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Limited Warranty and Operators Manual

ASI-3500-X lifting Beams for Lifting Caterpillar® 3500 Series Engine Heads

All Advanced Sourcing, Inc., (ASI) ASI-3500-X [Where X can be a model number 1 through 8] Below the Hook Lifting Device designs (ASI Lifting Beams) are tested to easily meet and exceeding applicable ASME B30.20 and OSHA 1926.251 design specifications criteria. Each ASI-3500-X unit is proof tested in manufacturing Quality Assurance before being made ready for shipment to our customers (OSHA 1926.251(a)(4)).

ASI warrants ASI Lifting Beams to be free of material and workmanship defects for 90 days. When used within the WLL and intended usage limitations, ASI Lifting Beams will provide years of trouble free service. However, if a product defect is detected during user inspection, the product must not be used and must be returned to ASI for evaluation, repair or replacement at the discretion of ASI. No modifications or repairs of any type can be made to the ASI Lifting Beams by the customer. Any repairs, alterations or use which is outside of the scope of the product design intentions void any and all warranty assumed, expressed or implied for the ASI Lifting Beams. Returns or repairs can be initiated by a call or email to the contact information at the header of this page.

ASI assumes no liabilities or obligations of any kind related to the use of the ASI Lifting Beams beyond repair of a ASI Lifting Beams itself. The ASI Lifting Beams are to be used only for the intended purpose of the device, and shall in no way be used to lift personnel, or used beyond the WLL. The ASI Lifting Beams shall never be used in a manner which threatens safety of personnel, such as lifting loads above or near personnel. This device should only be used by personnel trained in rigging and lifting loads per ASME and OSHA guidelines**.**

Indemnification:

ASI cannot control the safety factors related to this device once the device is shipped to the customer or end user. The unit could be stressed, abused, miss-used or otherwise set for failure by persons outside of the control of ASI. Therefore, upon delivery to the end user, the persons / user / operator / employer of the user / operator in physical possession of this device indemnifies and will hold harmless ASI and ASI staff and or related ASI personnel in all matters, events and case, regardless of the mode of failure, including failures or events within the intended scope of the device and / or outcome from the use of the device in any manner, including loss of assets or injury, including death of personnel or observers. Furthermore, the owner / user / operator / employer of the user / operator or persons in possession of this device at the time of failure or event accepts full responsibility for all losses and or claims and indemnifies ASI from the use of the device, including failures or other events within the intended scope of the device. ASI assumes no liability what-so-ever for damages, death or injury related to the use or failure of this device or related hardware including when used in the manner for which it was designed. If you or your organization can not agree to this indemnification clause, return the unit to ASI for a full purchase price refund.

Example Instructions for use of the ASI Lifting Beams:

Minimum Required Reading and Practices:

ASME B30-20-1

OSHA 1926.251, 1926.550(a)(19)

Or the latest revisions of these documents.

Minimum Safety Factors:

The ASI Lifting Beam (ASI-3500-X) is intended to carry Caterpillar® 3500 series heads using supplied threaded handles only. Before attaching the ASI Lifting Beam to engine heads mounted to an engine block, the engine heads to be attached to the ASI Lifting Beam must be free to move, meaning not affixed to the engine block by mechanical means in any way, including having all applicable bolts and manifolds removed from the head and additionally the heads must be broken free from the head gaskets and plates.

Only after the heads are proven free to move, - i.e., loose from the engine block and associated hardware, should the heads be attached to the ASI Lifting Beam to be lifted by an appropriately sized crane or hoisting system from the engine block location to a desired static location, or from an initial static location to the engine block location. In no way should the SI Lifting Beam be used to break the heads free from the engine block as this application of the device can easily exceed the WLL capacity of the ASI Lifting Beam and result in device failure, damage to assets, injuries to personnel and even death of personnel or observers. A loaded ASI Lifting Beam will weigh more than 400 lbs and can cause severe injuries or death to or of personnel if the unit is over-stressed and fails and / or swings uncontrolled from the boom of the hoisting equipment.

Warning: Shock loading of the ASI Lifting Beam in any manner of transportation while suspending a load, or using any type of impact breaking force to create shock to the ASI Lifting Beam and thus intending transmission of shock to the load being lifted by the ASI Lifting Beam, can easily over stress and cause failure of the ASI Lifting Beam resulting in severe injury or death. It is therefore required that the ASI Lifting Beam is used only in a manner that results in smooth movements not exceeding 1.25G's of force applied to the ASI Lifting Beam while used for transport.

OSHA 1926.550(a)(19) (general requirements for cranes and derricks) states ***that "all employees shall be kept clear of loads about to be lifted and of suspended loads."***

Employees or observers who are not directly under a load can be exposed to the hazard of failed rigging. When a rigging chain brakes, the material will not always fall straight down; it can shift and/or swing and then fall over a fairly broad area, depending on the height, weight, type of load, etc. All personnel in the area of a suspended load should remain a safe distance from the load to help prevent injuries to themselves, employees and observers.

See Addendum Attached.

Minimum Inspection of the ASI-3500-X lifting Beam:

- The ASI Lifting Beam must be thoroughly inspected before each use. Always refer to ASME 20-1.4.[3-5] when using the ASI Lifting Beam.

- Inspect for bent, cracked or otherwise deformed shackles which indicate the units have been over-stressed. Inspect that all hardware is in-tact, including safety nuts and pins used to assure the integrity of the pin in the shackle.

- Inspect for chain twist, (Figure 1) which can impose greater loads to the shackles and result in failure of these shackles. All chain links must be 90 degrees to the previous link and 90 degrees to the following link, including shackles (see Figure 2). Remove all twist in the chain if it exists. Do not use the ASI Lifting Beams if for some reason, the twist can not be removed, as all ASI Lifting Beam units are designed with chain harness and shackles purposely presenting only right-angle connections from one link to the next.

Figure 1.

A twisted chain imposes greater loads to all components. Always assure chain links are 90 degrees to one-another.

Figure 2.

Assure links are all 90 degrees from one-another to yield maximum strength.

- Inspect the chain links for cracks or deformations which indicate the chain has been over-stressed. Inspect for wear and do not use if wear to the chain or any hardware exceeds 3/64” less thickness than the unworn area of the chain or hardware.

- Inspect the master link for cracks and wear, deformations and overall serviceability.

- Inspect and assess the overall condition and serviceability of the ASI Lifting Beam to perform the function of moving the Caterpillar® heads from point to point by crane or hoist as intended.

- Inspect per OSHA and ASME 20-1 guidelines as applicable.

- Inspect per ASME-1926.251 guidelines as applicable.

- If in doubt, do not use the lifting Beam and request assistance from knowledgeable support personnel.

- If any part of the ASI Lifting Beam is not deemed safe and ready for use, tag the unit as “Out of Service” and return to ASI for assessment, repair or replacement at ASI’s discretion.

- An ASI Lifting Beam loaner unit will be made available as practical to keep you on schedule, so do not use a questionable unit due to schedule pressures!

- Always refer to ASME 20-1.4.[3-5] when using the ASI Lifting Beam. See partial listing of the ASME 20-1 standard below.

Using the ASI Lifting Beams:

The ASI Lifting Beam is only intended to aid in the safe transport of Caterpillar® 3500 series engine heads (heads). The heads are attached to the ASI Lifting Beams lifting Beam using T-Handles with Flanges, available from ASI (PN: ASI-THF-4.00 x 0.875 R1.1).

Safety First, Second and Third!

From Caterpillar® Engine to Ground Movement:

- Assure the area is safe to work in. Safety gear, including at minimum FR rated clothing, gas detectors, safety glasses, respiration mask, hard hat, gloves, steel toed work boots should be worn as required by the environment you and your crew are in.

- Remove all manifolds, brackets, temperature sensors, etc., necessary to safely remove the engine heads from the Caterpillar® engine. There must be room for the units to be extracted vertically without encountering objects interfering with the extraction.

- Using compressed air and a brush, safely remove all debris from on and around the engine heads deposited there when removing manifolds and sensors.

- Remove valve covers, head retention bolts and internal sensors to assure safe removal of the engine heads.

- Using compressed air and / or small brush, remove any additional debris from the engine head and surrounding surfaces to 1) assure a smooth, debris-free surface to which the ASI Lifting Beam will be attached, and 2) To limit the amount of debris that may fall into the engine cylinders and crankcase when the heads are removed.

- Break the stiction of the heads to the engine block by using a small pry bar or rubber mallet, tapping the engine head until free movement is observed. Test that each individual head is free to be lifted vertically and all sensor wires, etc are not attached or clear of the engine head.

- Attach the ASI Lifting Beam to the higher side of the heads, matching the lifting Beam relief with each head’s set of valves. Use T-handles to attach each head to the lifting Beam. Snug each ASI-THF-4.00 x 0.875 handle to assure no space is between lifting Beam and head, approximately 2 foot pounds of torque is all that is necessary. Assure the flange is indeed compressing against the ASI Lifting Beams lifting Beam and in turn the lifting Beam is being held tight to the engine head.

- Re-check each handle to assure it is snug and ready for lifting each head safely.

- Inspect the ASI Lifting Beam chain harness to assure chain twists are not present, (Figure 1 above) assure shackles are free to move and the chains are fully in contact with shackles in the correct position. Correct any and all issues as necessary to achieve links 90 degrees to one another. (Figure 2 above). Assure chain is not in contact with the ASI-THF-4.00 x 0.875 lifting handles.

- Using the crane or hoist, remove the slack in the chain harness of the ASI Lifting Beams lifting Beam. Guide the ASI Lifting Beam chain around any obstructions, such as ASI-THF-4.00 x 0.875 Handles, engine manifolds, or other obstructions.

- Using the crane or hoist, place a small amount of tension on the harness of the ASI Lifting Beams lifting Beam. Attach guide lines as needed to assure controlled movement around obstacles. Using a small pry bar or other means of manual guidance, guide the set of heads free from the engine block and facilitate rotation of the higher side of the head assembly towards the outside of the engine. Slowly hoist the head set assembly free of the engine block, taking care to watch for sensors, brackets or cables still attached that were possibly missed during preparation of the heads for removal.

- Assuring no persons are beneath the head assembly per OSHA 1926.550(a)(19), swing the head assembly to a large, clean surface on the ground or other stable surface, slowly guiding the assembly to a resting position position using guide lines to maintain a safe working distance from the load.

- Lower until the ASI Lifting Beams harness assembly is fully slacked and the crane clevis hook can be easily removed from the ASI Lifting Beams master link at the top of the chain harness.

- Do not remove the ASI Lifting Beams unless necesary. The ASI Lifting Beams will later be used to move the heads to the transport vehicle and so should remain attached to the heads while being transported back to the warehouse.

Transport Truck to Engine Block Movement:

- Inspect the ASI Lifting Beams per "**Minimum Inspection of the lifting Beam:**" listed above.

- If not completed previously at the warehouse, align four singular Caterpillar® heads for attachment to the ASI Lifting Beam, matching the lifting Beam relief with each head's valves.

- Use ASI-THF-4.00 x 0.875 T-Handles to attach each head to the lifting Beam. Snug each T-Handle to assure no space exists between lifting Beam and each head. Approximately 2-4 foot pounds of torque is all that is necessary. The flange should be well compressed against the ASI Lifting Beams, and lifting Beam to the engine heads.

- Inspect the ASI Lifting Beam chain harness to assure chain twists are not present. (Figure 1 and Figure 2 above). Assure shackles are free to move and the chains are fully in contact with shackles in the right position. Correct as necessary.

- Using the crane or hoist, attach the crane or hoist safety clevis to the ASI Lifting Beam master link.

- Gently remove the slack in the harness of the ASI Lifting Beam. Guide the ASI Lifting Beam chain around any obstructions, such as T-Handles, container or equipment.

- Attach guide lines to use for guiding the load from the truck bed or container to the engine block.

- Using the crane or hoist, place a small amount of tension on the harness of the ASI Lifting Beam. Slowly hoist the head assembly free of the truck bed or container, taking care to watch correct operation of the harness components and ASI Lifting Beam while lifting the head assembly.

- Observe and inspect all ASI Lifting Beam harness components, including the chain and shackles for twists before lifting free from the truck bed or container.

- Assuring no persons are beneath the head assembly per OSHA 1926.550(a)(19), swing the head assembly to a safe area (large, clean, non-slip surface for personnel preferred) and lower as much as practical to safely perform any final preparation work on the heads before installation on the engine block. Be sure not to add additional stress to the ASI Lifting Beams and heads that may impose an increased load or twisting torque to the ASI Lifting Beams.

- When final preparations are complete, assure no personnel are beneath the head assembly per OSHA 1926.550(a)(19), swing the completed head assembly to the engine block, keeping the assembly as low as possible while keeping clear of obstructions.

- Guide the head assembly into position with minimum risk to personnel until over the engine block. Use of guide lines from each end of the ASI Lifting Beam lower shackles is encouraged to keep personnel clear of a drop zone during this step.

- Slowly lower the head assembly onto the engine block, assuring roller cam push rods are correctly aligned with the cam access ports.

- Adjust alignment of the head assembly to the engine block while continuing to slowly lower the head assembly.

- Align the heads to the alignment pins of the engine block as much as possible. Slightly loosen the Handles which attach the heads to the ASI Lifting Beams approximately 1/2 to 1 1/2 turns, allowing slight movement of the heads in relation to the lifting Beam and to allow the heads to seek the alignment pins of the engine while still attached to the ASI Lifting Beams.

- Continue to lower the head assembly until all heads are firmly seated on alignment pins and ready for head bolts. Install head bolts as practical to assure personnel safety before removing the ASI Lifting Beams.

- Remove the T-Handles used to attach the Caterpillar® heads to the ASI Lifting Beams and place in a container carefully so the threads of the T-handles are not damaged. Inspect to assure all Handles are removed.

- Using the crane or hoist, slowly remove the ASI Lifting Beam from the head assembly, using the guide lines to guide the lifting Beam around any obstructions such as valves, intake and exhaust manifolds. If the crane or hoist indicates any unexpected load, stop

and inspect for Handles still attached or the Lifting Beam possibly being hung up on obstacles on the equipment.

- Lower the ASI Lifting Beam to ground level and assure slack in the harness. Unhook the crane or hoist clevis from the master link of the ASI Lifting Beam and stow the Lifting Beam away in a dry, clean storage location.

- Using the crane or hoist, attach the crane or hoist safety clevis to the ASI Lifting Beam master link of the head assembly removed from the engine in an earlier step.

- Gently remove the slack in the harness of the ASI Lifting Beams lifting Beam. Watch for chain twist and correct. Guide the ASI Lifting Beam chain around any obstructions, such as T-Handles or valves of the heads.

- Using the crane or hoist, place a small amount of tension on the harness of the ASI Lifting Beam.

- Slowly hoist the head assembly free of resting position, taking care to watch correct operation of the harness components and lifting Beam while lifting the head assembly.

- Inspect all ASI Lifting Beam harness components, including the chain and shackles for twists before lifting free from the resting position.

- Assuring no persons are beneath the head assembly per OSHA 1926.550(a)(19), and using guide lines to help keep personnel away from the load, swing the head assembly to the cargo area or container for transporting the heads back to the warehouse.

- Create slack in the harness of the ASI Lifting Beam. Unhook the crane or hoist clevis from the master link of the ASI Lifting Beam. Cover the heads and ASI Lifting Beam assembly to protect from weather and debris and secure to the transport vehicle for transport to the warehouse.

- After each use of the T-Handles, spray the handles completely with WD-40 to assure rust does not occur between uses of the ASI Lifting Beams Head Swing Kit.

Notes:

1. A center hole located between the two chain attachment points is provided on the ASI Lifting Beams as an attachment point for an additional shackle intended for use as a third point of contact with the lifting crane hook or means of assuring additional safety to crew using the ASI Lifting Beams Lifting Beam. This shackle and tie line to the crane hook or other means of support are not provided by ASI as the means of attachment to the lifting source may widely vary. However, this third point of contact with the lifting beam is an opportunity to provide increased safety for personnel or observers and it's use is recommended.
2. Procedures above are example procedures to help guide the end users in safety as a minimum level that should be used. Local company procedures and safety practices over and above the minimum example practices noted are encouraged to increase safety for personnel in each particular environment.
3. See Addendum as required reading for more information. Assure the Addendum is not out of date, as these documents by this and other organizations may change without notice.

Document Revision: ASI Lifting Beams Manual and Warranty

1.0 Initial draft not released

1.1 Released to customers for Safety Considerations reviews

1.2 Included verbiage for tie lines to guide the beam and heads from a distance assuring personnel safety. Included verbiage to note the ASI Lifting Beams is for use with Caterpillar® heads only, not for use as a general lifting Beam.

1.3 Minor revisions to verbiage related to field practices. Added **Notes:** section drawing attention to the center hole provided as a means for additional safety for personnel. Corrected part number in the document to read ASI Lifting Beams. Was: ASI-3500-R4.

1.4-1.5 Added the ASI-3500-6 lifting beams and corrected grammar and spelling issues

1.6 Removed ASI-3500-4 and ASI-3500-6 model numbers, replacing them with generic ASI-3500-X to reduce confusion and wording. This was done to accommodate the ASI-3500-2 and -5 lifting beams.

Trademarks, Copyright and Patents:

Addendum:

Partial listing of ASME 20-1 (2003):

20-1.4.3 Conduct of Lifting Device Operators

(a) The operator shall give attention to the operation of the lifts during a lifting sequence.

(b) When physically or otherwise unfit, an operator shall not engage in the operation of the equipment.

(c) Operators shall be responsible for those operations under their direct control. Whenever there is any doubt as to safety, the operator shall consult a designated person before handling the load.

(d) The operator shall respond only to instructions from designated persons. However, the operator shall obey a stop order at all times, no matter who gives it.

(e) The operation of the lifter shall be observed before use and during a shift. Any deficiency observed shall be carefully examined by a designated person. If the deficiency constitutes a hazard, the lifter shall be removed from service and tagged “Out of Service.” Any indication of a hazardous condition shall be reported to a qualified person for evaluation.

(f) The operator shall be familiar with standard hand signals when applicable.

(g) The operator shall land any attached load and store the lifter before leaving the lifting device.

(h) All controls shall be tested by the operator before use during a shift. If any controls do not operate properly, they should be adjusted or repaired before operations are begun.

(i) The operator shall not ride, or allow others to ride, loads or the lifting device.

(j) The operator and other personnel shall stay clear of the load.

20-1.4.4 Lifting Device Operating Practices

(a) Lifting devices shall be operated only by the following qualified personnel:
- (1) designated persons
- (2) trainees under the direct supervision of a designated person
- (3) maintenance and test personnel, when it is necessary in the performance of their duties
- (4) inspectors (lifting devices)

(b) The lifting device shall not be loaded in excess of its rated load or handle any load for which it is not designed.

(c) The lifter shall be applied to the load in accordance with the instruction manual.

(d) Before lifting, the operator shall make sure that lifter ropes or chains are not kinked, and that multiple part lines are not twisted around each other.

(e) Care should be taken to make certain the load is correctly distributed for the lifter being used.

(f) The temperature of the load should not exceed the maximum allowable limits of the lifter.

(g) The lifter shall be brought over the load in such a manner as to minimize swinging.

(h) Care shall be taken that there is not sudden acceleration or deceleration of the load.

(i) Do not allow load or lifter to come into contact with any obstruction.

(j) The operator shall avoid carrying the load over people.

(k) The lifter shall not be used for side pulls or sliding the load unless specifically authorized by a qualified person.

(l) The operator shall not leave suspended loads unattended.

20-1.4.5 Miscellaneous Operating Practices

(a) An operator shall not use a lifting device that is tagged “Out of Service” or otherwise designated as non-functioning.

(b) “Out of Service” tags on lifting devices shall not be removed without the approval of the person placing them or an authorized person.

(c) The lifter, when not in use, should be stored at an assigned location.

(d) Caution should be taken that operating markings or tags shall not be removed or defaced. Missing or illegible markings or tags shall be replaced.