$35.00

HDUL - 450

OPERATIONS AND MAINTENANCE MANUAL

JERR-DAN

An Oshkosh Corporation Company

1080 Hykes Road
Greencastle, PA 17225
Phone (717) 597-7111
www.jerr-dan.com

5-376-000121
REV. 0 - 10/08

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FOREWORD

This manual serves as a guide for the owner and operator in the safe operation and optimum performance of your Jerr-Dan equipment.

For your safety, and the safety of others, you must

- know the proper use of the equipment
- use the equipment within its capability
- develope consistent habits of proper use
- use good judgement

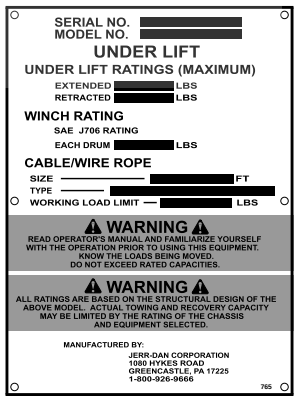
Before attempting to operate the unit, carefully read all sections of this manual.

Keep this manual with your equipment at all times. Refer to it if in doubt of proper operation.

Information contained in this manual reflects how your Jerr-Dan equipment was built at the factory. Modifications or additions by the distributor or owner are not reflected in this manual.

This manual does not include operation and maintenance information for the commercial chassis (International, Ford, GM, etc.). That information is provided by the chassis manufacturer.

When inquiring about operation, maintenance or warranty, please have ready your equipment's Sales Order Number, Serial Number and Model Number. This information can be found on the aluminum tag riveted to the HDUL-450 on the drivers side.



Jerr-Dan Corporation strives to provide information that is accurate, complete and useful. All information contained in this manual is as accurate as known at the time of publication and is subject to change, without notice, as a result of continuous product improvements. Jerr-Dan reserves the right to amend the information in this document at any time without prior notice.

Should you find inadequacies in the text, please send your comments to the following address:

Jerr-Dan Corporation
Attn: Technical Publications
1080 Hykes Road
Greencastle, PA 17225

or by e-mail at technicalpublications@jerr-dan.com.

Always keep this manual in your vehicle so the operator can study it as needed before a recovery. Remember to replace the manual if lost.

Additional or replacement manuals or replacement safety warning labels can be ordered by calling Jerr-Dan Parts at 717-597-7111.

JERR-DAN

An Oshkosh Corporation Company

1080 Hykes Road Greencastle, PA 17225
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LIMITED WARRANTY

Manufacturer's Warranty. Manufacturer's sole warranty shall be the following, which Distributor shall make on behalf of Manufacturer by conspicuous notice in writing accompanying each contract or memorandum of sale:

1. Warranty. Jerr-Dan Corporation, ("Manufacturer") warrants each new product made by it to be free from defects in material or workmanship for one year from the date of initial sale, lease, rental, or other disposition of such product, and agrees only to repair or replace at its own expense, f.o.b. the place or places of manufacture, at manufacturer's option, any part or parts of the product found to be defective in material or workmanship, provided Manufacturer is notified of such defect or defects within the one year warranty period and given a reasonable time to correct the defect. In no case, shall the warranty extend to defects in materials, components, or services furnished by third parties. Defects caused by chemical action, or the presence of abrasive materials and defects arising following the operation beyond rated capacity or the improper use or application of any Products shall not be considered defects within the scope of the foregoing warranty. If any repairs or alterations are made or any parts are replaced during the period covered by any warranty above mentioned by other than an authorized Manufacturer's Distributor in accordance with authorized Manufacturer's service manuals or with other than parts, accessories, or attachments authorized by Manufacturer for use in its products, customer shall pay for all such repairs or parts without recourse against Manufacturer, and Manufacturer shall be relieved of responsibility for fulfillment of this warranty with respect to parts or components of all repairs, alterations or replacements so made. No claims for labor shall be considered unless authorized by Manufacturer.

2. Disclaimer as to Consequential or Special Damages. Under no circumstances shall Manufacturer be liable for any consequential or special damage which any person, firm, corporation, or other entity may suffer or claim to suffer or incur or claim to incur as a result of any defect in the product or in any correction or alteration thereof made or furnished by Manufacturer or others. "Consequential" or "special damages" as used herein includes but is not limited to costs of transportation, lost sales, lost orders, lost profits, lost income, increased overhead, labor and material costs and cost of manufacturing variances and operational inefficiencies.

3. Maximum Liability. The maximum liability of Manufacturer under the exclusive warranty set forth herein shall be the amount paid to Manufacturer by the vendor of the component with respect to the product to which such vendor warranty applies.

4. Limitation of Liability. The limitation of liability provisions herein shall apply to any and all claims or suits brought against Manufacturer, including any claim based upon negligence, breach of contract, breach of warranty, strict liability or any other theories upon which liability may be asserted against Manufacturer.

5. Exclusive and Entire Warranty. The warranty constitutes Manufacturer's entire warranty as to the product and it is expressly agreed that the remedies of dealer and those claiming under dealer as stated in this warranty are exclusive. Manufacturer does not assume (and has not authorized any other person to assume on its behalf) any other warranty or liability in connection with any product covered by this warranty.

MANUFACTURER EXPRESSLY DISCLAIMS ANY AND ALL OTHER WARRANTIES OF ANY KIND WHATSOEVER AS TO THE PRODUCT FURNISHED HEREUNDER, INCLUDING BUT NOT LIMITED TO EXPRESS OR IMPLIED WARRANTIES AS TO MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSES SOLD, DESCRIPTION OR QUALITY OF THE PRODUCT FURNISHED HEREUNDER.

6. Notice of Occurrence. This warranty shall be void if, upon the occurrence of any incident involving any product made by Manufacturer, and resulting in any personal injury or property damage, customer shall fail to notify Manufacturer within 24 hours of such occurrence or permit Manufacturer audit representatives to have immediate access to such product and to all records of and within the control of the customer and/or distributor relating to the product and the occurrence.

7. Filing of Warranty Claim. Upon notifying the Manufacturer of a failure, the Manufacturer or its representative will verbally authorize and confirm by letter the repairs to be made. Verbal authorization will require the following information:

A) Owner's name and telephone number.

B) The dealer's name from whom it was purchased.

C) The Manufacturer's unit serial number.

D) Telephone number of the party making the repairs.

E) The part numbers needed to make repairs.

F) Owner to be informed of C.O.D. on parts, 50% to assure return of defective parts.

At this time, the Manufacturer will ship as soon as practical the parts needed to make the repair. Included with the parts will be the invoice for the parts and a Request for Warranty form, with the Warranty Return Tags.

The vehicle owner/dealer will complete the Request for Warranty form and the Warranty Return Tag marked "Return with Shipping Notice". Both documents should be attached to the shipping notice and returned to the Manufacturer by mail. The parts to be returned shall be tagged with the Warranty Return Tag (more than one part pertaining to the same warranty claim shall be identified with the same warranty claim number - see number on Warranty Return Tag). All parts under this claim shall be returned to the Manufacturer pre-paid for warranty evaluation.

Upon receiving the part or parts for warranty evaluation, the part will be inspected and tested. After being inspected and tested, the decision to honor or deny warranty claim shall be based on analysis of all available information.

When warranty is honored, the Manufacturer will reimburse the owner/dealer in the amount agreed to by both parties.

If warranty is denied, the owner and distributor will be notified in writing of the decision and a full explanation for the decision will be given.

8. Manufacturer may at any time amend the foregoing form of warranty without prior notice.

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LIMITED WARRANTY

Coverage and Procedures

Like our wheel lift and car carrier products, Jerr-Dan warranty programs are designed for the long haul.

Whether you own a wheel lift or car carrier, you are assured that your equipment is of the highest quality, and is covered under this limited warranty.*

Our one-year unlimited mileage plan is offered for wheel lifts and car carriers. This warranty is designed for the most comprehensive protection of your specific equipment.

WHEEL LIFT:

The Jerr-Dan one-year warranty covers material and workmanship including the following:

I. Body
II. Substructure
III. Wheel lift assembly
IV. Wrecker boom assembly
V. Winch and winch components (excluding cable)
VI. Hydraulics
VII. Electrical wiring assembly

CAR CARRIERS:

The Jerr-Dan one-year warranty covers material and workmanship including the following:

I. Deck
II. Winch and winch components (excluding cable)
III. Substructure
IV. Hydraulics
V. Electrical wiring assembly

Procedures for warranty coverage:

1. Contact your selling distributor.
2. If necessary, contact Jerr-Dan for the distributor nearest you - Call 1-800-926-9666.
3. If necessary, Jerr-Dan may authorize repair by a qualified equipment service center. Under these arrangements, it will be necessary to obtain an estimate of repairs before any work is performed. Send estimate of repair cost to:

   Jerr-Dan Corporation
   Warranty Department
   1080 Hykes Road
   Greencastle, PA 17225

   Be sure to include your daytime phone number.
4. Authorization for repairs under this limited warranty will be provided by telephone within 24 hours of receipt of valid warranty claims and confirmed by letter or fax.

*5. This outlines the Jerr-Dan One-Year Warranty Plan. Coverage does not include damages caused by excessive abuse or consequential damages resulting from the lack of proper service, maintenance or need for repairs. All plans begin at original retail purchase date.

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SAFETY

The safe operation of your Jerr-Dan Wrecker is your responsibility. Read this manual and the truck manufacturer's manual and thoroughly understand them. You can be held legally responsible for injuries or damage resulting from unsafe operating practices.

Our recommendations for operating your equipment can help you avoid unsafe practices and their bad consequences. These recommendations are contained in this manual.

Jerr-Dan Corporation is not responsible for the results of any unsafe practice of tow operators or for the failure of your equipment or its accessories resulting from improper use or maintenance.

The danger from a vehicle continues after it is disabled or wrecked. Recovering or towing vehicles can be dangerous too! The danger threatens tow operators and everyone else close by. As a tow operator you must develop an awareness of the hazards involved. You must use every safeguard to prevent injuries.

Careful consideration of the immediate surrounding conditions such as the weather, terrain, type or condition of the vehicle to be recovered and the condition and experience of the operator is foremost to the safety and success of the operation.

Wire rope cables wear out or can become damaged. Periodically inspect the wire rope cable for any signs of fatigue or damage. Check the hooks to be sure they have not been bent or deformed. Replace immediately when damaged. **Refer to the Wire Rope Handling and Inspection Section.**

For each step in operating your equipment develop the habit of asking yourself "is it safe to proceed?" Carefully check your set up before starting a lift or tow.

Because recoveries can be so different, we cannot warn you of all the possible hazards you will encounter, but we will tell you of the most common hazards that we know about. We also strongly recommend that you receive specialized and advanced training from a professional Towing and Recovery instructor before operating any recovery equipment.

To alert personnel to hazardous operating practices, safety messages are used throughout the manual. Each safety message contains a safety alert symbol and a signal word to identify the hazard's degree of seriousness.

CAUTION:

Identifies when a potentially hazardous situation exists and may result in a minor or moderate injury or property damage.

WARNING:

Identifies when a potentially hazardous situation exists and could result in death or serious injury.

DANGER:

Identifies when an imminently hazardous situation exists and can result in death or serious injury.

DO NOT EXCEED THE FOLLOWING RATINGS:

HDUL- 450

UNDER LIFT RATING:

Full Retracted	45,000 lbs.[1]
Mid Extended	32,000 lbs.[1]
Full Extended	24,000 lbs.[1]
Tow Rating	?????? lbs.

HEAVY DUTY TIRE LIFT RATING (OPTION):

Lifting Capacity (Each Arm)	7,000 lbs.
Lifting Capacity (Total)	14,000 lbs.
Towing Capacity (Maximum)[2]	80,000 lbs.

WINCH RATING: (Dp Planetary Gear)[3] (OPTION):

Each Drum (Single Speed)	20,000 lbs

WIRE ROPE:

Working Limit Each Line	9,600 lbs
Nominal Breaking Strength	33,600 lbs
Construction	6 x 37 EIPS RRL IWRC
Diameter	9/16 inch
Standard Length	150 Feet

[1] Rating Using Axle Lift Tools

[2] THE TOWING CAPACITY SHOULD NOT EXCEED THE GROSS COMBINED WEIGHT RATING (GCWR) OF THE TOWING VEHICLE OR 42,000 LBS. (GCW) GROSS COMBINED WEIGHT OF THE TOWED VEHICLE, WHICHEVER IS LOWER.

[3] SAE J706: Surface Vehicle Recommended Practices - Rating of Winches

MAXIMUM LIFTING CAPACITY - THE MAXIMUM LOAD THAT CAN BE LIFTED.

GROSS COMBINED WEIGHT RATING (GCWR) - THE VALUE SPECIFIED BY THE VEHICLE MANUFACTURER AS GCW.

GROSS COMBINED WEIGHT (GCW) - ACTUAL WEIGHT OF THE ENTIRE VEHICLE AT THE GROUND WITH TRAILER OR TRAILERS, INCLUDING VEHICLE EQUIPMENT, DRIVER, PASSENGER, FUEL AND PAYLOAD (EVERYTHING THAT MOVES WITH THE VEHICLE).

NOTE

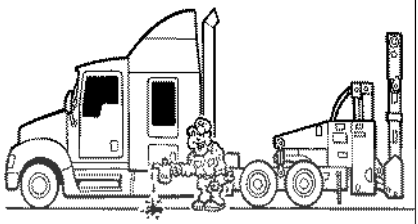
These ratings apply to the structural design of the HDUL-450 only. They might be limited by the axle rating and gross vehicle weight rating of the truck chassis.

The payload and towing capacity of any towing vehicle must meet the following:

- The actual payload on the towing vehicle must not exceed the posted rating and the towed vehicle load must not exceed the posted lift / towing ratings.
- The total weight of the towing vehicle (cab chassis, body, payload, driver, passenger(s), tools, fuel, etc.) and the towed vehicle load must not exceed the GVWR (Gross Vehicle Weight Rating) of the towing vehicle.
- The total weight of the towing vehicle and a towed vehicle load must be distributed so that each axle's GAWR (Gross Axle Weight Rating) is not exceeded.
- The total weight of the towing vehicle and towed vehicle (everything that moves with the towing vehicle) must not exceed the GCWR (Gross Combination Weight Rating) of the towing vehicle.

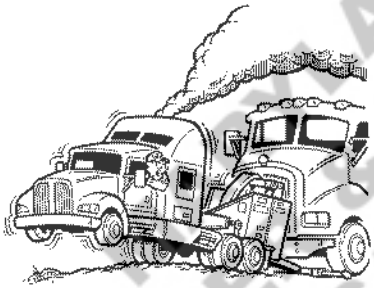
Staying within these ratings is necessary to maintain the safety and performance of the towing vehicle.

CHECK TRUCK MANUAL FOR SPECIFIC GVW & AXLE RATINGS. ALSO LOOK AT THE CERTIFICATION DECAL AFFIXED TO DRIVER'S SIDE DOOR JAMB, HINGE PILLAR OR LATCH POST AND THE STRUCTURAL CAPACITIES PLACARD INSIDE THE SIDE RECOVERY SYSTEM TOOL COMPARTMENT ON THE DRIVERS SIDE.

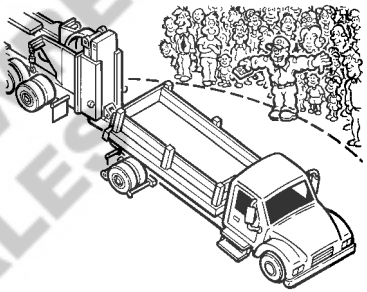


- Don't use a recovery vehicle that has not been properly maintained. Pay special attention to the mounting bolts, and lubrication of moving parts.

- Don't exceed ratings of booms, wire ropes, snatch blocks, or winches. Stay within nameplate ratings. Note that boom ratings decrease significantly as the boom is extended.

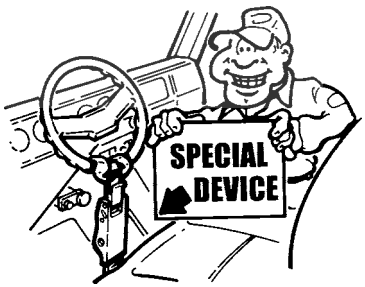


- Don't expect your wrecker to tow loads equal to the wrecker ratings. Wrecker ratings apply to loads imposed during recovery with the wrecker properly stabilized.

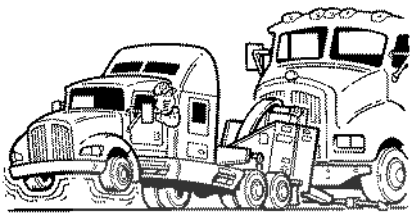


- Don't permit bystanders in the area while performing recovery work.

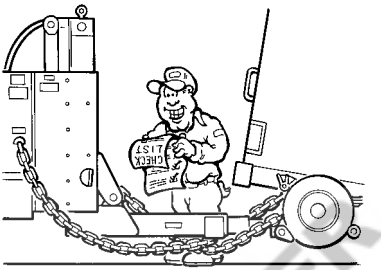
- Don't operate the wrecker's engine faster than recommended. Excessive speeds can damage PTO, hydraulic pumps, and winches.



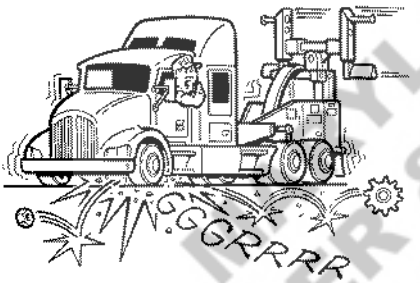
- Don't rely on anti-theft steering locks to secure the steering wheel. Use a special steering wheel clamping device designed for this purpose.



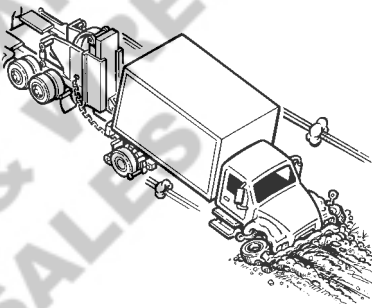
- Don't tow a vehicle that reduces the weight on the front wheels of the wrecker more than 50 percent. (SAE J2512)



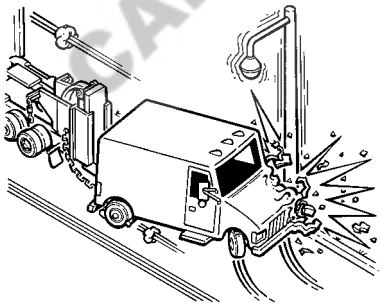
- After you have hooked up a vehicle for towing, don't start the tow until you have double checked the hook-up, installed safety chains, and released the parking brakes of the towed vehicle.



- Don't travel with the PTO engaged. Damage to the recovery vehicle's transmission and hydraulic components will occur. Engage it only while operating the controls.

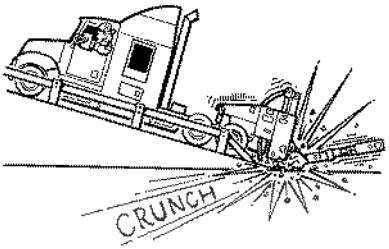


- Don't tow a vehicle on its front wheels if they are damaged.

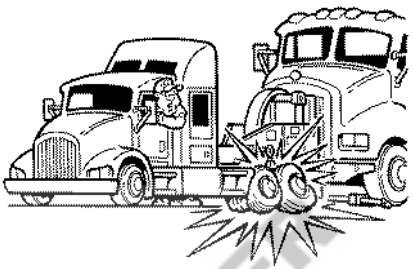


- Don't tow a vehicle on its front wheels unless the steering wheel is secured with the front wheels straight ahead.

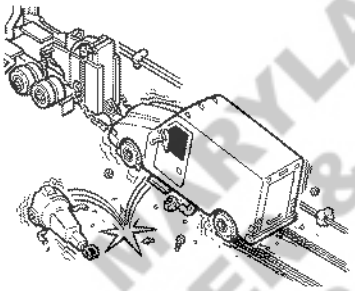
- Never fold the boom up into storage position without removing the towing adapters.



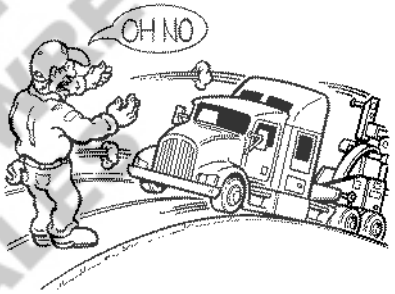
- Keep the underlift boom raised high enough off of the ground when roading to avoid dragging it over road surfaces.



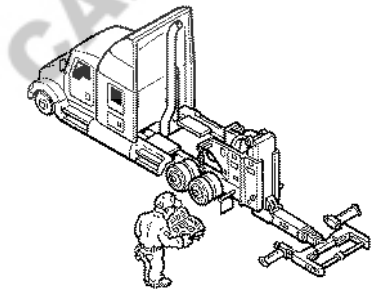
- Never exceed the front and/or rear axle ratings of your towing equipment.



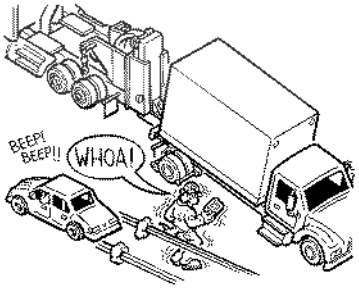
- Don't tow a vehicle on its drive wheels unless steps have been taken to protect its transmission and differential. Follow the recommendations of the vehicle manufacturer. As an alternative, use a towing dolly.



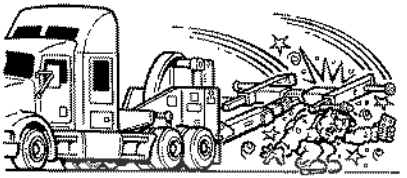
- Be sure all brakes and locks are properly set on the recovery vehicle.



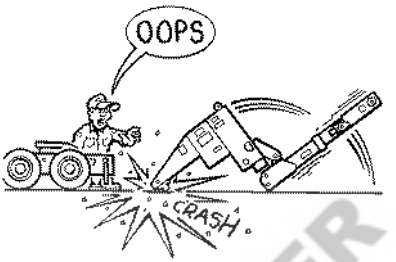
- Observe all warning decals.



- Make sure you are clear of oncoming traffic. A wireless remote is standard with your HDUL so you can stay out of dangers way.



- Use caution when standing behind the boom when tilting it down.

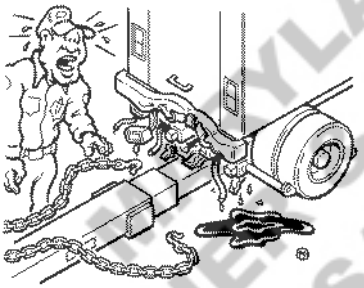


- Never disconnect the HDUL from the truck tractor without first installing the jack stands.

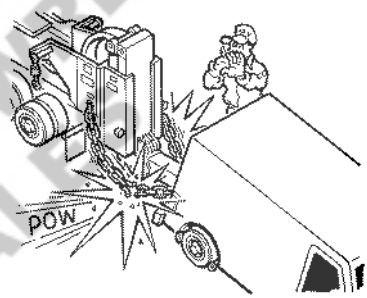
SAFETY CHAINS AND TIE-DOWN CHAINS MUST BE USED WHEN TOWING AND TRANSPORTING

Safety chains and tie-down chains are provided for use with your new Jerr-Dan Recovery Vehicle. Periodically inspect all chains for any signs of fatigue or damage. Don't overlook the hooks; be sure they have not been bent or deformed. If chain or hook damage is noted, they must be replaced before being used. **Do not use safety chains for recovery operations.**

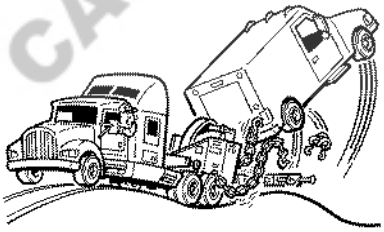
Many states require that the towed vehicle be secured to the wrecker body with safety chains. Check your local regulations and use your safety chains. Safety chains are provided for use with your new JERR-DAN.



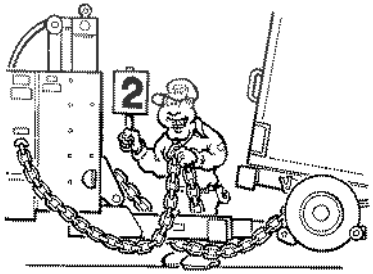
- Never attach the chain hooks in such a way as to damage brake lines or other functional parts.



- Check that the chain does not become over tensioned when raising the towed vehicle to the towing position or during the towing operation.



- Keep in mind that driving over bumps and hollows and around corners will tend to tighten or loosen the chains.

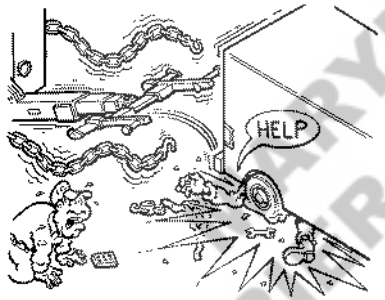


- Always use two safety chains and two tie-down chains when towing all vehicles, regardless of distance.

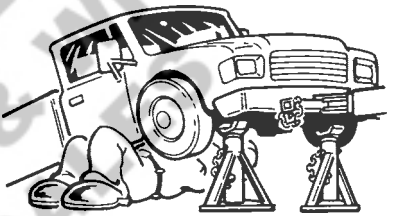
LIFT SAFETY

Careful consideration of the immediate surrounding conditions such as the weather, terrain, type or condition of the vehicle to be recovered and the condition and experience of the operator is foremost to the safety and success of the operation.

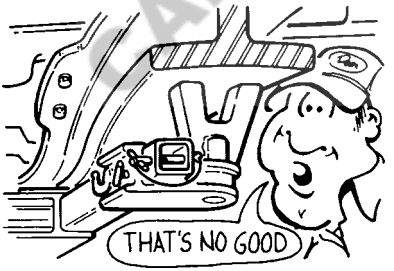
Your unit is unique. It not only can make lifts from level surfaces, our boom tilt feature allows pickup of vehicles that are parked on both inclines and declines.



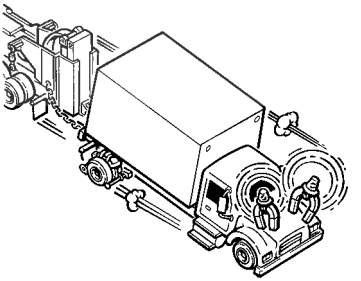
- You should never make a lift or movement while close to or under the vehicle being lifted!



- Always use jack stands to support the vehicle if it is necessary to work under it.



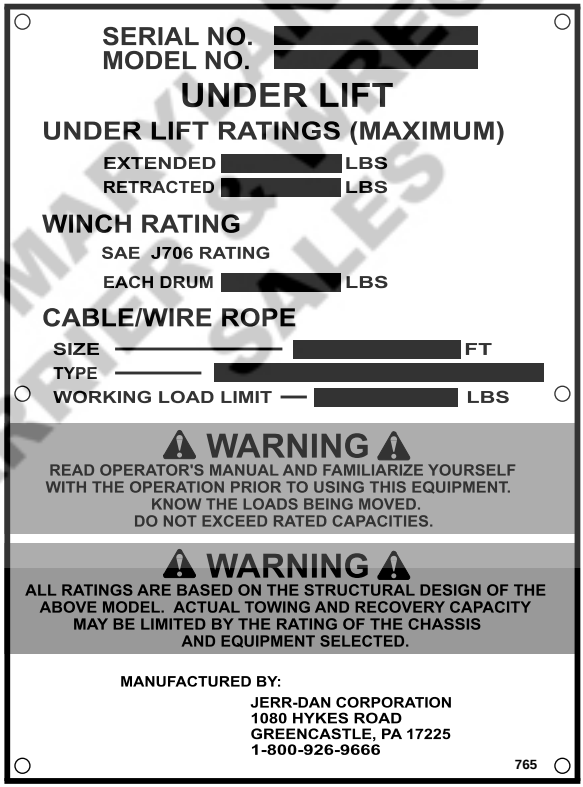
- Don't use towing forks that are not of proper size for the pickup requirements.



- Magnetic towing lights are required in many areas and are always recommended for safe tows.

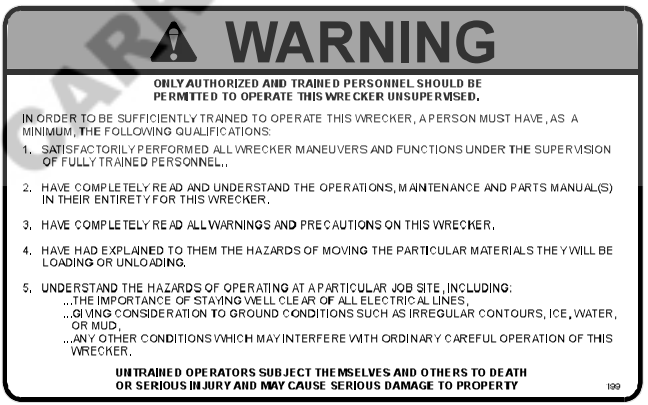
CAPACITY/RATING INFORMATION PLACARDS

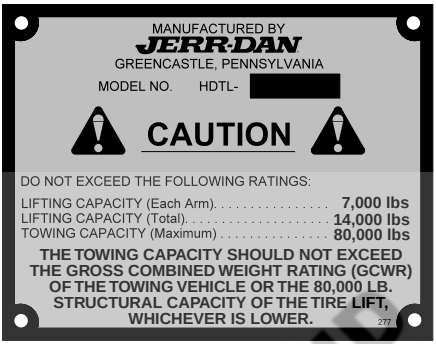
These placards provide information about Side Recovery System ratings, capacities and load limits. You must stay within these ratings/capacities when using the Jerr-Dan Side Recovery System. These placards must not be obliterated, removed or painted over. They are there to remind and protect the operator. (Not all placards are used on all units) If a placard becomes lost or unreadable, it should be replaced. Replacements are available through the Service Parts Department.

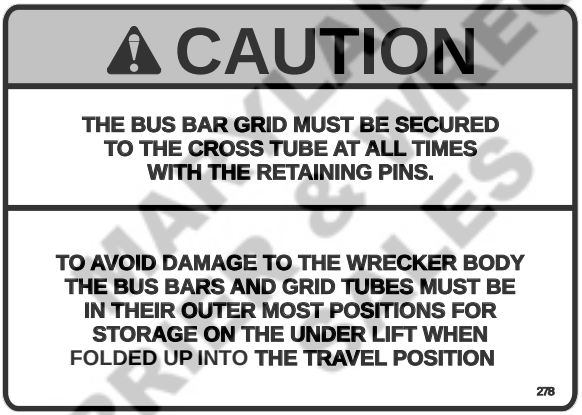


SAFETY WARNING LABELS

These safety warning labels describe hazards and what happens if you encounter them. Read each safety warning label and figure out how to avoid the hazard. These labels must not be obliterated, removed or painted over. They are there to remind and protect the operator. (Not all decals are used on all units) If a decal becomes lost or unreadable, it should be replaced. Replacements are available through the Service Parts Department.





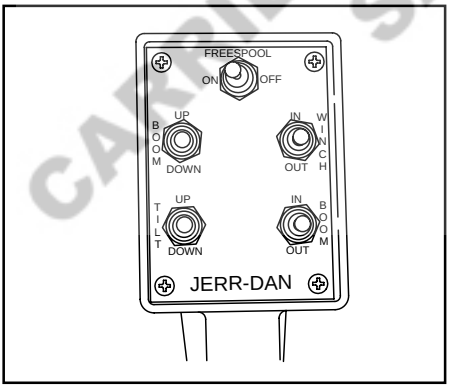


OPERATION

The safe operation of your Jerr-Dan wrecker is your responsibility. You can be held legally responsible for any injuries or damage caused by the unsafe operation of your equipment. If you follow our tested and proven procedure you will operate the equipment properly. Remember you alone are always responsible for your actions.

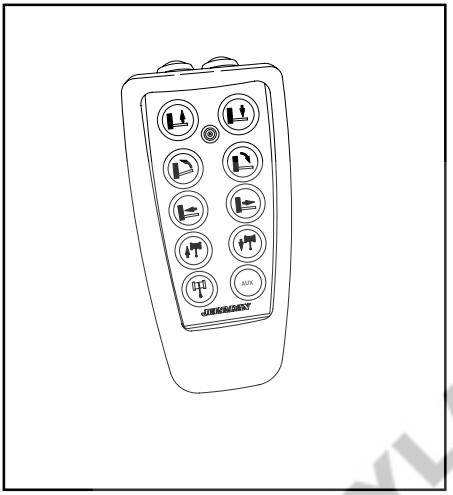
Always know the weight distribution of your load and ensure you are within your truck's Gross Axle Weight Rating (GAWR), Gross Vehicle Weight Rating (GVWR) and Gross Combination Weight Rating (GCWR) as well as any federal or state roading regulation. In addition, be aware of your truck's overall loaded height to be sure that you are under the federal bridge law height of 13 feet 6 inches.

The operating controls for your wrecker are conveniently located on both the driver and passenger sides of the deck to keep you safe and out of harms way. **Always operate the controls from the side away from traffic.** Also, all of the hydraulic functions of the HDUL are conveniently operated by a hand held wireless remote controller .



The following wired remote controls are provided:

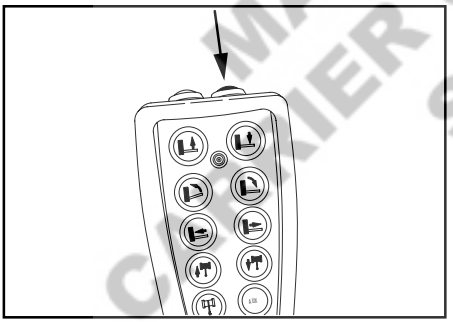
1. Boom Up/Down Controls
2. Boom Tilt Up/Down Controls
3. Boom In/Out Controls
4. Winch In/Out Controls
5. Winch Free-Spool Controls



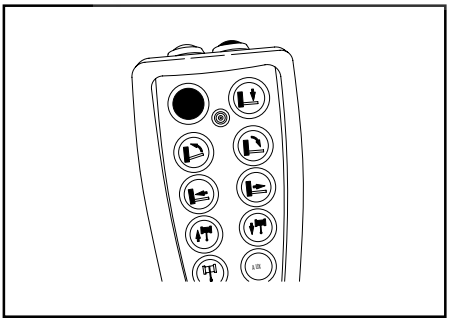
The following wireless remote controls are provided:

1. Power (Green) - ON
2. Power (Red) - OFF
3. Indicator Light
4. Boom Up/Down Controls
5. Boom Tilt Up/Down Controls
6. Boom In/Out Controls
7. Winch In/Out Controls
8. Auxiliary 1
9. Auxiliary 2

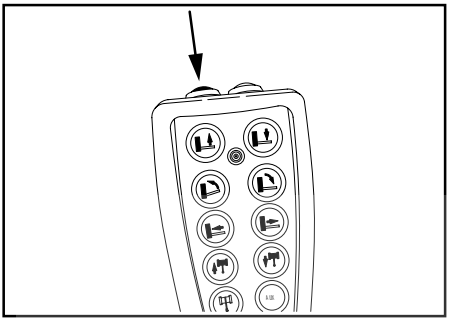
Follow these simple steps to operate the controller:



1. With the trucks engine running and the PTO engaged, press the green button on the hand controller to turn the power on to the hand controller. The red light on the controller will illuminate and flash.



2. Depress the appropriate yellow button on the hand controller for the desired function(s). The red light will stop flashing whenever a function is being operated.

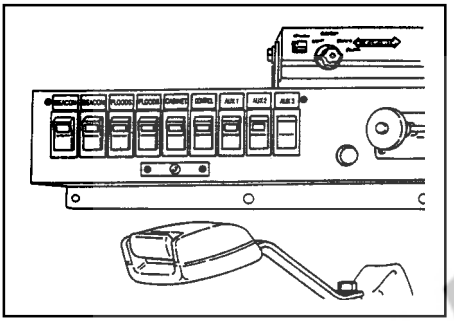


3. To turn off the power to the hand controller, simply press the red button. The red light will stop illuminating.

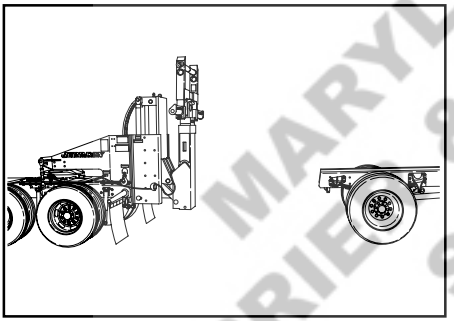
In the event of a hand controller malfunction, the HDUL hydraulic functions can be operated using the valve's manual override buttons.

UNDER LIFT OPERATION

Follow these simple steps:

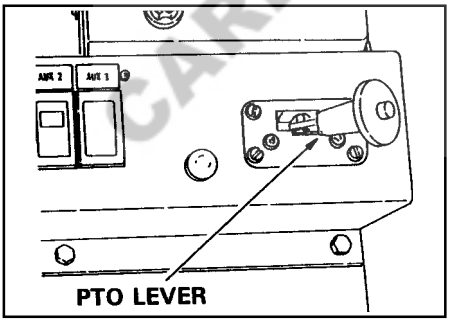


1. Turn on the safety and work lights.



2. Position the recovery vehicle as close to the subject casualty vehicle and as close to the direction of the pull as possible.

3. Place the recovery vehicle's transmission gear selector into neutral and set the parking brakes.



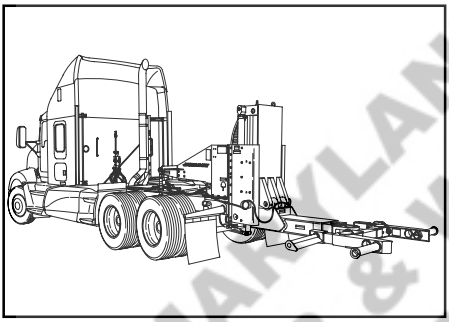
4. If your tractor has a PTO and wet line system, engage the power-take -off with the engine running. See PTO operator's manual. **NEVER TRAVEL WITH THE POWER TAKE-OFF CONTROL ENGAGED.** This could result in damage to the PTO unit and the recovery vehicle's transmission.

5. Adjust the electronic or manual throttle control to elevate the engine speed to approximately 1000-1200 R.P.M. of P.T.O. output shaft speed for optimum performance.

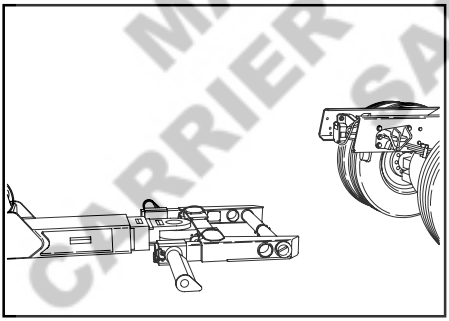
CAUTION:

Never exceed 1200 R.P.M. When your hook up is complete, reset the engine idle to normal.

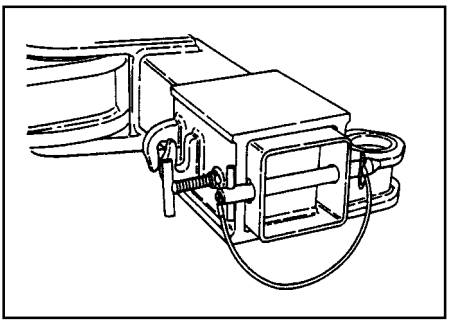
6. Confirm the recovery vehicle's position in relation to the casualty vehicle to be towed. Reposition the recovery vehicle if necessary. ***Be sure the casualty vehicle is not in gear or park. Keep the brake set.***



7. Using the tilt fuction, unfold the under lift boom down until it is in the horizontal position.



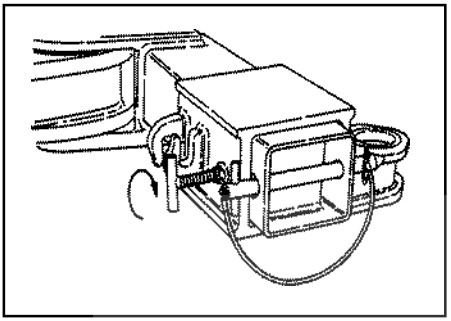
8. Lower the under lift boom to about one (1) in. from the ground and swing the crossbar parallel to the casualty vehicle.



9. Attach the lift receivers to the crossbar by sliding them over the ends of the crossbar. Install the retaining pin into the end of the crossbar and secure with the safety pin.

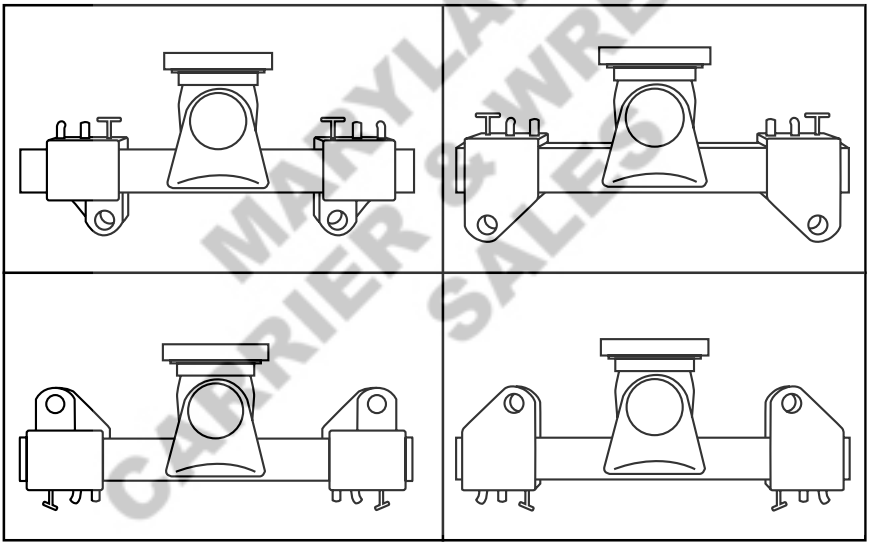
CAUTION:

The retaining pins must be in place during all towing applications.

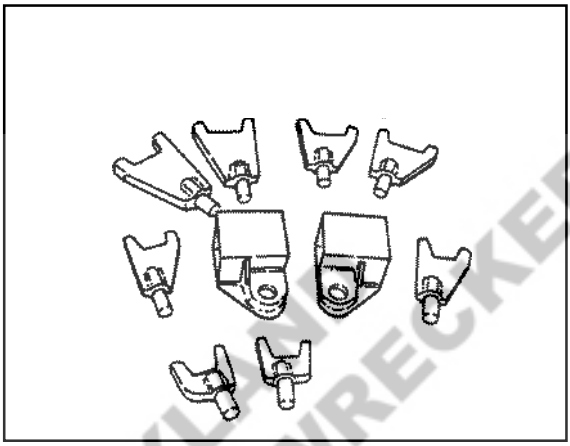


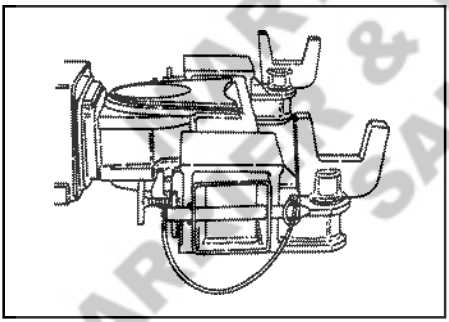
10. Adjust the lift receivers on the crossbar to the desired position and tighten the “T” handles to secure the receivers on the crossbar.

Various Positions for Lift Receiver Use

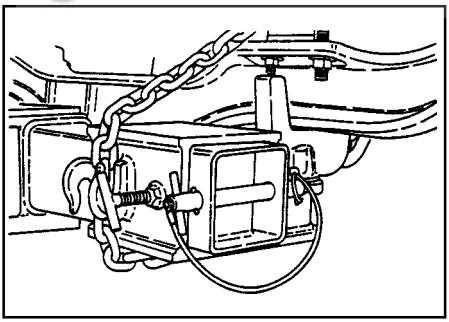


FRAME FORKS

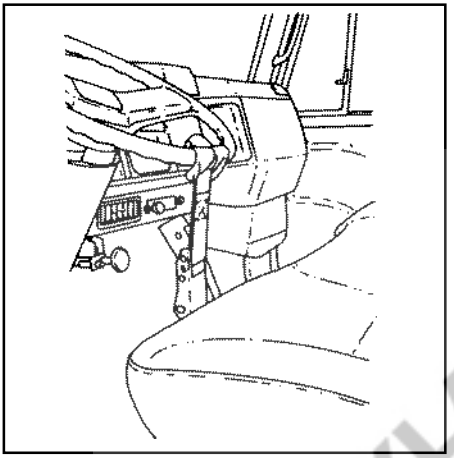




1. Choose the frame forks that are best suited to your needs and insert them into the receivers on the crossbar.
2. Extend the under lift boom under the vehicle so that the frame forks are in the proper position for lifting. **At the same time make sure you are not attaching the frame forks to any steering components.**



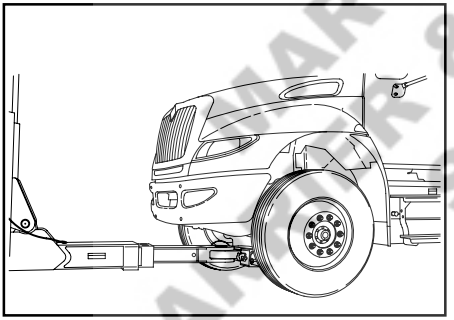
3. Raise the boom to lift the casualty slightly.
4. Secure the casualty vehicle to the crossbar with chains and a chain binder.



5. After securing the casualty vehicle and before making the final lift, check to be sure that the casualty's parking brake is released, the transmission is in neutral, and the wheels are straight.

CAUTION:

If vehicle to be towed is on a slope, do not release the brake until the load is secured.

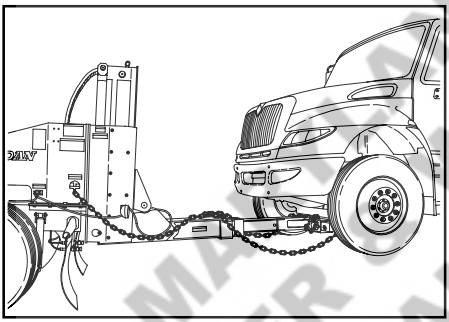


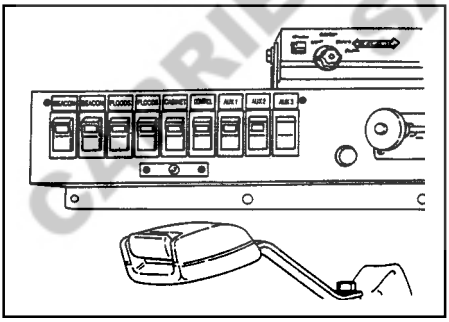
6. It is recommended that the steering wheel be secured by a steering wheel strap for any front or rear tow.
7. With the vehicle in neutral and the parking brake released, you can move the vehicle safely up, down, in or out. All of these movements are hydraulically controlled.
8. Power retract the under lift until the casualty vehicle is about three (3) to four (4) feet from the back of the recovery vehicle. Leave enough room to maneuver around corners without corner binding or causing contact between the two (2) vehicles. **Be sure that the fly boom is extended at least four (4) in. from the middle boom section to ensure unobstructed cross-bar pivoting.**

9. Raise the casualty vehicle into towing position observing the far end for sufficient ground clearance. It is possible to set the rear of a front lifted vehicle completely onto the ground, causing damage. Take irregular road surfaces into consideration. Observe the lift function from the side and away from both vehicles if possible.

NOTE:

When towing, the Underlift Boom should be as close to horizontal as possible. You will have better turning and manuevering capabilities and it will prolong the life of your under lift and pivot pin.





10. Be sure to maintain sufficient ground clearances with the bottom of the casualty vehicle.
11. Attach the safety chains and magnetic towing lights.
12. Hook-up and connect air and braking systems.
13. If the remote hand controller was used, turn the CONTROL switch "OFF". (Switch is located on panel on the floor.)

WARNING:

Never fold the boom up into the storage position without removing the towing adapters from the crossbar receivers.

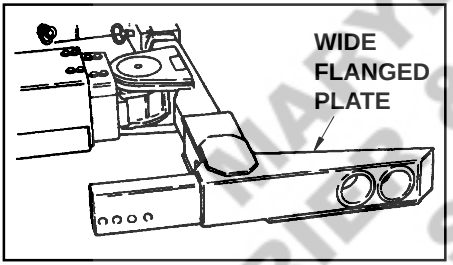
HEAVY DUTY TIRE LIFT (OPTIONAL)

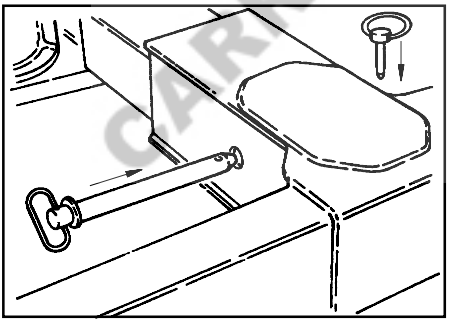
DO NOT EXCEED THE FOLLOWING RATINGS:

	HDTL
Lifting Capacity (Each Arm)	7,000 lbs.
Lifting Capacity (Total)[2]	14,000 lbs.
Towing Capacity (Maximum)[1]	80,000 lbs.

[1] THE TOWING CAPACITY SHOULD NOT EXCEED THE GROSS COMBINED WEIGHT RATING (GCWR) OF THE TOWING VEHICLE OR 42,000 LBS. (GCW) GROSS COMBINED WEIGHT OF THE TOWED VEHICLE, WHICHEVER IS LOWER.

[2] **MAXIMUM LIFTING CAPACITY** - THE MAXIMUM LOAD THAT CAN BE LIFTED.



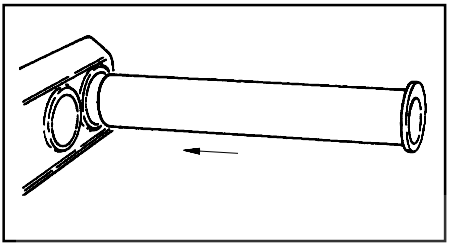


1. Slide the tire lift grid onto the crossbar.

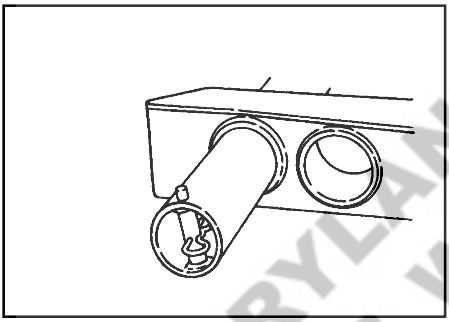
CAUTION:

Make sure that the tire lift Grid is installed as shown with the wide flanged plate on top. The flanges are marked with an "L" for left hand and an "R" for right hand.

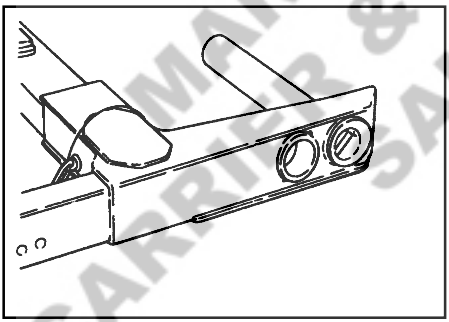
2. Install the retaining pin from the back side of the crossbar through the grid and crossbar and secure with the pin. There are two width positions. One for wider front end lifts and one for narrower rear end lifts.



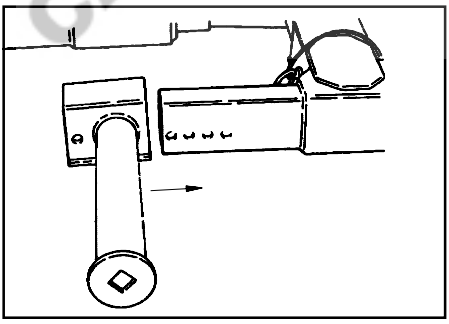
3. Insert the round tube into the desired position in the grid.



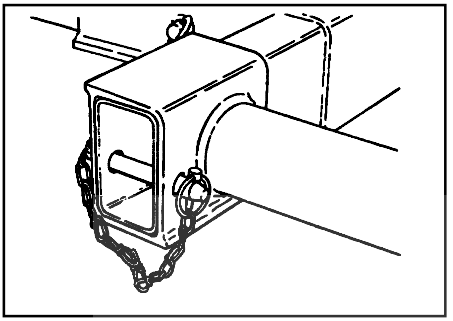
4. Install the retaining pin and hairpin.



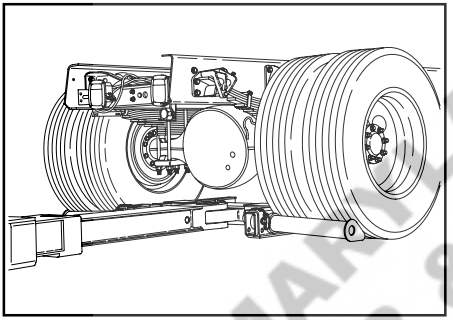
5. Retract the tube inward to the loading position.



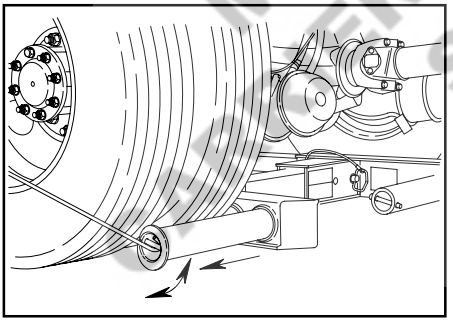
6. Slide the arm weldment over the end of the grid and adjust to the desired position for loading.



7. Install the retaining pin through the grid and arm weldment and secure with the pin.



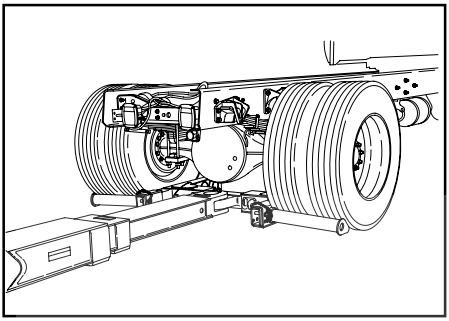
8. Extend the under lift under the casualty vehicle so that the arm makes contact with the front of the tires. **At the same time make sure that you are not going to damage any under body components.**



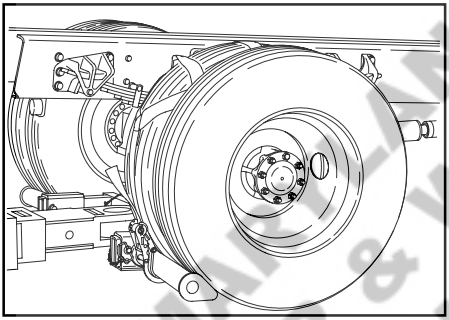
9. Using the pulling tool, extend the round tube to capture the back of the tire. After extending the tube, make sure that the flanged edge of the tube is turned up to prevent the tire from sliding off the end of the tube.

CAUTION:

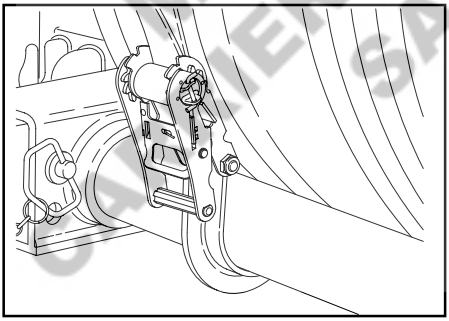
When lifting a vehicle that has dual tires from the rear, only extend the round tube out to capture the inside tire. The flanged edge of the tube must be between the tires and turned up to prevent the tire from sliding off the end of the tube.



10. Raise the boom to lift the casualty vehicle slightly. At the same time make sure that you are not going to damage any components.



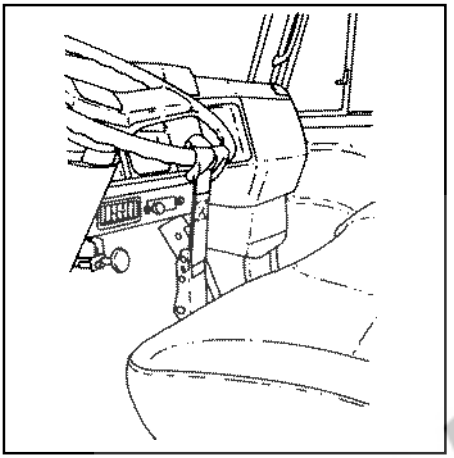
11. Attach the hook end of the tie-down strap to the round tube behind the tire. Pull the strap up and cover the tire and attach the hook on the ratchet end of the strap to the arm in front of the tire.



12. Take up the slack in the strap by ratcheting the takeup spool arm. Continue until the tires show some compression.

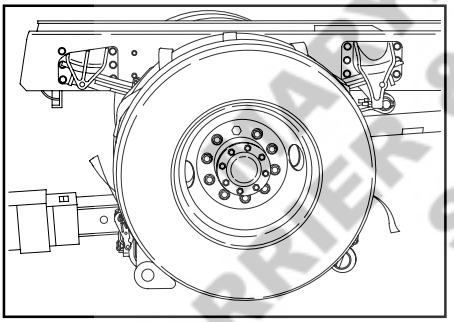
CAUTION:

If vehicle to be towed is on a slope, do not release the brake until the load is secured.



13. Always secure the steering wheel with a steering wheel strap for any front or rear tow.

14. With the vehicle in neutral and the parking brake released, you can move the vehicle safely up, down, in or out. All of these movements are hydraulically controlled.

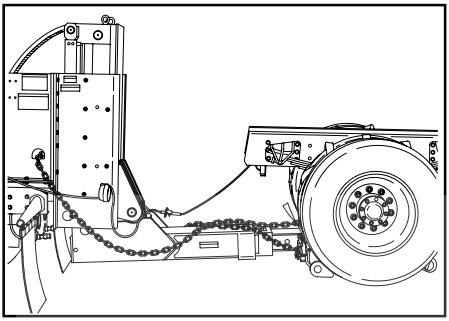


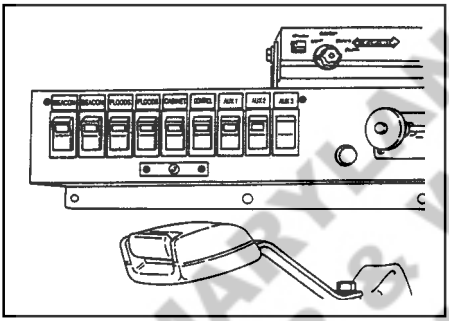
15. Power retract the under lift until the casualty vehicle is about three (3) to four (4) feet from the back of the recovery vehicle. Leave enough room to maneuver around corners without corner binding or causing contact between the two (2) vehicles. **Be sure that the fly boom is extended at least four (4) in. from the middle boom section to ensure unobstructed cross-bar pivoting.**

16. Raise the casualty vehicle into towing position observing the far end for sufficient ground clearance. It is possible to set the rear of a front lifted vehicle completely onto the ground, causing damage. Take irregular road surfaces into consideration.

NOTE:

When towing, the Underlift Boom should be as close to horizontal as possible. You will have better turning and manuevering capabilities and it will prolong the life of your under lift and pivot pin.





17. Be sure to maintain sufficient ground clearances with the bottom of the casualty vehicle.

18. Attach the safety chains and auxiliary towing lights.

19. Hook-up and connect air and braking systems.

20. If the remote hand controller was used, turn the CONTROL switch "OFF". (Switch is located on panel on the floor.)

WARNING:

Do not use the tire lift if the tire(s) of the casualty vehicle are flat or if there is damage to the wheels or suspension.

CAUTION:

The tire lift and grid tubes must be in their outermost positions for storage on the under lift when folded up in the travel position to avoid damage to the body.

CAUTION:

Retighten the tie-down straps periodically during a tow as the tires settle into the grid from towing.

CAUTION:

The use of secondary tie-down chains is recommended. Fit the secondary tie-down chains to the axle (not to any part of the suspension or body which will rise and fall with the suspension) arranged so as to hold the wheel down in the grid and prevent it from jumping up, forwards, or backwards. Use load binders as required.

CAUTION:

The use of trailer brakes or secondary braking devices while towing is recommended.

CAUTION:

Do not tow any vehicle without safety chains being installed.

CAUTION:

Always follow the chassis manufacturer's recommended procedures for towing. Remove drive lines and drive shafts as directed. Many vehicles can be severely damaged unless these components are removed prior to towing.

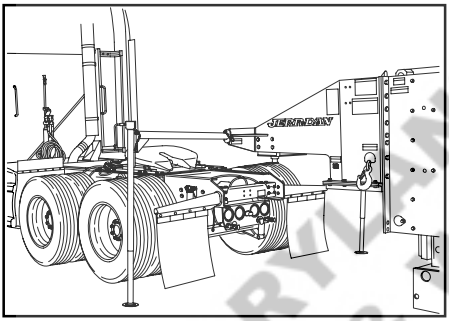
CAUTION:

All products are subject to age, wear and deterioation, all of which cause a reduction in the products breaking strength capacity. It is recommended that all products be regularly inspected. Any worn, deformed, misused or overloaded products should be replaced immediately.

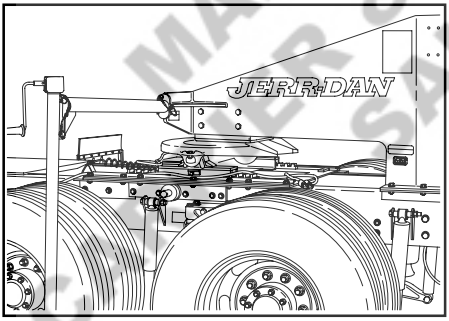
TRUCK TRACTOR CONNECTION HOOK UP

If your HDUL-450 is the non-fixed removable model, you may need to remove the HDUL-450 from time to time to use the truck tractor for other uses. The HDUL-450 can be removed and installed easily in a matter of a few minutes.

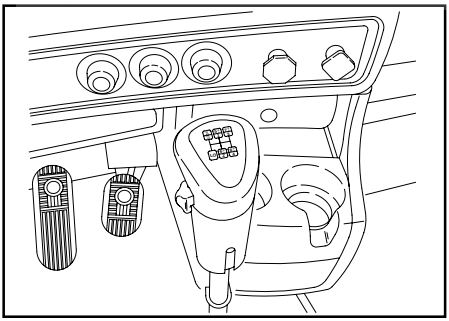
Follow these simple steps:



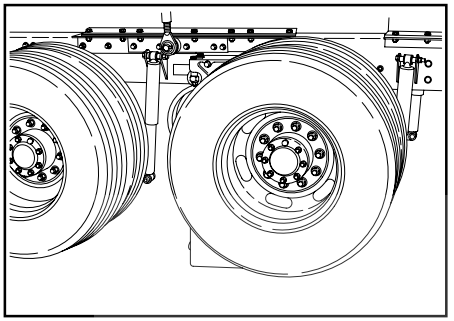
1. Align the truck tractor with the front of the HDUL gooseneck fifth wheel.



2. Back under the HDUL engaging the king pin. The HDUL gooseneck should ride up the slope of the fifth wheel plate causing the plate to pivot horizontal capturing the king pi in the lock.

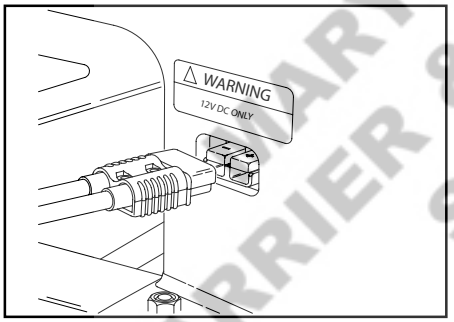


3. Place the truck tractor transmission gear selector into neutral and set the parking brakes.

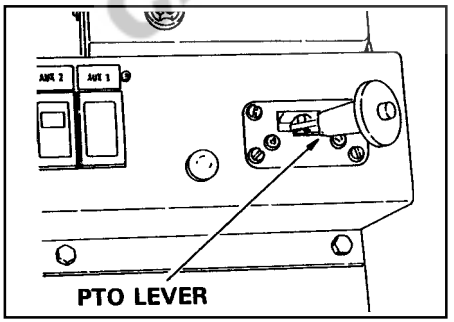


4. Block the rear tires with wheel chocks to prevent accidental movement of the truck tractor.

5. If your tractor has a PTO and wet line system, hookup the two hydraulic lines between the truck tractor and the HDUL . *If your HDUL has a self contained hydraulic system, there are no hydraulic lines to hookup.*



6. Next, connect the electrical power cable between the truck tractor and the HDUL.

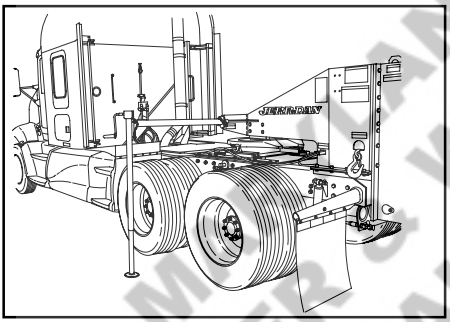


7. If your tractor has a PTO and wet line system, engage the power-take -off with the engine running. See PTO operator's manual. **NEVER TRAVEL WITH THE POWER TAKE-OFF CONTROL ENGAGED.** This could result in damage to the PTO unit and the recovery vehicle's transmission.

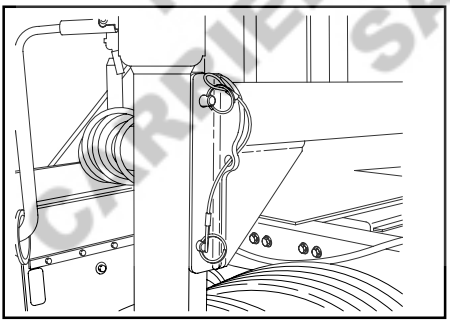
8. Adjust the electronic or manual throttle control to set the engine speed to approximately 1000-1200 R.P.M. Refer to chassis operator's manual for proper operation of the auxiliary throttle.

CAUTION:

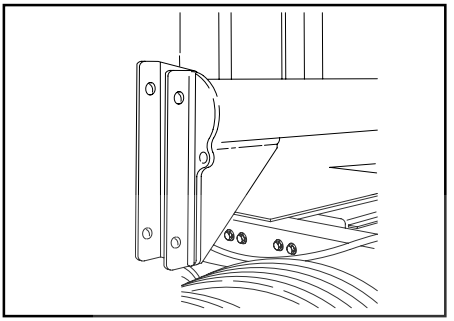
NEVER exceed 1400 R.P.M. When your hook up is complete, reset engine idle to normal.



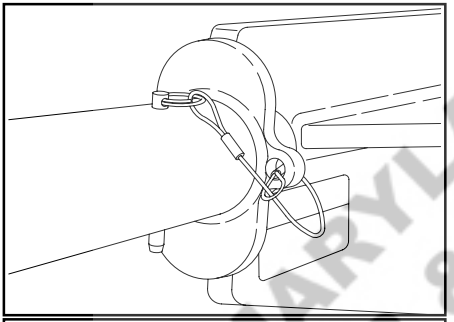
9. Next, you need to remove the gooseneck parking stand.



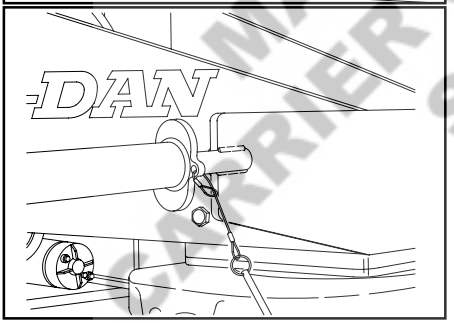
10. Begin by removing the two pins that connect the jack stands to the jack arms.



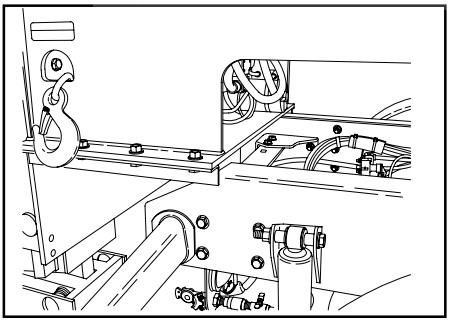
11. Remove the jack stands and set aside or store in a toolbox.



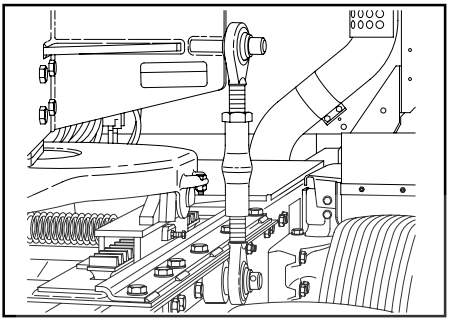
12. Remove the pin that connects the jack arms to the gooseneck pin.



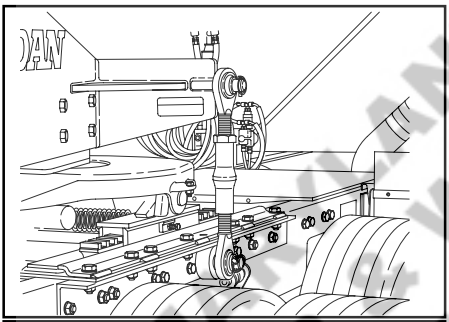
13. Remove the jack arms and set aside or store in a toolbox.



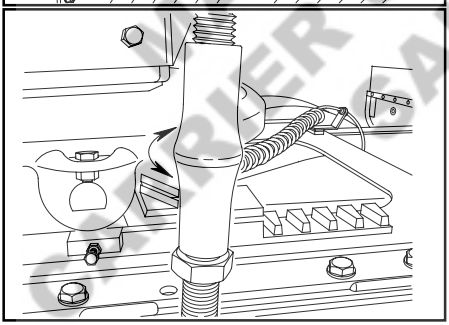
14. Using the controller, raise the boom slightly to lower the HDUL until it makes contact with the rear of the truck tractor frame. *The side angles should help guide the HDUL down over the frame and the gooseneck should still be in tight contact with the fifth wheel plate of the truck tractor.*



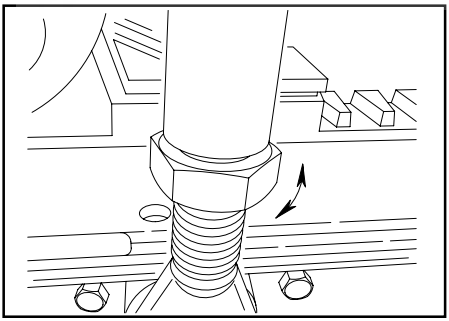
15. Next, place the "Hold Down Links" over the pins on the side of the gooseneck and the pins on the fifth wheel slider plate.



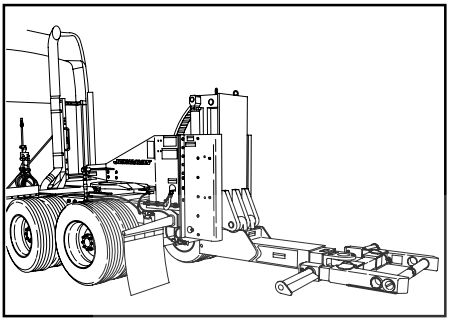
16. Secure with click pins at both ends.



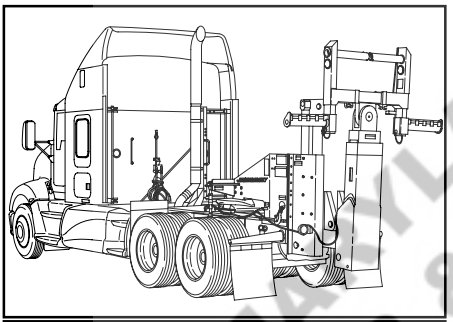
17. Snug up the "Hold Down Links" by turning the adjustable turnbuckles. They should only be hand tight.



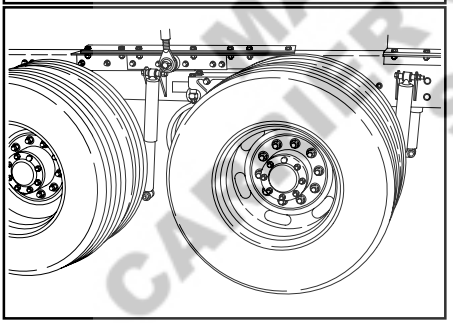
18. Lock the turnbuckles by hand tightening the locking nuts against the turnbuckles so that the turnbuckles cannot turn or loosen.



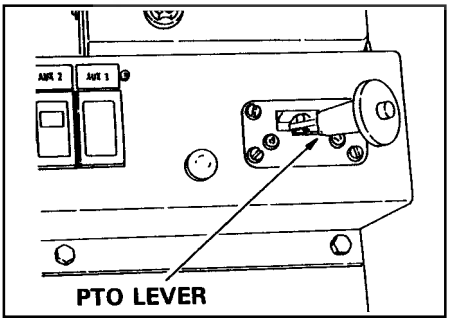
19. Raise the boom to lower the HDUL completely onto the rear of the truck tractor frame.



20. Tilt the boom up until the boom is in the stowed transport position.



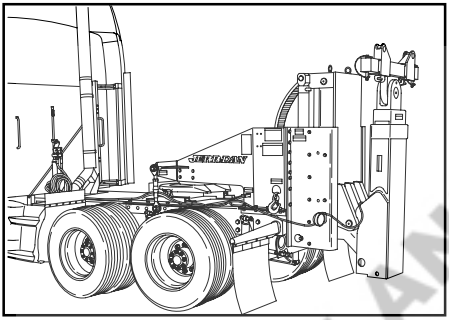
21. Remove the wheel chocks.



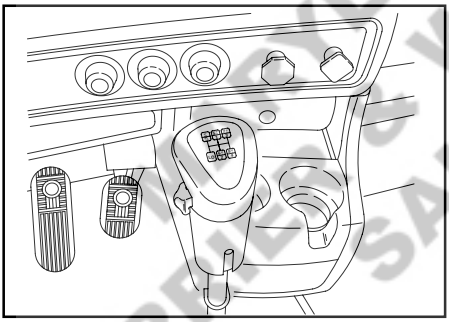
22. If your tractor has a PTO and wet line system, disconnect the power take-off (PTO). Refer to PTO operator's manual. **NEVER TRAVEL WITH THE POWER TAKE-OFF CONTROL ENGAGED.** This could result in damage to the PTO unit and the recovery vehicle's transmission.

TRUCK TRACTOR DISCONNECTION UN-HOOK UP

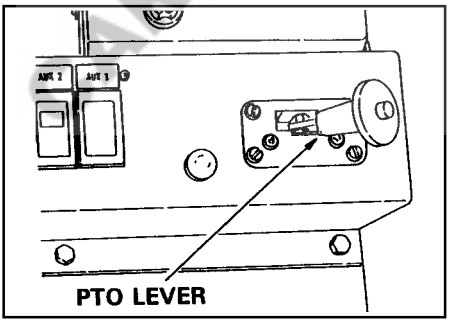
Follow these simple steps:



1. Position the HDUL in a desired location on firm level ground.



2. Place the truck tractor transmission gear selector into neutral and set the parking brakes.

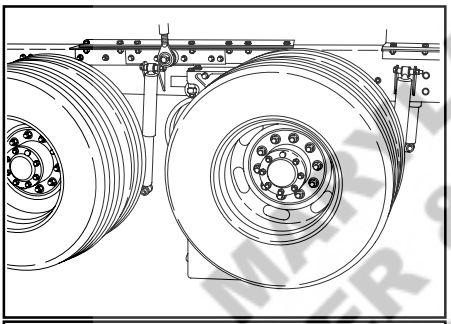


3. If your tractor has a PTO and wet line system, engage the power-take -off with the engine running. See PTO operator's manual. **NEVER TRAVEL WITH THE POWER TAKE-OFF CONTROL ENGAGED.** This could result in damage to the PTO unit and the recovery vehicle's transmission.

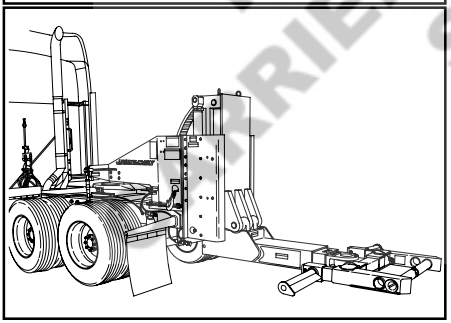
4. Adjust the electronic or manual throttle control to set the engine speed to approximately 1000-1200 R.P.M. Refer to chassis operator's manual for proper operation of the auxiliary throttle.

CAUTION:

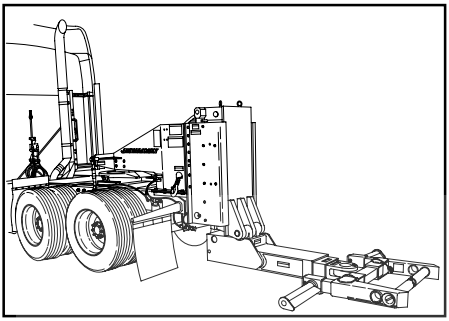
NEVER exceed 1400 R.P.M. When your hook up is complete, reset engine idle to normal.



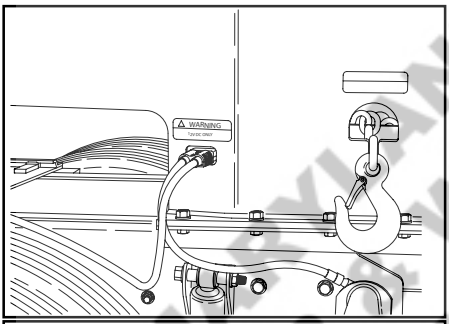
5. Block the rear tires with wheel chocks to prevent accidental movement of the truck tractor.



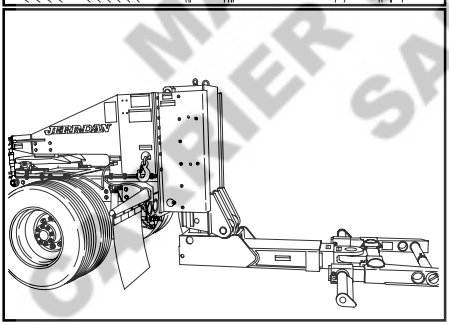
6. Using the controller, tilt the boom down to a horizontal position with the ground.



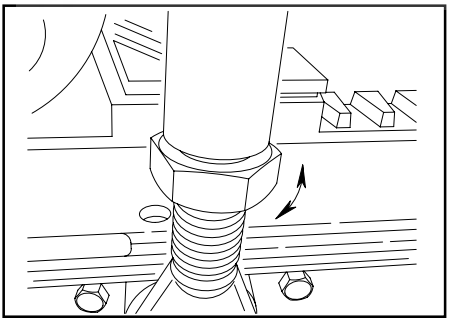
7. Lower the boom until it is resting on the ground.



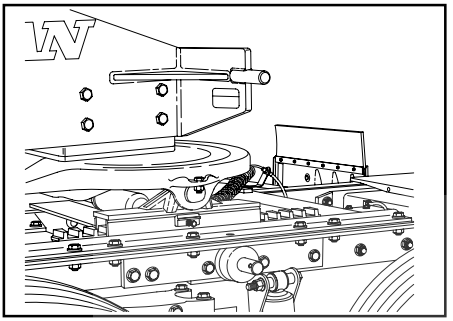
8. Continue lowering the boom until the rear of the gooseneck just begins to come off of the rear of the truck tractor frame.



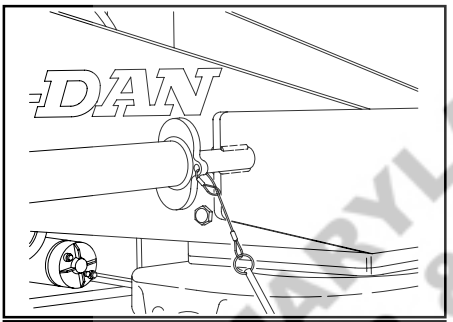
9. Using the tilt control, slightly tilt the underlift boom down pushing the gooseneck slightly forward and down in the front to take the tension and pressure off of the "hold down links". *You may have to play around with this a little to be able to remove the "hold down links".*



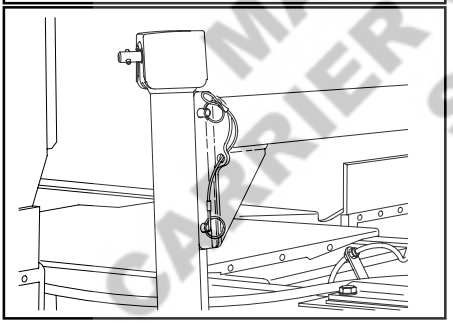
10. Loosen the locking nuts on the links by hand and turn the adjustable turnbuckle until loose. and remove.



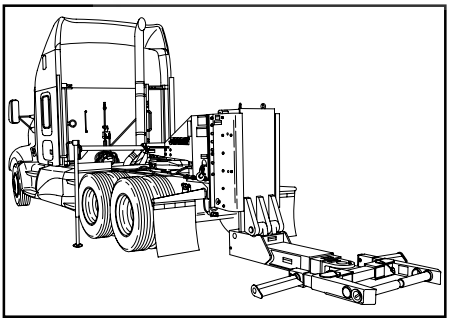
11. Remove the click pins that secure the "Hold Down Links" to the gooseneck pin and remove the "Hold Down Links".



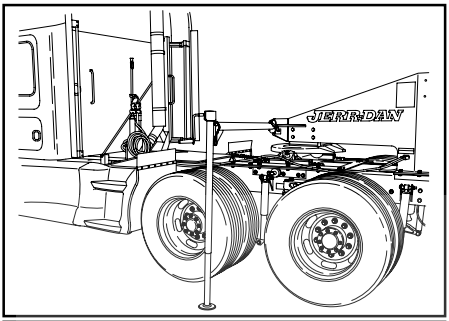
12. Slide the jack arm onto the gooseneck pin and secure with the click pins.



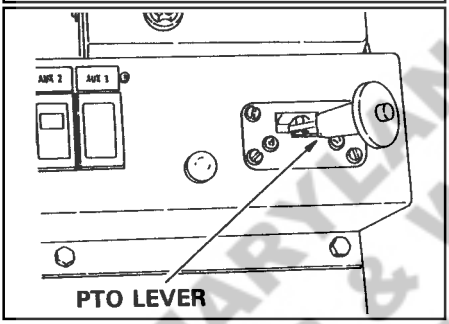
13. Attach the jack stands to the jack arms and secure with the click pins.



14. Using the controls, lower the boom down to raise the rear of the gooseneck off of the truck tractor frame several inches and tilt the boom down to keep the front end of the gooseneck tilted down with a little pressure on the fifth wheel plate.

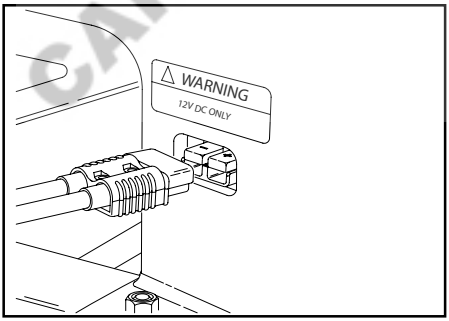


15. Adjust the height of the parking stand jacks on both sides so that they are just slightly above the ground. *They do not need to be in tight contact with the ground. This will allow the gooseneck to drop slightly when the truck tractor is removed.*

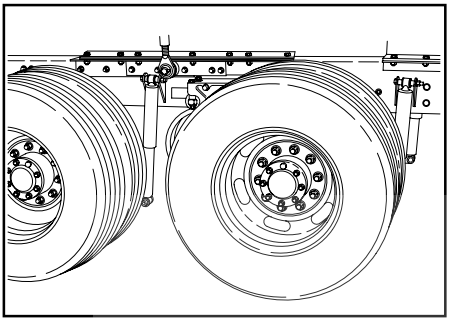


16. If your tractor has a PTO and wet line system, disconnect the power take-off (PTO). Refer to PTO operator's manual. **NEVER TRAVEL WITH THE POWER TAKE-OFF CONTROL ENGAGED.** This could result in damage to the PTO unit and the recovery vehicle's transmission.

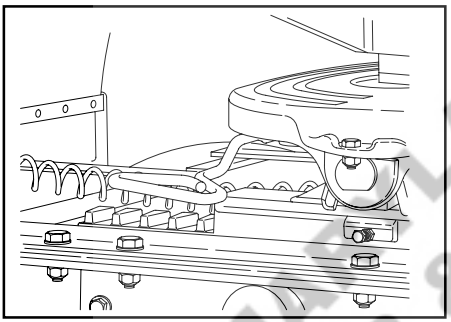
17. If your tractor has a PTO and wet line system, disconnect the two hydraulic lines between the truck tractor and the HDUL . *If your HDUL has a self contained hydraulic system, there are no hydraulic lines to disconnect.*



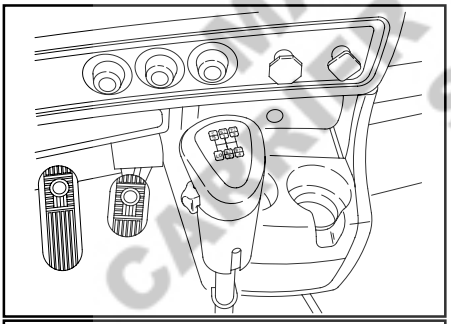
18. Next, disconnect the electrical power cable between the truck tractor and the HDUL.



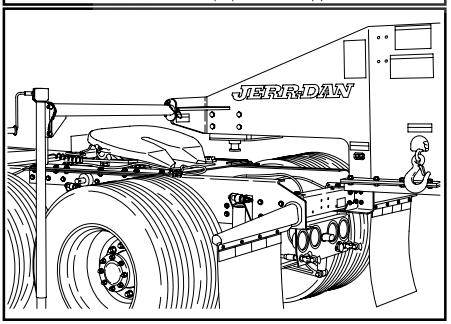
19. Remove the wheel chocks.



20. Unlock the fifth wheel kink pin lock.



21. Release the truck tractors parking brake.



22. Slowly pull out from under the HDUL fifth wheel gooseneck disconnecting the HDUL from the truck tractor.

MAINTENANCE AND LUBRICATION

Your Jerr-Dan equipment has been designed to give you excellent service and long life, but like all equipment, it requires proper and periodic maintenance. The truck chassis itself is on a maintenance schedule recommended by the manufacturer. Follow these guidelines and protect your vehicle warranty. There are a number of different lubricants used on your Jerr-Dan equipment. The following Lubricant Chart shows the proper lubricant and the most common brands and specification which meet the requirements.

Use only safe practices when maintaining this equipment. Always shut off the engine before reaching into pinch areas.

Inspect your equipment periodically for damage or evidence of pending failure. Damaged or broken parts should be replaced immediately. Never operate the carrier or any of its components if they are defective or operating improperly. The cause of any binding or leakage should be determined immediately and the problem promptly fixed.

Most of the pivot joints utilize high strength composite bearings with hardened and plated pins to drastically reduce maintenance, down-time and the cost of lubrication over the life of the product. There are however a few areas that still require some lubrication or maintenance. The Lubrication Chart and diagram shows the location of these points, lubrication schedules, and what type of lubricant to use.

If a cylinder seal leaks, disassemble the cylinder and find the cause of the leak. Small scores caused by chips or contaminated fluid can usually be worked out with fine emery cloth to avoid repetition of the trouble. Whenever any seal replacement is necessary, it is always advisable to replace all seals in that component. These seals are available in kits. Also, thoroughly clean all components before reassembly.

The HDUL-450 may be mounted to the truck chassis by bolts. We recommend that these bolts be inspected within the first 30 days and inspected and retorqed every 90 days thereafter. Replace any broken or damaged bolts immediately. **Refer to chart on the following page.**

FASTENER TORQUE SPECIFICATIONS

TIGHTENING TORQUES (FOOT-POUNDS) FOR SCREWS AND NUTS			
SIZE INCHES (MM)	 GRADE 2	 GRADE 5	 GRADE 8
1/4 (6.350)	6	8	10
5/16 (7.938)	10	14	19
3/8 (9.525)	17	27	33
7/16 (11.112)	28	45	60
1/2 (12.700)	45	68	90
9/16 (14.288)	63	100	120
5/8 (15.875)	90	135	180
3/4 (19.050)	145	230	310
7/8 (22.225)	145	380	500
1 (25.400)	220	570	760

- All torque values shown are for bolts (cap screws) and nuts that are either zinc-plated or lubricated.
- Torques shown above apply only to screws and nuts used for assembly and installation of all components, not to the chassis.
- Different torque values may be given in instructions for certain components due to short thread engagement or low-strength internal threads.
- When nuts are used, tighten nuts to torques shown (screws or bolts should be held but not turned). **Always use a calibrated torque wrench.**
- Retighten nuts of all mounting screws that secure the wrecker and wrecker-body within 30 days after putting the vehicle into service. Thereafter, inspect and retorque such screws and nuts every 90 days and after each job that imposes extremely heavy loads on the equipment.
- Convert ft/lbs to Nm (Newton metres) by using the following formula:

Multiply:		by:		to get:
ft/lbs	x	1.3558	=	Nm (Newton metres)

OILS AND GREASES

The following oils and greases are suitable for use with your Jerr-Dan.

Company	Product
	HYDRAULIC OILS
1. Chevron	AW Hydraulic Oil MV
2. Exxon	Univis N32
3. Mobil	DTE13
4. Texaco	Rando DHZ-32
5. Shell	Tellus Oil T 32
6. Citgo	A/W All Temp
7. Amoco	Rycon Oil 32
8. Conoco	AW Hydraulic Fluid MV 46
9. Mobil	DTE11M (for cold weather use)
10. Conoco	AW Hydraulic Fluid MV 32 (for cold weather use)
	GREASES
1. Drydene	HD Lithium EP2
2. Gulf	Crown EP2
3. Amoco	Amolith EP2
4. Shell	Alvania EP2
5. Texaco	Marfax EP2
6. Mobil	Mobilux EP2
7. Sunoco	Prestige EP2
	WINCH AND GEAR LUBE
1. Phillips	140 wt. EP Gear Lube 93301 (or approved equivalent)
2. Mobil	Mobil SCH624 (or approved equivalent for cold weather use)

LUBRICATION POINTS

The following lubrication chart is located on the inside on the drivers side of the unit.

TROUBLESHOOTING

You probably won't require anything but preventive maintenance to keep your equipment running, however, the following chart should help you isolate and correct minor problems if they occur with use. Any service work on the hydraulic system should be performed by qualified mechanics. For a more comprehensive troubleshooting guide refer to Jerr-Dan's "Hydraulic Troubleshooting Guide", part number 5-377-000013, which is available through the Service Parts Department.

HYDRAULIC SYSTEM

Problem	Cause	Solution
Slow operation	a. Low engine RPM b. Low oil level c. Blocked or restricted hoses d. Dirty hydraulic oil e. Hydraulic pump worn f. Clutch Pump belt slipping	a. Speed up engine b. Check dipstick and fill with the specified oil c. Inspect: remove blockage d. Drain, flush and refill with clean oil, replace filter e. Rebuild or replace f. Tighten or Replace belt
Valve Solenoid(s) sticking or frozen	a. Broken centering spring or clogged with foreign material b. Low Amperage/Voltage at Solenoid	a. Inspect, clean or replace b. Check Amperage/Voltage
Valve leaks	a. Defective seals	a. Replace
Cylinder leaks	a. Defective seals or rods b. Dirty or Defective CounterBalance Valve	a. Inspect and replace b. Clean or Replace CounterBalance Valve
Erratic cylinder function	a. Air in the system b. Defective pump (pulsating)	a. Cycle hydraulic system 10 to 15 times to remove air b. Replace if necessary
Remote hand controller fails to respond	a. Electric power turned off b. Bad or discharged battery c. Faulty Remote Hand Controls d. Loss of program memory	a. Turn on controller power on controller b. Replace battery c. Use Manual override d. Reprogram memory

HYDRAULIC CLUTCH PUMP

Problem	Cause	Solution
No oil flow from pump	a. No oil in reservoir b. Pump not "primed" c. Clutch not engaging	a. Fill hydraulic reservoir b. Fill inlet hose from pump end c. Check wiring/fuse
Pump will not build or hold pressure	a. Relief valve improperly set b. Relief valve stuck open	a. Adjust relief valve to manufacturers specifications b. Remove, clean and reset
Pump is noisy - whines	a. Air in the system b. Cavitation	a. See "Oil Foaming" b. Check Hoses, Reservoir breather or strainer
Pump is noisy - squeals	a. Belts are worn/loose b. System horsepower demand exceeds belt capacity c. Clutch is slipping	a. Inspect, adjust and/or replace b. Review application c. Check voltage/ground
Pump "throws" belts	a. Engine and pump pulley alignment b. System horsepower demand exceeds belt capacity c. High-speed engagement	a. Check installation b. Review application c. Reduce start-up RPM
Pump leaks at shaft seal	a. Damaged seal b. Damaged pump body	a. Replace seal b. Replace pump body
Pump leaks at body section	a. Damaged seal b. Damaged pump body c. Body section bolt torque	a. Replace seal b. Replace pump body c. Torque to specification
Pump leaks at fittings	a. Loose fitting b. Damaged fitting c. Damaged pump body	a. Inspect and/or tighten b. Replace fitting c. Replace pump body
Pump is overheating	a. Low oil level b. Dirty oil c. Relief valve stuck open d. Relief valve improperly set e. Improper weight oil	a. Fill hydraulic reservoir b. Replace oil and filter c. Remove, clean and reset d. Adjust relief valve to manufacturers specifications e. Replace with correct oil
Oil foaming	a. Low oil lever b. Improper oil	a. Fill hydraulic reservoir b. Fill with correct oil

P.T.O. FUNCTIONING IMPROPERLY

Problem	Cause	Solution
Cable tight or frozen	a. Cable kinked or bent b. Cable and P.T.O. connection not adjusted properly c. Mounting bracket nuts are over tightened at P.T.O.	a. Straighten or replace b. Inspect and adjust c. Loosen if necessary
Rattling noise in P.T.O.	a. P.T.O. backlash too loose (Consult P.T.O. Manual)	a. Shims must be removed
Howling Noise in P.T.O.	a. P.T.O. backlash too tight (Consult P.T.O. Manual)	a. Shims must be added
Gear oil leak between P.T.O. and pump	a. Defective shaft seal	a. Remove and replace
P.T.O. will not engage or disengage	a. Cable and P.T.O. connection not adjusted properly b. Defective shifter cover plate	a. Inspect and adjust b. Inspect and replace

HYDRAULIC PUMP

Problem	Cause	Solution
Pump noisy (Cavitation)	a. Low oil supply b. Heavy oil c. Dirty oil filter d. Restriction in suction line e. Pump worn	a. Fill to proper level b. Fill with proper oil (See chart) c. Replace filter d. Clean out and remove e. Repair or replace
Pump/Clutch Pump slow or fails to respond	a. Low oil supply b. Worn or Loose Belt(s)	a. Fill to proper level b. Tighten or Replace Belt(s)
Oil heating up	a. Foreign material lodged in relief valve b. Using too light oil c. Dirty oil d. Oil level too low e. Pump worn (slippage)	a. Inspect and remove/ replace filter b. Drain and refill with clean oil c. Drain, flush and refill with clean oil/replace filter d. Fill to proper level e. Repair or replace

HYDRAULIC PUMP - con't

Problem	Cause	Solution
Oil foaming	a. Air leaking into suction line b. Wrong kind of oil c. Oil level too low	a. Tighten all connections b. Drain and refill with non-foaming type of hydraulic oil (See lube chart) Replace filter c. Refill to proper level
Hydraulic oil leak between P.T.O. and pump	a. Defective shaft seal	a. Replace shaft seal
Clutch Pump leaks at Pulley Shaft	a. Defective Shaft Seals b. Hydraulic Supply/Return lines connected incorrectly	a. Replace seals or Pump b. Check hydraulic line connections
Pump leaks at front and rear covers	a. Defective seals	a. Replace seals

GLOSSARY OF TERMS

A

Anchoring Device - Used to attach cable ends, snatch blocks, safety chains, and tie-down assemblies to the towing vehicle.

Approach Angle - Angle between the plane of the platform and the ground.

Attachment - Any device that can be added to a basic unit or assembly.

Auxiliary Braking Device - A device which attaches to the disabled vehicle to assist the tow truck's brakes in retarding or stopping both vehicles.

Auxiliary Equipment - Equipment that is not necessary to perform the basic function of the primary equipment.

Auxiliary Towing Lights - Stop, tail, and turn signal lights attached to the trailing end of the towed vehicle and operated as part of the towing vehicle lighting system.

B

Bending Moment - The force times the distance from a reference point to the point the force is applied causing bending.

Bird Nesting - The tangling and intertwining of wraps and layers on a drum.

Body - The structure mounted on a chassis cab or that portion of the vehicle that carries the load.

Body Hinge - The attachment mechanism connecting the body to the hinge pin at the pivot axis about which the body rotates into the tilt position.

Body Subframe - Another term for body understructure or mounting frame.

Body Weight - Unmounted weight of a body with applicable options.

Boom - The structure member that supports the load.

Boom Angle - The boom angle is measured between a horizontal line and a line through the boom pivot and center of sheave.

Boom Head - The structural member at one end of the boom which can swivel and support the load lifted through the sheave and sheave support device.

Boom Length - The straight line distance from center of the revolving base to the center of the boom head.

Brakes - Parking - A system used to hold a stopped machine in a stationary position.

Brakes - Service - A primary brake system used for retarding and stopping the truck.

Bumper - DOT - A bumper designed to provide rear-end protection that meets the requirements of FMCSR 393.86.

Bus Bar Grid - A device used for towing vehicles by lifting one end of the towed vehicle by the wheels.

C

CA (Cab to Axle) - The distance from the back of the truck cab to the center of the rear axle.

CG (Center of Gravity) - The point at which the weight of the chassis, body/equipment and payload, if collectively or individually supported, would balance vertically, horizontally, and laterally.

CT (Cab to Tandem) - The distance from the back of the truck cab to a point midway between the tandem axles.

Cable - Steel wire rope used for pulling.

Car Carrier - Vehicles equipped to transport other vehicles mounted on a flat platform and/or with an additional assembly attached to the rear to facilitate towing a second vehicle. These units are also known as slidebacks, rollbacks, transporting equipment carriers and flatbeds. See Carrier.

Carrier - A platform body with a winch for loading.

Casualty Vehicle - The damaged or disabled vehicle.

Capacity - The load that a machine can lift at any given point.

CAUTION - A signal word used when a potentially hazardous situation exists that might result in minor injury or property damage.

Certification Label - Required by Public Law 89-563, which states that a motor vehicle or item of motor vehicle equipment complies with all applicable Federal Motor Vehicle Safety Standards (FMVSS) in effect on the date of manufacture.

Chain Assemblies - Chain with all hardware and coupling devices.

Chassis Cab - A vehicle consisting of a chassis upon which is mounted a cab; capable of being driven by the addition of wheel or other items of running gear, but lacking a body or load-carrying structure.

Completed Vehicle - A vehicle that requires no further manufacturing operations to perform its intended function, other than minor finishing operations such as painting.

Component - Any part of an assembly on a machine when referred to individually.

Control - A device used to control the functions of a unit.

Control Lever- A device for imparting motion into a control linkage.

Crossbar - A transverse horizontally pivoting member attached to the boom of a wheel-lift or underlift for attaching towing accessories.

Curb Side - The right or passenger side of the vehicle when viewed from the rear, opposite side from *ROADSIDE.*

Curb Weight - The weight of a vehicle in operational status, with all standard and commonly installed equipment and the fuel tank(s) filled to capacity.

Cylinder - A device which converts fluid power into a linear mechanical force and motion usually consisting of a movable piston and piston rod within a cylinder bore.

D

DANGER - A signal word used when an imminently hazardous situation exists that can result in death or serious injury.

Disabled Vehicle - Any vehicle that cannot operate under its own power.

Dolly - A four-wheeled carriage used in towing to support the trailing end of the towed vehicle.

DOT (Department of Transportation) - A federal agency dealing with regulations concerning both the manufacture and operation of motor vehicles and motor vehicle equipment. See NHTSA.

Driveline - The driveshaft and associated joints.

Drum - Any spool on which are wrapped ropes used in machine operation.

E

Extend Cylinder - Cylinders used to extend or retract boom structures.

F

Filter- A device whose primary function is the retention by a porous media of insoluble contaminants from a fluid.

Final Stage Manufacturer - A person, firm, or corporation who performs such manufacturing operations on an incomplete vehicle that it becomes a completed (end-user) vehicle.

FMVSS (Federal Motor Vehicle Safety Standards) - Regulations promulgated by NHTSA under Public Law 89-563, which are mandatory and must be complied with when motor vehicles or items of motor vehicle equipment are manufactured and certified thereto.

Frame - Structure on which either the upper or lower equipment is located.

Frame Cutoff - Centerline of rear axle(s) to the rearmost point of the chassis frame as modified for body installation.

Frame Lift - See Underlift.

Frame Section Modulus - The engineering term that indicates the relative strength of frames as it relates to shape. It takes into account frame depth, flange width, and material thickness. All other things being equal, the frame with the largest section modulus will have the greatest strength and stiffness, i.e., the ability to more effectively resist deflection under load.

Free Spool - The operation of unspooling wire rope from a drum by pulling on the end of the wire rope while the winch is stationary. The drum is disconnected (declutched) from its powertrain during this operation.

Forks - A device attached to the lift bar for lifting a vehicle by the tires, axle, frame, or structural member. May be classified as chain, axle, or frame forks.

FW (Frame Width) - The overall width of the chassis frame measured outside to outside behind the cab.

G

GAWR (Gross Axle Weight Rating) - The value specified by the manufacturer as the load-carrying capacity of a single-axle system as measured at the tire-roadway interface.

GCWR (Gross Combination Weight Rating) - Represents the entire weight of a vehicle on the ground with a trailer or trailers including vehicle, equipment, driver, fuel, and payload (everything that moves with the vehicle.) Gross combination weights published represent maximum allowed.

Grab Hook - For use with chains and some tow-sling hookups.

Grid - A device that attaches to the lift bar for engaging the tires of a towed vehicle.

GVWR (Gross Vehicle Weight Rating) - The maximum total vehicle rated capacity, measured at the tire ground interface, as rated by the chassis manufacturer.

GVW (Gross Vehicle Weight) - Value specified by the manufacturer as the maximum loaded weight of a single vehicle including all equipment, fuel, body, payload, driver, etc.

H

Headboard - Structure on which an emergency light bar is mounted.

Hook-up Chains - Length of chain used to connect a recovery vehicle to a casualty vehicle.

Horizontal Center of Gravity (HCG) - The point at which half of the gross weight is forward and half is aft.

Hydraulic Control Valve - A mechanical device to divert or control the flow of fluid in a hydraulic system.

Hydraulic Hose - Flexible oil lines used to transmit fluid.

Hydraulic Oil - Fluid used in operation of hydraulic systems.

Hydraulic Relief Valve - A mechanical device used to limit the pressure in a hydraulic circuit.

I

Incomplete Vehicle - As assemblage consisting, as a minimum, of a frame and chassis structure, powertrain, steering system, suspension system and braking system to the extent that those systems are to be part of the complete vehicle that requires further manufacturing operations.

Independent - The Wrecker Boom and Underlift Boom are separate (independent) from each other.

Integrated - The Wrecker Boom and Underlift Boom are combined together as a complete unit.

J

J-Hook - Attachment device used for towing/recovery.

L

L-Arm - See Wheel Arm

Layer - All wraps of the same diameter on a drum.

Lift Bar - A traverse horizontally pivoting member attached to the boom of a wheel-lift or underlift for attaching towing accessories.

Lift Cylinder - Cylinders used to raise or lower boom structures.

Lift Forks - See Forks.

Lifting Capacity - The load that a machine can lift at any given point.

Lift Tow Rating - Maximum Steering Towing Load.

Light Bar (Emergency) - An array of lamps used in accordance with local ordinances.

Light Pylon - Structure on which an emergency light bar is mounted.

Line Pull - The maximum wire rope pull, in pounds, at the drum, at full-load engine speed, with specified lagging diameter.

Line Speed - Speed in feet per minute of a single rope, based on full load engine speed with specified lagging diameter.

M

Marker Lights - Small amber and red lights attached to bodies to indicate overall clearance at night.

Maximum Loaded Vehicle Weight - The sum of curb weight, passengers and cargo.

Motor - A rotary motion device which changes hydraulic energy into mechanical energy.

Motor Vehicle Safety Standards - See FMVSS.

Mud Flap - Splash-Deflecting shields at rear of wheel.

N

NHTSA (National Highway Traffic Safety Administration) - The federal agency responsible for promulgating and insuring compliance of regulations dealing with the manufacture and certification of motor vehicles or items of motor vehicle equipment. See DOT.

O

Outriggers - A beam type device attached to frame of a truck or rubber tired carrier, to provide maximum stability by reducing load on tires and increasing width of operating base.

Overall Vehicle Height - Distance from the ground to the highest point on the vehicle with equipment in stowed position.

Overall Vehicle Width - The design dimension ot the widest part of the vehicle, exclusive of signal lamps, outside rearview mirrors, flexible fender extensions, and mud flaps, determined with doors and windows closed and the wheel in the straight ahead position.

Overhang - The horizontal distance for the centerline of a single rear axle or center point of a tandem rear axle to a point where the vertical component is imposed.

P

Payload - The weight of the commodity being hauled. Payload capacity is computed by subtracting the completed weight of the vehicle (including driver and passengers) from the GVWR.

Pintle Hook - Hook mounted on a truck or semitrailer used to couple a full trailer.

PTO (Power Takeoff) - Mechanical device used to transmit engine power to auxiliary equipment. Power takeoffs can be mounted on either a main or auxiliary transmission. Front mounted and flywheel mounted power takeoffs are also used in various applications.

Push Bumper - Device used to push a vehicle, sometimes equipped with a rubber face.

R

Rating - The specified design operating limit of a device.

Rear Jack - One or more devices designed, when used, to stabilize chassis.

Recovery - Act of moving a vehicle to a position from which it can be driven or towed.

Recovery Vehicle - Vehicle to retrieve and if necessary lift and tow other vehicles.

Resisting Bending Moment (RBM) - A calculation used to compare frames of different section modulus and of different material. It is the product of the section modulus times the yield strength of the frame material.

Roadside - The left or driver's side of the vehicle when viewed from the rear, opposite side from *Curbside*.

Rolling Resistance - The restraining forces contributed to the load when rolling on wheels.

Rollback - See Car Carrier

Rope - See Wire Rope

Rub Rail - Member running longitudinally providing rub service on side of body.

S

SAE - Society of Automotive Engineers.

Safety Chain(s) - Used to connect the towing and towed vehicle as a secondary coupling system to prevent separation of a vehicle trailer, converter dolly, or towed vehicle, should the primary coupling become detached.

Safety Wrap - Wrapping the tow chain(s) around the grab hooks of the tow bar inboard of chain.

Scotch Blocks - A device used to prevent chassis movement.

Serial Number - An identification number stamped on a metal plate by the passenger car, van, or truck manufacturer (see VIN), or the towing equipment manufacturer, and placed on chassis, body, or components for identification purposes.

Sheave - A wheel grooved for a wire rope to transfer power.

Shipping Weight - The dry weight of a complete truck with all standard equipment including grease and oil but without and fuel or coolant.

Side Rail - Horizontal extensions of the body sides, either sheet or tubular metal.

Slew - A rotating super structure about a vertical axis.

Snatch Block - A single or multiple pulley used to reduce line tension or change cable direction.

Spacer Blocks - Used in conjunction with wood beams to provide additional clearance between the tow bar, chains, and the body of the casualty vehicle.

Spade - One or more ground penetrating devices designed primarily, when used, to stabilize rearward chassis movement.

Stabilizers - A hydraulic or manually operated leg device (i.e., outboard legs, outriggers, or jack legs) attached to trucks to give additional support down to the ground for improved stability.

Steering Wheel Securing Device - Used to secure front wheels in lieu of standard steering column lock.

Stroke - The length of travel of a cylinder rod or piston.

Suction Line - A tubular connection line to convey fluid between a reservoir or tank and the inlet of a hydraulic pump.

Supply Tank - An oil reservoir used in the hydraulic system.

Swivel Head - See Boom Head.

T

T-Hook - Attachment device used for towing.

Tail Plate - Rearmost part of the towing vehicle body.

Tail Swing - Clearance distance from center of rotation to the extreme rear extension of the revolving superstructure.

Tie-Down Assemblies - Device(s) used to restrain cargo or vehicles (i.e., strap, bridle, chain, or cable.)

Tie-Down Chains - Chains used to restrain cargo or vehicles.

Tilt Cylinder - Cylinders used to change the attitude of a structure or body.

Tire Clearance - Necessary space between tires and the nearest component to allow operation of truck without damage to tires.

Tire Lift - A device used for towing vehicles by lifting one end of the towed vehicle by the wheels.

Tow - Act of transporting a vehicle form one point to another by a second vehicle.

Towed Vehicle - The vehicle being towed.

Towing - See Tow.

Tow Bar - A device for positioning a towed vehicle behind a towing vehicle.

Tow Chain - Length of chain used to connect the sling with the towed vehicle.

Tow Sling - A device used for lifting and towing vehicles with a partial load supported on rubber straps.

Tow Vehicle - Vehicle used to lift-tow other vehicles.

Towing Light/Bar - See Auxiliary Towing Lights.

Trailer 5th Wheel Plate - A plate attached to a tow truck-lifting device that captivates the kingpin on trailers allowing a trailer to be towed in the same manner as intended by the trailer manufacturer.

U

Underlift - A device used for towing vehicles by lifting one end of the towed vehicle from under the axle or structural member.

Unloaded Vehicle Weight - The weight of a vehicle with maximum capacity of all fluids necessary for operation of the vehicle, but without cargo or occupants. Also referred to as curb weight.

V

Valve - A device which controls fluid flow direction, pressure, or flow rate.

VIN (Vehicle Identification Number) - The number assigned to a vehicle by the manufacturer primarily for registration purposes. It may consist of numerals, letters, or a combination thereof.

W

WARNING - A signal word used when a potentially hazardous situation exists and could result in death or serious injury.

Weight Distribution - The portion of total weight of the vehicle on each axle.

Wheel Arm - A device that attaches to the lift bar for engaging the tires of a towed vehicle.

Wheelbase - Horizontal dimension from centerline of front axle to the effective centerline of the rear axle(s).

Wheel Chock - A device used to prevent chassis movement.

Wheel Fork - See Wheel Arm.

Wheel-Lift - A device used for towing vehicles by lifting one end of the towed vehicle by the wheels.

Wheel Securing Device - A strap or mechanical device, when attached to the lift-bar, which limits the potential for separation of the towed vehicle from the underlift, during operating conditions.

Wheel Straps - Used to tie down wheels of the towed vehicle when using wheel-lift, car carrier, or dolly towing equipment to limit the potential for separation of the towed vehicle from the towing apparatus.

Winch - A device for winding and unwinding cable.

Wire Rope - See Cable

Working Load Limit - Minimum breaking strength divided by the factor of safety.

Wrap - A single coil of wire rope wound on a drum.

Wrecker - See Tow Vehicle, or Recovery Vehicle.