hose to the Dual Deadman Controller
- Attach 2 inline relief valves to the Dual Deadman Controller
- Attach 2 colored air hoses to the inline relief valves
- Attach the 2 colored air hoses to the desired Paratech Airbags
- Ensure that all locking mechanisms are locked on the quick connect couplings on the air hoses
- Pressurize the system by turning your SCBA on and set the regulator to 118 psi
- Completed Setup (See Figure 54)

Figure 54

Inflating the Airbags

- Maximize the lifting airbag surface contact by cribbing up to what you are going to lift
- When using two bags for height, place the larger airbag on the bottom and **DO NOT** stack more than two bags.
    - Ensure that the air inlets on the airbag are on opposite sides
- Line up the X's on the airbags (See Figure 55)

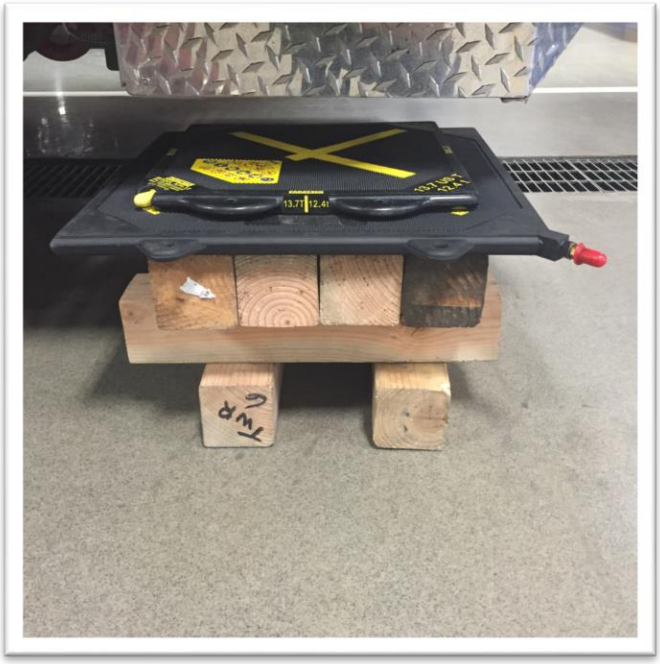

Figure 55

- Inflate the bottom airbag until top of the airbag makes contact with the object, then inflate the top bag to achieve desired height.
- Depress the up green button on the Deadman Controller and the lifting airbag will inflate
- Chase the load as you go
    - Lift an inch, crib an inch with wood cribbing
- Inflate only until desired height or maximum pressure of 118 psi is achieved
- Turn the inline relief off to maintain pressure in the bag

Disassembly of airbag system

- Don't disconnect any components of the airbag system while under pressure
- Depress the red down button on the Deadman Controller to deflate the airbags
    - Deflate the top airbag first, then the bottom airbag
    - Remove cribbing as you deflate and lower your object
- Once the bags are deflated, start at the air supply and it turn it off
- Depress the red and green buttons on the controller to release any pressure in the controller and supply line
- Check gauges, if at zero, disconnect the hoses

Maintenance

- Paratech suggests an inspection of the 5 components every 3 months and after each use
- Clean bags with warm water and light soap
    - Don't use petroleum base products to clean the airbags as they will begin to breakdown the surface of the airbag
- Keep the regulator, controller, inline relief valves, and hoses clear of dust, grit, and oil
- Dry components and return to service
- Check for leaks on the airbag by cleaning the bag and inflating the airbag to 30 psi
    - Wipe the bag down with soapy water and let stand for 10 minutes
    - Check for leaks and if any leaks are found, mark the leak location, and take the bag out of service.

Weights of common materials

- Wood – 45lbs per cubic foot
- Concrete – 150lbs per cubic foot
- Dirt/Sand – 100lbs per cubic foot
- Steel – 490lbs per cubic foot

Airbag Safety Concerns

- When stacking airbags, total lifting capacity is designated by the smallest bag
- Inflate bags slowly to prevent unwanted moving or shifting
- Chase the load as you go
- General practice is to inflate to only 50% of the bags capacity to prevent unwanted stability
- Never work under a load supported only by air bags
- Reduce a bags lifting capacity by 50% when lift is greater than 1"
- Never exceed the maximum air pressure of the lift bag
- Avoid high temperatures (220 degrees)
- Avoid sharp objects
- Never place wood between two bags
- Place a material or piece of plywood on top of the airbag to protect the bag and to maximize surface contact area
- Do not carry bags by the air inlet
- Stand clear of hoses and do not walk on them

Figure 56

Components

- Hydra-Fusion Strut
  - 10 ton lifting capacity with a 2:1 safety factor
  - 20,000lb stabilizing capacity with a 4:1 safety factor
  - Hydra-Fusion Struts are used in conjunction with Paratech Long-Shore, Acme-Thread, and Lock-Stroke Struts & extensions.
- Hydra Fusion Pump
  - Two stage, single action pump with 10-foot non-conductive hose, rated for 10,000 psi.

BASIC SAFETY PRECAUTIONS:

- To avoid the possibility of serious injury or death, stay clear of the loads and keep others away.
- Do not exceed the rated capabilities of the HFS (Hydra-fusion Strut), pump, or hose.
- Control the load at all times with Stabilization Struts. *Always install Stabilization Struts first at a lower angle with respect to the ground and object being lifted; **45°- 55°** is optimal.
- Always perform a lift using the HFS at a **60°- 80°** angle or greater with respect to the ground and object being lifted. (Figure 57)
- A vertical lift using the HFS directly under a load is acceptable at 90°.
- Make sure the HFS Lock-Collar chase the load at all times by adjusting the Lock-Collar down as the HFS is extended. The Lock-Collar should never get more than 1” away from the tube body.
- DO NOT rapidly drop a load supported by the HFS. Lower the load carefully by **SLOWLY** opening up the pump control lever.
- Do not use the pump hose to move attached equipment. Stress may damage the hose and fittings, which could cause personal injury and equipment failure.

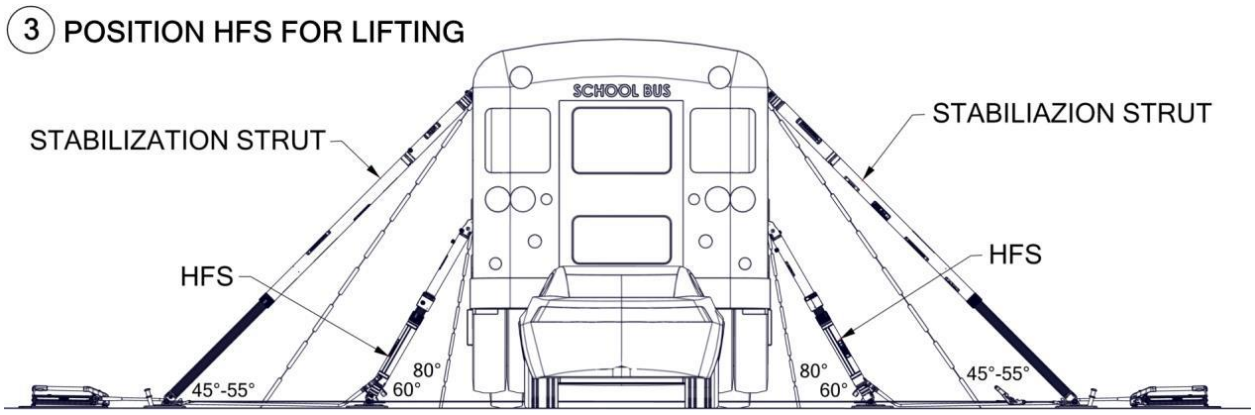

Figure 57

Hydra-Fusion Strut and Pump operation

- Connect the HFS (tube end down) to a Paratech base plate and ensure the locking pin is secure.
- Connect a ratchet strap to opposing strut base plate to ensure there is no movement of the base plates.
- Select an appropriate Paratech strut or extension and connect it to the HFS.
    - Note – One HFS can be used in combination with one strut and one extension with a combined length of 16 feet or two extensions having a maximum combined length of 3 feet.

Figure 58

- Install stabilization struts at 45-55 degrees and attach a ratchet strap from one base plate to the other.
- Connect the pump hose to the HFS ensuring that the pressure is bled off the pump first.
    - Turn the valve controller clockwise for pressure and counter clockwise to bleed off pressure (Figure 59)

Figure 59

- Unlock the handle of the pump.
- To extend the HFS, turn the pump control valve clockwise to the closed position and work the handle up and down.
    - As the strut is lifting it is essential to rotate the lock collar to “chase the load” and ensure that the load is captured at all times, keeping the collar within one inch of the strut body.
    - Note – The pump can be operated in two positions, horizontal or vertical (the head must be pointed down).
- To release pressure or lower the load, slowly open the pump control valve (turning counter clockwise) to control the descent.
    - Control the lock collar and “chase the load” keeping the collar within one inch of the tube body. (figure 60)

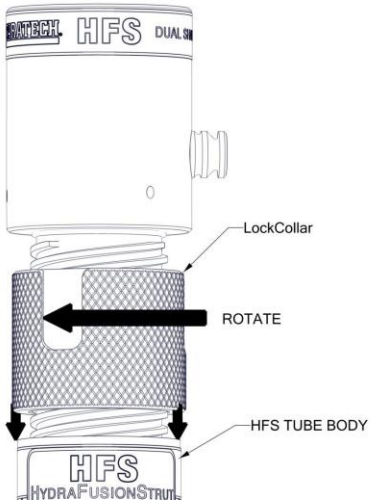

Figure 60

- After use, before disconnecting the pump hose, bleed all pressure from the system by turning the control valve counter clockwise allowing the strut to fully retract. (Figure 60)

Figure 61

The VSK Controller is used to supply pressurized air into the stabilization struts to follow the load as it is being lifted so personnel can remain at a safe distance from the vehicle or hazard area. (Figure 61)

Controller Operation

- Attach a high-pressure hose from the Paratech regulator (connected to a cylinder) to the inlet connector of the controller.
- Connect a wye to the outlet side of the controller and attach one hose to each of the struts you want to control. (figure 62) You may also connect air hoses in series to the struts you want to control utilizing wyes connected to each strut. (Figure 63)

Figure 62

Figure 63

- Up to four struts can be connected to one controller.
- Once all struts are connected, set the regulator between 50 and 200 psi.
    - The VSK controller reduces the output pressure to 25 psi.
- Turn the 90-degree shutoff valve so it is in line to allow airflow through the controller.
- Slide the control forward until the strut begins to extend with the load. (figure 20)
    - As the strut is lifting it is essential to rotate the lock collar to “chase the load” and ensure that the load is captured at all times, keeping the collar within one inch of the strut body.
- Leave the slide control at the designated position for the duration of the operation.
- To lower the load, slide the control back until the strut begins to lower.

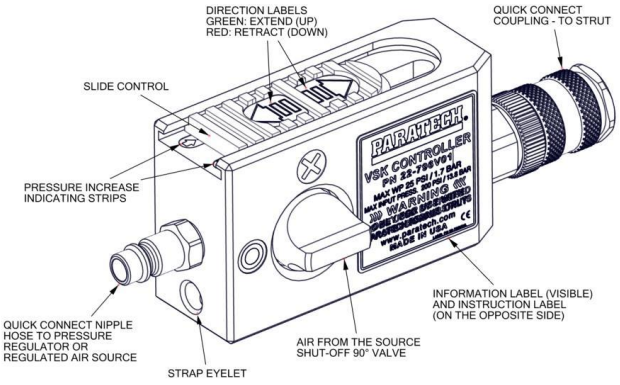

Figure 64

- It may be necessary to capture the suspension of a vehicle when lifting another vehicle off of it.
    - Use a ratchet strap from one wheel over the hood of the car to the other wheel and tighten the strap. (This will reduce the amount of lift that must take place) (Figure 65)

Figure 65

- There are several ways to attach a strut for stabilizing or lifting a vehicle.
    - Finding a strong purchase point for the strut tip to connect directly to the vehicle. (figure 66)
    - Using chains to sling or cradle the load.
        - Attach a chain to a chain tip on one end of a strut sling it under the load and attach it to another chain tip on a strut on the other side of the vehicle. (figure 67)
            - Ensure that the struts are directly across from each other and are at the same extension.

Figure 66

Figure 67

- It may be necessary to “marry” two vehicles together to ensure the best stabilization possible.
    - Connect one or more ratchet straps to structural components of both vehicles to secure them to one another. (figure 68)

Figure 68

- If there is not an effective connection point on a vehicle to secure ratchet straps to the struts, pickets can be used to immobilize the strut bases. (figure 69)

Figure 69

Reference Information

- NFPA 1006
- www.Paratech.com
- Extrication and Cribbing PowerPoint by Chris Beswick
- Fire.jbpub.com Chapter 8 Vehicle Stabilization
- Cribbing Basics PowerPoint by Brad Delano
- University of Extrication by Ron Moore