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HEAVY DUTY AXLE CORRECTION PROCEDURES

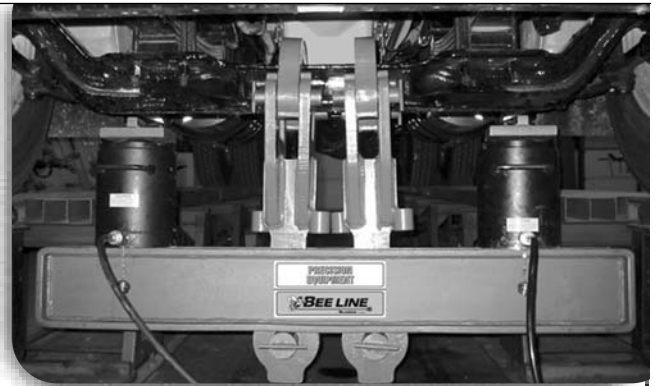
To correct camber and caster on the big “over the road” rigs, Bee Line developed the 405 and the 406 Series Floating Beam Systems to make the procedure safe and easy. Specific tools have been designed to be used safely with the beam and when used with the Bee Line AA Alignment Machine, one worker can correct heavy duty truck axles right on the vehicle. Every Bee Line Floating Beam System comes complete with a handy beam lift. The beam lift raises and lowers the floating beam system effortlessly into position saving you and your employees from any unnecessary heavy lifting.

The valuable information enclosed in this brochure shows the recommended tooling set-up that should be used to correct various alignment problems with the floating beam system. The information is designed to be used in conjunction with the Bee Line LC 6000 Series Computer Alignment System and the 890 Series Electric Hydraulic Pump's (shown on back). For more information on the system contact your local Bee Line Sales Representative or call Bee Line customer service at 1-800-728-7828.

NEGATIVE CAMBER CORRECTION - BOTH SIDES

Negative Camber correction can be accomplished on both the right and left wheels simultaneously. If camber is too positive on both wheels and the relationship between wheels is correct, the correction should be done as shown with the clevis' equally centered on the axle. A single clevis can be used but two clevis' provide more stability during the setup. If unequal amounts of correction are required, a single clevis should be used and be moved toward the side where the most correction is needed.

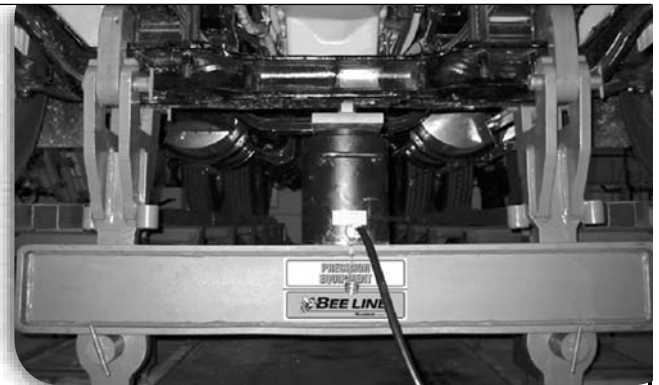
After ensuring the jack tops are on the rams and you are standing outside the wheel, extend the rams until the beam is parallel to the axle. Extend the rams simultaneously (keeping the beam level) while monitoring the live camber adjustment screen until a change of $\frac{1}{2}$ to $\frac{3}{4}$ degrees is noted. Remove the pressure. If the readings return to the original values, increase the amount of screen change an additional amount equal to the change still desired. Relieve the pressure and view the screen. Continue this procedure until camber values are different than starting values with no pressure on the rams. Once this yield point is determined, the amount of change will be directly proportional to the amount of additional movement viewed during the correction. **NOTE: (Safety) - Regulate individual rams to maintain the correction beam parallel to the axle at all times.**



POSITIVE CAMBER CORRECTION - BOTH SIDES

Positive Camber correction can be accomplished on both the right and left wheels simultaneously. If camber is negative on both wheels and the relationship between wheels is correct, the correction should be done as shown, with the ram equally centered on the axle. If unequal amounts of correction are required, the ram should be moved toward the side where the larger correction is needed.

Ensure the jack top is on the ram and you are standing outside the wheel. While monitoring the live camber adjustment screen, increase the camber value until a change of $\frac{1}{2}$ to $\frac{3}{4}$ degrees is noted. Remove the pressure. If the readings return to the same original values, increase the camber change on the screen by an additional amount equal to the change still desired. Remove the pressure and view the screen. Continue this procedure until the camber value is different than the original starting value with no pressure on the ram. Once the yield point of the axle is determined, the amount of change will be directly proportional to the amount of additional movement viewed during the correction. **NOTE: For heavy axles, it may be necessary to use the 404044 tool group to position the clevis farther out on the axle in order to produce more leverage.**



DIS-SIMILAR CAMBER CORRECTION

(TO DECREASE LEFT & INCREASE RIGHT)

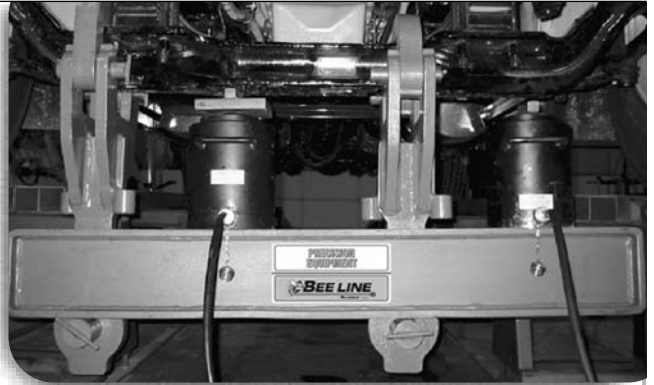
The setup shown is for producing a more negative camber on the left wheel and a more positive camber on the right wheel.

After ensuring the jack tops are on the rams and you are standing outside the wheel, extend the center ram until the right screen camber value changes + 1/2 to 3/4 degrees from the original camber value and close the valve. Extend the ram on the left side of the vehicle to change the left screen camber value - 1/2 to 3/4 degrees from original value and close the valve. (Although the center ram will have the major affect on the right side camber and the outer ram will have the major affect on the left camber, there will be a slight interaction).

When making a correction on the right side of the vehicle, ensure that the ram on the left side does not contact the axle.

If both sides need correction, start with the right side adjustment using the center ram. Apply pressure until an additional change of + 3/4 degrees is seen for right camber on the camber adjustment screen. Remove the pressure on the center ram. If the reading returns to approximately the same original value, increase the pressure an additional amount equal to the change still desired. Again, relieve the pressure and view the screen. Continue this procedure until the axle on the right side changes. Continue with small increments until the desired value is achieved.

Reapply pressure to the center ram until the screen camber value is the same as was used to attain the desired right wheel value and close the valve. Apply pressure to the ram on the left side of the vehicle until an additional change of - 1/2 to 3/4 degrees is seen on the screen for the left camber. Remove the pressure on both rams (reversing the sequences of application). If the left reading returns to the same original value, extend the center ram to the same right side value as before and again close the valve. Increase the camber value of the left wheel an additional amount equal to the change still desired. Again, relieve the pressure on both rams and view the screen. Continue this procedure until the axle on the left side starts to change. Continue with small increments until the desired values are achieved. **NOTE: For heavy axles it may be necessary to use the 404044 tool group to position the right clevis farther out on the axle in order to produce more leverage.**



DIS-SIMILAR CAMBER CORRECTION

(TO DECREASE RIGHT & INCREASE LEFT)

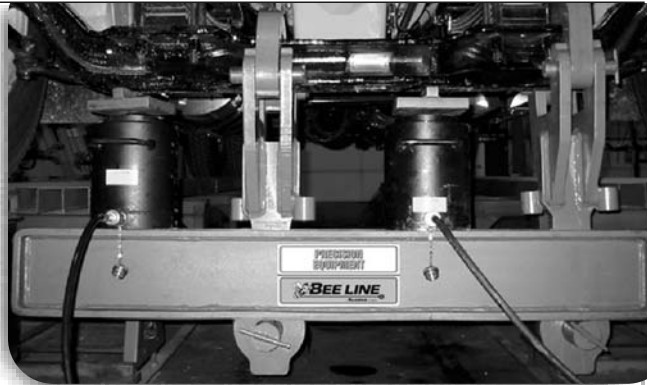
The setup shown is for producing a more negative camber on the right wheel and a more positive camber on the left wheel.

After ensuring the jack tops are on the rams and you are standing outside the wheel, extend the center ram until the left screen camber value changes + 1/2 to 3/4 degrees from the original camber value and close the valve. Extend the ram on the right side of the vehicle to change the right screen camber value - 1/2 to 3/4 degrees from original value and close the valve. (Although the center ram will have the major affect on the left side camber and the outer ram will have the major affect on the right camber, there will be a slight interaction).

When making a correction on the left side of the vehicle, ensure that the ram on the right side does not contact the axle.

If both sides need correction, start with the left side adjustment using the center ram. Apply pressure until an additional change of + 3/4 degrees is seen for left camber on the camber adjustment screen. Remove the pressure on the center ram. If the reading returns to approximately the same original value, increase the pressure an additional amount equal to the change still desired. Again, relieve the pressure and view the screen. Continue this procedure until the axle on the left side changes. Continue with small increments until the desired value is achieved.

Reapply pressure to the center ram until the screen camber value is the same as was used to attain the desired left wheel value and close the valve. Apply pressure to the ram on the right side of the vehicle until an additional change of - 1/2 to 3/4 degrees is seen on the screen for the right camber. Remove the pressure on both rams (reversing the sequences of application). If the right reading returns to the same original value, extend the center ram to the same left side value as before and again close the valve. Increase the camber value of the right wheel an additional amount equal to the change still desired. Again, relieve the pressure on both rams and view the screen. Continue this procedure until the axle on the left side starts to change. Continue with small increments until the desired values are achieved. **NOTE: For heavy axles it may be necessary to use the 404044 tool group to position the left clevis farther out on the axle in order to produce more leverage.**



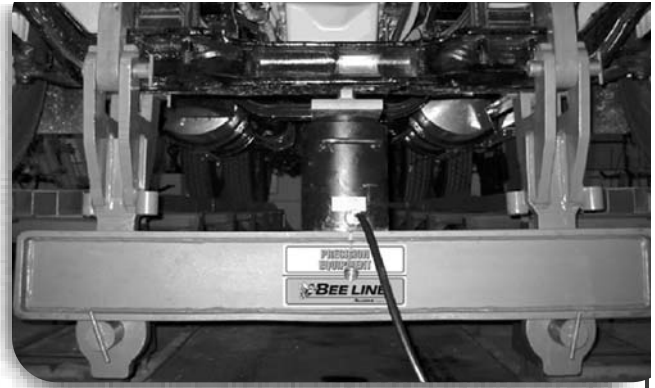
EXTRA HEAVY DUTY AXLE CAMBER CORRECTION

On extra heavy-duty axles, a two step camber correction is normally required to produce a more positive camber on the left side of the vehicle, although the same procedure can be used to increase camber on the right wheel. The procedure is to over correct camber on both wheels using a positive camber correction setup with the ram offset to the side where the camber is to have the greatest increase in relationship to the other wheel. Instead of monitoring actual camber, monitor the camber relationship to the other wheel, correcting for 1/2 of the difference required. Then setup for a negative camber correction with the clevis offset to the opposite side as the ram was when doing the positive correction. Bring the actual camber values back into spec. The other half of the differential should be automatically picked up. **NOTE: Always ensure the jack tops are on the rams and you stand to the outside of the wheel.**

EXAMPLE:

STEP 1: For maximum leverage on the camber correction, a positive correction setup with the ram set as close to the left spring seat as possible (but not pushing on the spring seat bulk), should be used to over correct the camber on both wheels i.e. approximately (+1 degree right and + 1 1/8 degree left with pressure relieved). **NOTE: #404044 special axle tools can be used for additional leverage.**

STEP 2: In order to decrease the camber from the setting obtained in step #1 to the desired final camber value, a camber decrease setup is used using a single clevis offset towards the right spring seat as far as possible (but not over the spring seat bulk). (The 404051 dual-pin adapter will help distribute pin load and stabilize the setup).



SPRING SEAT CORRECTION

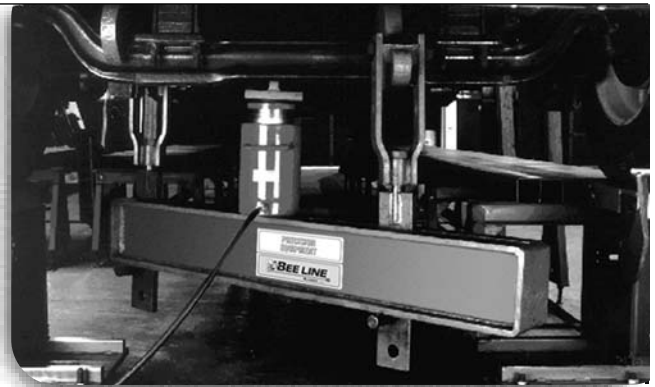
If the Spring Seats are not at equal angles (within 1/2 degree side-to-side) with the U-bolts loose on one side of the axle, a correction must be made. The spring pads not being at equal angles will put stress on the spring assemblies and/or a torsional twist on the axle and could cause damage especially on composite springs.

Use the setup shown if the right spring pad is tilted more downward at the front than the left (ensuring the jack top is on the ram). Otherwise, reverse the direction of the hooks, leaving the hooks at the same location on the axle. As with the caster, the right side will be corrected to match the left.

Monitoring the amount of spring seat correction can be accomplished by watching the right side caster change while standing

to the outside of the wheel. This may only give approximate results since the actual change may be spread between both spring seats. The purpose is to get both spring seats at equal angles. The spring seat gauge is the only true measurement of the results achieved.

If the spring seats are at equal angles and caster is still not within the side to side tolerance, a caster correction must be performed. **NOTE: Twisting the axle to correct spring pad relationship or caster relationship is performed to restore the axle to its original configuration. If the final caster values desired are different than the current values once the correct relationship is achieved, caster shims are to be installed in pairs of equal thickness (1 per side) to change caster on both sides equally.**

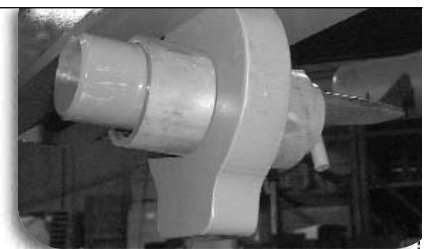


VALUABLE ACCESSORY!

BEAM LEVELING SPACERS

BeeLine is pleased to introduce the next generation of spacers to level the 404000 floating beam. They can be used when a different clevis is used in each location on the axle (i.e. one spring pad clevis and one narrow clevis) or when each clevis is mounted at a different height on the axle. These spacers help level the beam making the correction of the axle safer, by keeping the ram pushing perpendicular to the axle instead of at an angle.

These new spacers are round in shape and come in two different sizes. The larger spacer (403098) has a 4-inch outer diameter and a wall thickness of just short of 3/4 inch. The smaller spacer (403099) has a 3 1/4 inch outer diameter and a wall thickness of just short of 3/8 inch. They will fit both the 405 and 406 tool groups. We feel these thicknesses will be more usable than the previous 1-inch spacer was.



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CASTER TWIST

A Caster twist is normally performed on the right side of the vehicle for accessibility and operator convenience. Use the setup shown with the outside twisting tool toward the rear of the vehicle to increase right caster relative to the left side. The outside twisting tool will be on the front side of the axle to make the right caster more negative. Then equally shim both sides if more or less caster is desired on both sides.

Use a Spring Seat gauge to ensure that both spring seats are at equal angles or within 1/2 degree side to side and that equal shims are used on each side. Unequal shims will put excessive stress on the spring assemblies and could cause damage, especially on composite springs. **NOTE: If the spring seat pads are not at equal angles when equal shims are installed, a spring seat correction twist should be performed first.**

The inside twisting tool should be close to the spring seat and the outside tool should be spaced out near the wheel (blocks can be used if necessary).

It is recommended to make the caster adjustment with the right wheel turned out 15 degrees and immobilizing the steering wheel to hold the right wheel in place. This will produce the best results without requiring the brake and wheel unit to be locked.

After ensuring the jack top is on the ram and you are standing outside the wheel, operate the ram in small increments, starting with a screen caster change of 1 to 1 1/2 degrees under pressure. If the screen returns to the original value when pressure is released, increase the screen change by an additional amount equal to the amount of change still desired. Again relieve the pressure and view the screen. Continue to make incremental changes until the desired values are achieved when the axle is in the relaxed state. A caster recheck (both wheels) must be performed after twisting to verify the final readings. **NOTE: If the camber adjustment screen is used, start with a change of 3/8 to 5/8 degrees under pressure. A camber value change of 1/8 degree is equal to 1/2 degree of caster change (approximately).**



HYDRAULIC PUMPS

The Bee Line Electric Hydraulic Pumps are the finest pumps available on the market. The pumps allow operation of rams together or separately. They operate on 110V, 10,000 PSI. The two stage system has a high volume first stage for output below 300 PSI. It automatically switches to a 10,000 PSI second stage for efficient work. The electric pump unit is available with a solenoid control valve, or a hand held automatic release control switch valve.



TRANSPORT RINGS

Take advantage of the 100.3B and the 130.3B Transport Rings. These rings are designed to help support the 100 Ton and the 130 Ton Rams while setting on the 404000 Beam.

The ring tabs drop into the opening in the 404000 slot to keep the ram centered on the top of the beam providing extra stability while moving the beam with the beam lift. (fig. A). By raising the ring the ram has total freedom of movement (fig. B).

VALUABLE ACCESSORY!



FIG. A



FIG. B