M.I. 1514 *REV. B

Maintenance Instruction

Service Department

ELECTRO-MOTIVE

EXPORT FLEXICOIL LOCOMOTIVE TRUCK ASSEMBLY

INTRODUCTION

The flexicoil truck assembly, Fig. 1, supports the weight of the locomotive and provides a means for transmission of power to the rails. The truck is designed to withstand the stress resulting from road shock due to normal variations in the roadbed and other conditions encountered during operation. An important function of the truck assembly is to absorb and isolate these shocks so they will not be transferred to the locomotive underframe and the equipment mounted on the underframe.

Traction motors mounted in the truck convert electrical energy into locomotive tractive effort. The motors are geared to driving axles which apply force to the rail through the wheels. The driving force is transmitted through the axle journal bearings to the truck frame and through the truck frame pressure areas to mating pressure areas on the truck bolster. The bolster transmits the force through its center bearing to the carbody center bearing to provide locomotive tractive effort.

The main frame of the truck is supported on sets of double coil springs above each journal bearing. The journal bearing or journal bearing adapter transmits the load directly from the springs to the axle. Each journal bearing or journal bearing adapter is held between two pedestal jaws which are an integral part of the truck frame. Each pair of pedestals is joined at the bottom by a pedestal tie bar. Renewable pedestal wear plates and journal box wear plates provide control of clearances between the pedestals and journal bearing or journal bearing adapter.

The term Flexicoil is used to describe a truck assembly with the truck bolster "floating" independent of the truck frame. The bolster rests on heavy coil springs. The coil springs provide vertical cushioning and also flex for lateral movement of the bolster.

Two sizes of traction motors are used on the truck assemblies, the large standard or broad gauge motor and the smaller universal gauge motor. The standard broad gauge motor can be used on all gauges of 1 435 mm (4' 8-1/2") and wider. The universal gauge motor can be used on meter gauge up through the widest gauge.

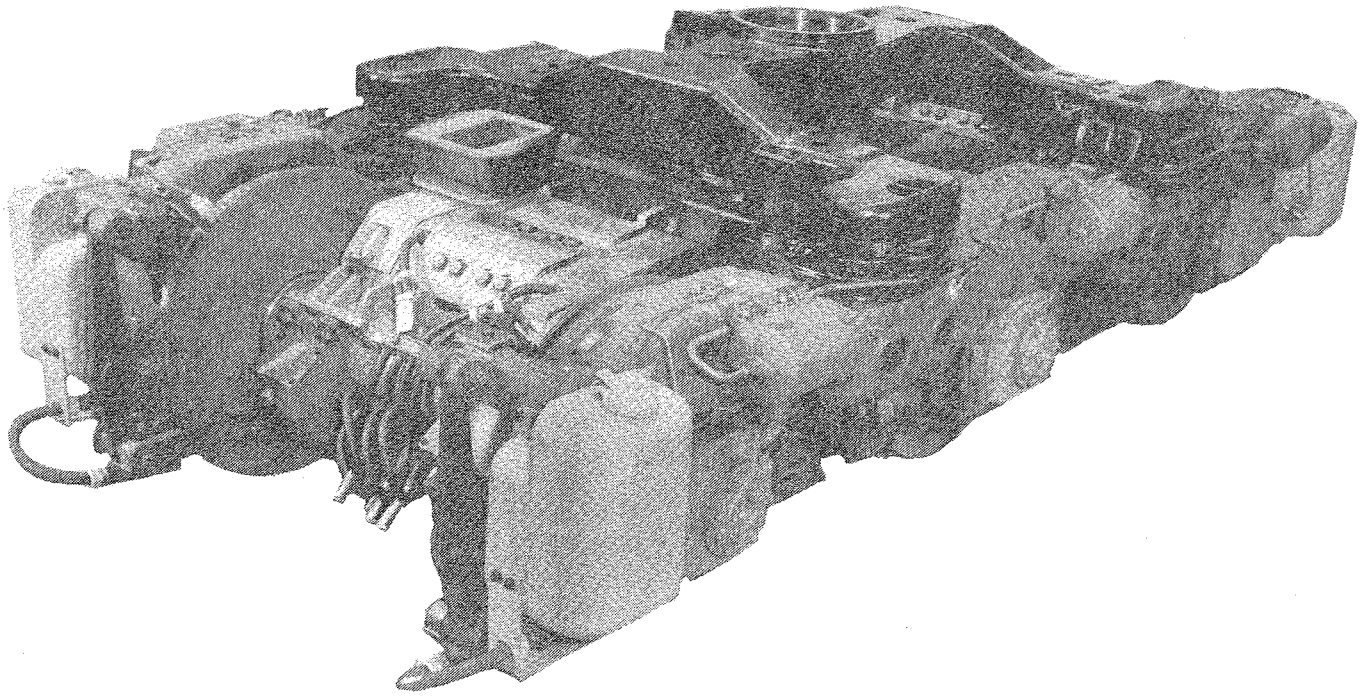
The traction motors are supported on their respective drive axles and at suspension assemblies mounted on truck frame lugs. This arrangement provides good motor accessibility and good wheel adhesion characteristics. A flexible bellows, either mounted on the carbody or on the traction motor, supplies clean cool air to the traction motor through the traction motor air duct.

There are three basic flexicoil export truck assemblies. The truck assemblies are as follows:

Truck Assembly	Description
A-1-A	3 Axles/2 Motors
GB	2 Axles/2 Motors
GC	3 Axles/3 Motors

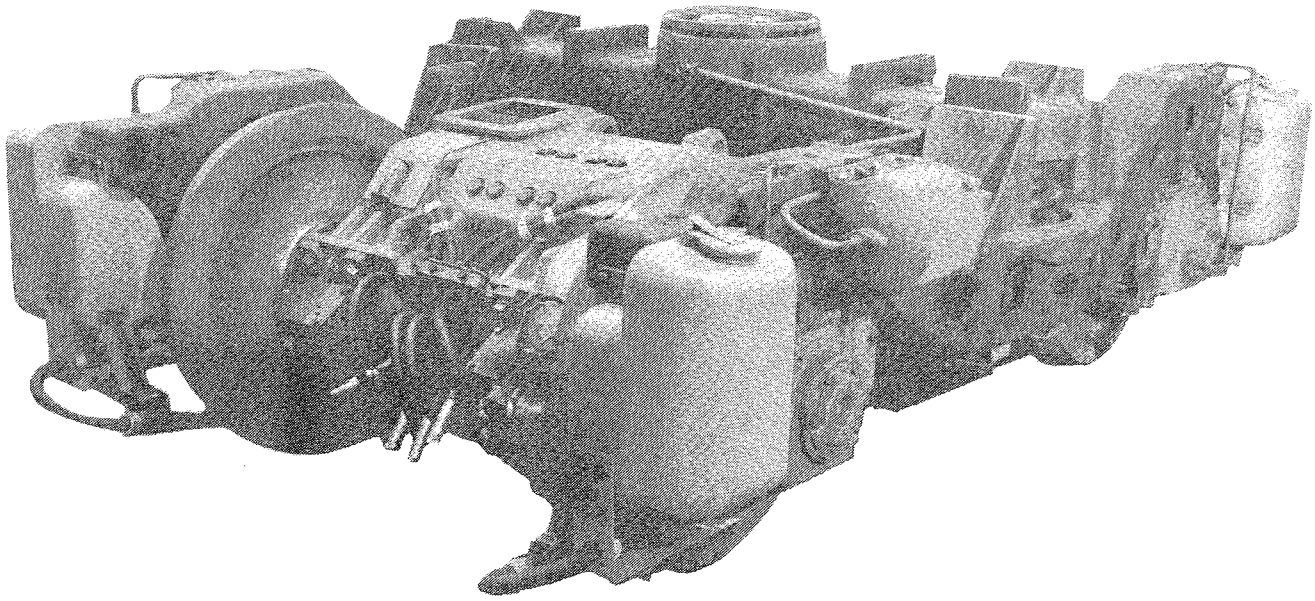
Air brake cylinders and brake rigging mounted on the truck frame are used to apply retarding force to the wheels to slow or stop the locomotive. Either a single shoe brake system, Fig. 2 or a clasp brake system, Fig. 3 is used with the flexicoil truck assembly.

*Extensively revised and completely retyped. Supersedes previous issue of this number.



Model GC, Three Axles/Three Motors,
Flexicoil Truck Assembly

29588



Model GB, Two Axles/Two Motors,
Flexicoil Truck Assembly

29589

Fig. 1 – Typical Flexicoil Export Truck Assemblies

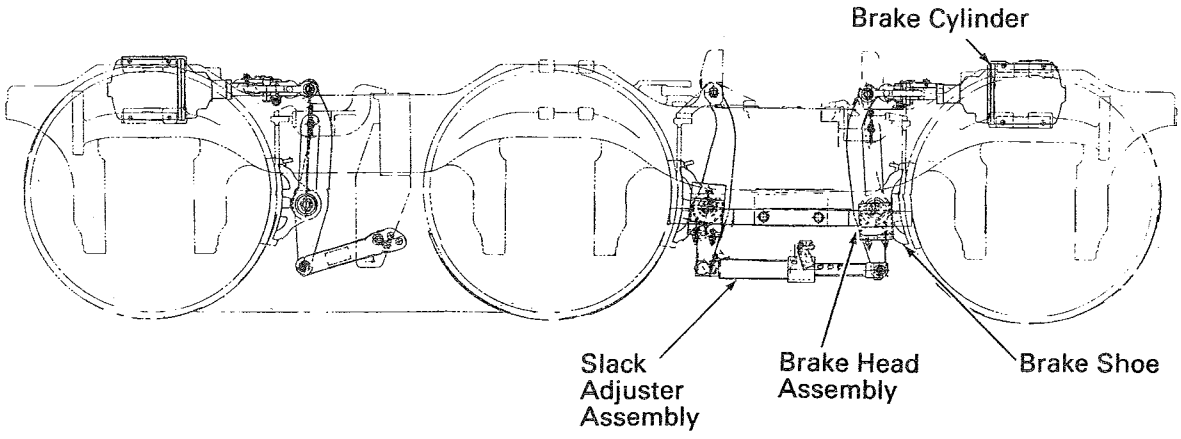


Fig.2 – Single Shoe Brake Rigging

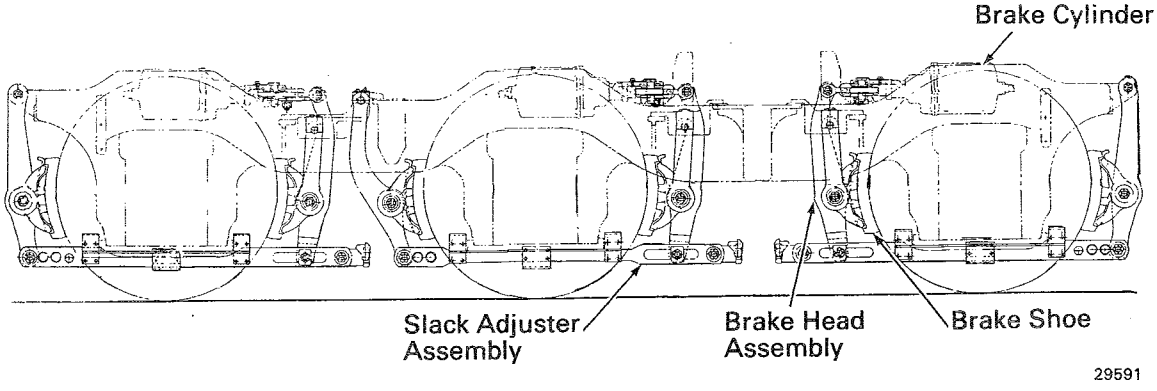


Fig.3 - Clasp Brake Rigging

TRUCK ASSEMBLY DESCRIPTION

A-1-A TRUCK ASSEMBLY

A-1-A truck assembly (three axles/two motors), is equipped with an idle axle with a pair of wheels to support the locomotive weight, but the idle axle wheels are not driving wheels.

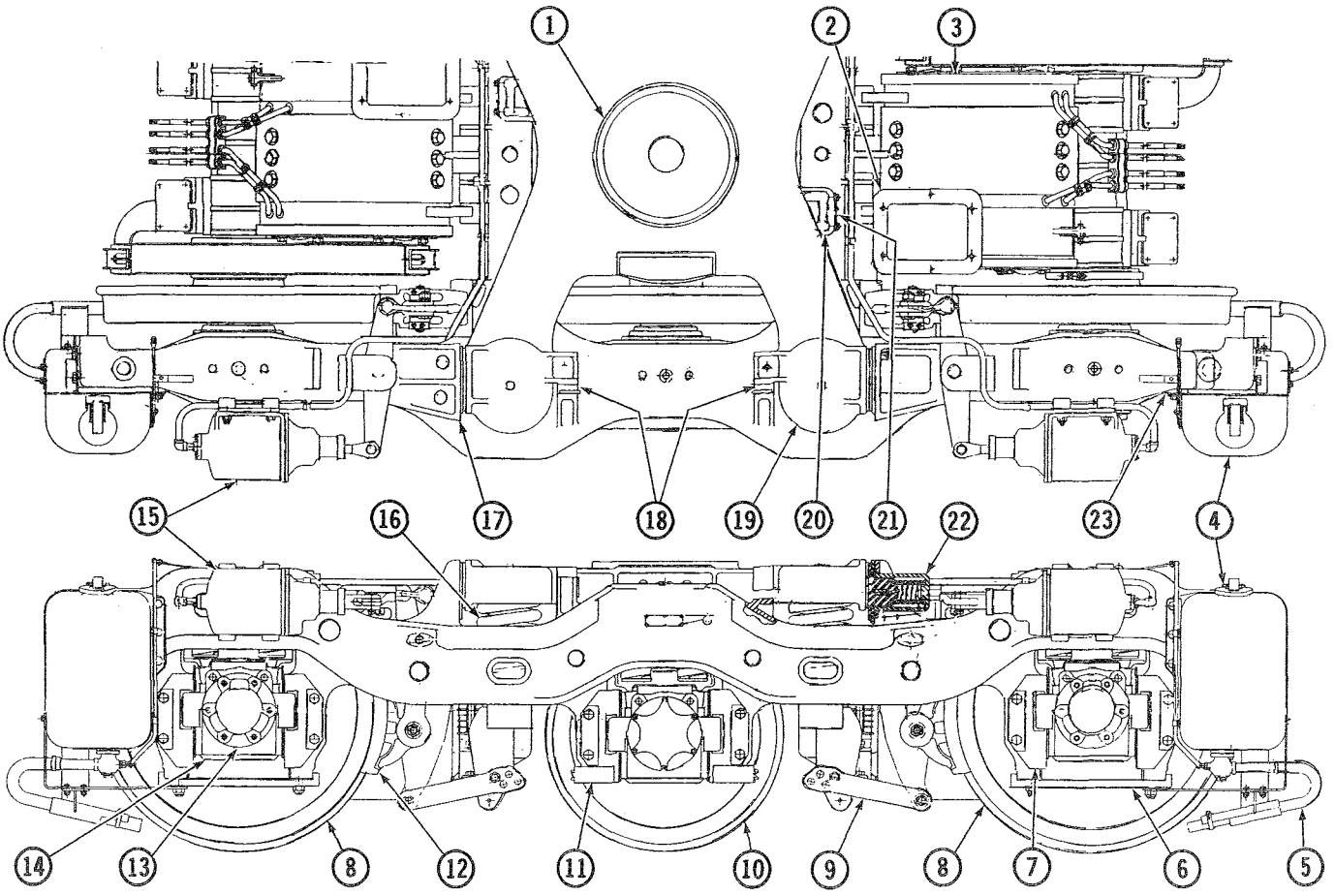
The truck is equipped with standard gauge motors as shown in Fig. 4. The truck frame and wheel spacing can be obtained in different widths to suit the particular track gauge.

The "H" design bolster assembly (19, Fig. 4) is supported at each of the four corners by coil springs (16) held in spring pockets in the truck frame. The bolster assembly is held in place by upright pedestals (17). Bolster stops (18) limit the side movement of the bolster.

Spring loaded friction snubber assemblies (22) are located at diagonally opposite corners of the bolster. The piston of the snubber assembly presses against the bolster plate to damp the action of the bolster support.

Each journal bearing (14) is held between the two pedestals extending below the truck frame. Each pedestal has a replaceable liner (7). The ends of the pedestals at both ends of the truck are joined by a tie bar (6) bolted to the end of each pedestal. The bar transfers part of the pedestal load to the other pedestal. The pedestals at the center set of wheels, which are not driving wheels, have keeper assemblies (11) bolted to the ends of the pedstals. The keeper assemblies hold the journal bearing in place when the truck is lifted.

The center bearing (1) of the bolster receives the locomotive carbody center bearing. Two safety links (20) on opposite sides of the bolster connect the bolster to the truck main frame, but are arranged



1. Bolster Center Bearing
2. Traction Motor Air Duct
3. Traction Motor
4. Sand Box
5. Sand Application Hose
6. Pedestal Tie Bar
7. Pedestal Liner
8. 1 016 mm (40") Wheel
9. Brake Rigging
10. 838 mm (33") Wheel
11. Keeper Assembly
12. Brake Shoe
13. Journal Bearing
14. Journal Bearing Adapter
15. Brake Cylinder
16. Bolster Coil Spring
17. Bolster Pedestal
18. Bolster Stop
19. Bolster Assembly
20. Safety Link
21. Pin Assembly
22. Friction Snubber Assembly
23. Truck Frame

29592

Fig.4 – A-1-A Flexicoil Truck Assembly, Three Axles/Two Motors

to permit vertical movement of the bolster. The safety links also prevent separation of the bolster from the truck assembly.

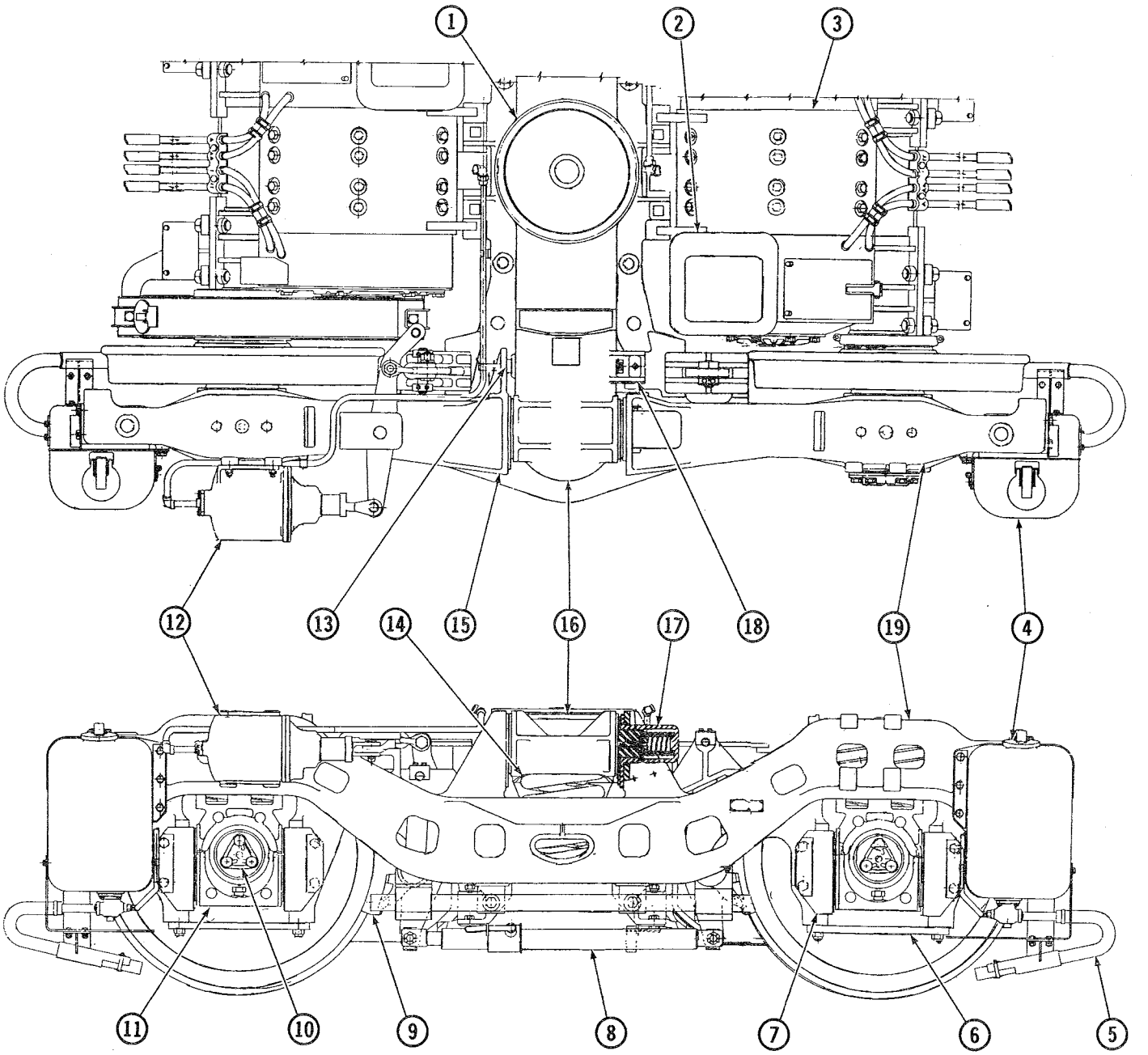
The main truck frame (23) is supported on coil springs above each axle journal bearing (13).

A sand box (4) is mounted at each corner of the frame. Sand traps are installed at the bottom of each sand box. Air lines are connected to each sand trap and sand application lines (5) extend from each trap to its respective wheel.

GB TRUCK ASSEMBLY

The GB truck assembly (two axles/two motors), Fig. 5, is equipped with standard gauge motors, however, universal gauge motors may be used. The truck frame and wheel spacing can be obtained in different widths to suit the particular track gauge.

The "bridge" design bolster assembly (16, Fig. 5) is supported at each end by a double coil spring (14) held in spring pockets in the truck frame. The bolster assembly is held in place by upright pedestals (15). Bolster stops (18) limit the side movement of the bolster.



1. Bolster Center Bearing
2. Traction Motor Air Duct
3. Traction Motor
4. Sand Box
5. Sand Application Hose
6. Pedestal Tie Bar
7. Pedestal Liner
8. Brake Rigging (Single Shoe)
9. Brake Shoe
10. Journal Bearing
11. Journal Bearing Adapter
12. Brake Cylinder
13. Bolster Safety Pin
14. Bolster Coil Spring
15. Bolster Pedestal
16. Bolster Assembly (Bridge-Type)
17. Friction Snubber Assembly
18. Bolster Stop
19. Truck Frame

29593

Fig.5 – GB Flexicoil Truck Assembly, Two Axles/Two Motors

A spring loaded friction snubber assembly (17) is located in one bolster pedestal at each side of the truck. The piston of the snubber assembly presses against the bolster plate to damp action of the bolster support.

Each journal bearing is held between two pedestals extending below the truck frame. Each pedestal has a replaceable liner (7). The ends of the pedestals are joined by a tie bar (6) bolted to the end of each pedestal which transfers part of the pedestal load to the other pedestal.

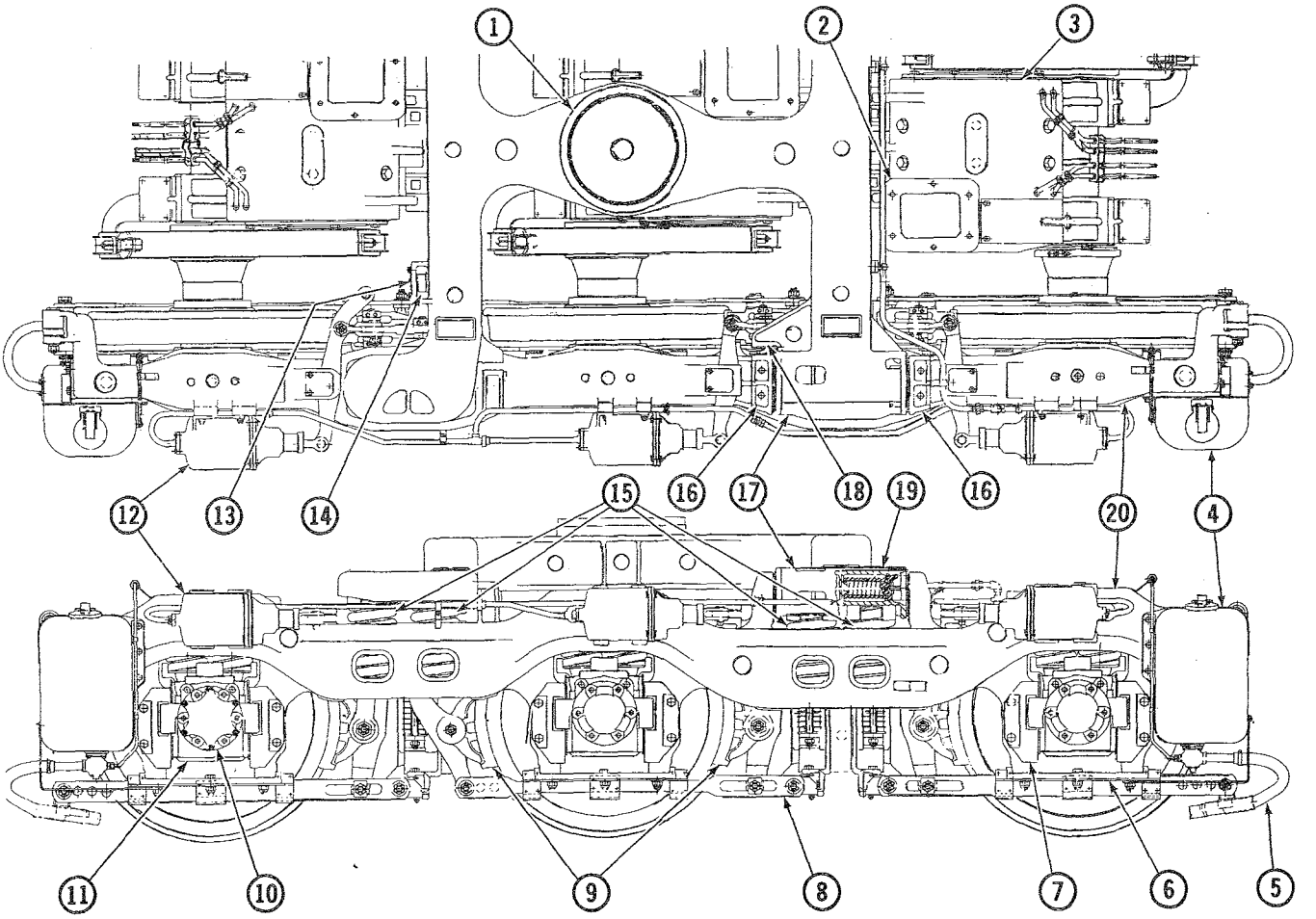
The center bearing (1) of the bolster receives the locomotive carbody center bearing. Two safety support pins (13) on opposite sides of the bolster contact a stop on the truck frame to prevent separation of the bolster from the frame, but do not interfere with normal bolster movement.

The main frame (19) is supported on coil springs above each axle journal bearing.

A sand box (4) is mounted at each corner of the frame. Sand traps are installed at the bottom of each sand box. Air lines are connected to each sand trap and sand application lines (5) extend from each trap to its respective wheel.

GC TRUCK ASSEMBLY

The GC truck assembly (three axles/three motors), Fig. 6, is equipped with standard gauge motors,



1. Bolster Center Bearing
2. Traction Motor Air Duct
3. Traction Motor
4. Sand Box
5. Sand Application Hose
6. Pedestal Tie Bar
7. Pedestal Liner
8. Brake Rigging (Clasp Brake)
9. Brake Shoe
10. Journal Bearing
11. Journal Bearing Adapter
12. Brake Cylinder
13. Safety Link
14. Pin Assembly
15. Bolster Coil Springs
16. Bolster Pedestal
17. Bolster Assembly
18. Bolster Stop
19. Friction Snubber Assembly
20. Truck Frame

29594

Fig.6 – GC Flexicoil Truck Assembly, Three Axles/Three Motors

however, universal gauge motors may be used. The truck frame and wheel spacing can be obtained in different widths to suit the particular track gauge.

The "H" design bolster (17, Fig. 6) is supported at each end by coil springs (15) held in spring pockets in the truck frame. Two of the four corners of the "H" are held in place by upright pedestals (16). Bolster stops (18) limit the side movement of the bolster.

Spring loaded friction snubber assemblies (19) are located at the pedestal ends of the bolster. The piston of the snubber assembly presses against the bolster pedestals to damp vertical spring movement.

Each journal bearing is held between two pedestals extending below the truck frame. Each pedestal has a replaceable liner (7). The ends of the pedestals are joined by a tie bar (6) bolted to the end of each pedestal which transfers part of the pedestal load to the other pedestal.

The center bearing (1) of the bolster receives the locomotive carbody center bearing. Two safety support pins (14) on opposite sides of the bolster contact a stop on the truck frame to prevent separation of the bolster from the frame, but do not interfere with normal bolster movement.

The main frame (20) is supported on coil springs above each axle journal bearing.

A sand box (4) is mounted at each corner of the frame. Sand traps are installed at the bottom of each sand box. Air lines are connected to each sand trap and sand application lines (5) extend from each trap to its respective wheel.

MAINTENANCE

TRUCK CLEANING UNDER LOCOMOTIVE

The trucks should be cleaned periodically to eliminate any accumulations of oil, sand, dust, and road dirt. Accumulations of the above tend to increase wear as well as detract from the general appearance of the truck.

CAUTION

When cleaning trucks under the locomotive, the engine should be running to supply air under pressure to the traction motors. Air discharged from the motors will help prevent overspray from entering the motors. Care should be exercised to direct spray away from any motor openings.

Using a wetting agent and an alkaline solution cleaner, spray the truck, being careful to direct the spray away from any motor openings.

Let the cleaning solution remain on the truck for 10 to 15 minutes. Then, using steam and an alkaline solution in a mixing gun, thoroughly spray the truck assembly.

The truck may now be rinsed, using hot water if desired; however, rinsing is not generally required.

LUBRICATION

No periodic lubrication is required on the truck assembly, however, if the truck is equipped with screw-type brake shoe slack adjusters, the adjuster threads should be lubricated, if found to be dry.

The center bearing should have enough oil added at the time a unit is trucked to cover the center bearing wear plate by 1.6 mm (1/16").

No lubrication is required on bearing adapter or pedestal jaw wear surfaces. Special care should be taken to keep bolster and truck frame rubbing surfaces free of oil or grease.

TRUCK REMOVAL

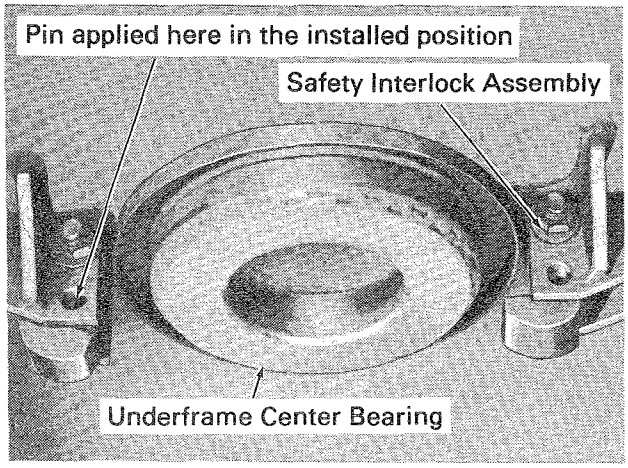
Before attempting truck removal, the safety interlocks, Fig. 7, or the side bearing clips, Fig. 8, must be released. They are attached to the underside of the carbody underframe and lock into recesses in the truck bolster. The interlocks or side bearing clips can be either a bolted or pinned swing-hook arrangement.

Ensure all other physical connections between the trucks and the carbody are disconnected, such as air brake equipment, sanding equipment, traction motor cables, hand brake chain, and speed recorder connection.

The trucks may be removed from the locomotive by using an overhead crane or jacks to raise the locomotive, or by use of a drop table.

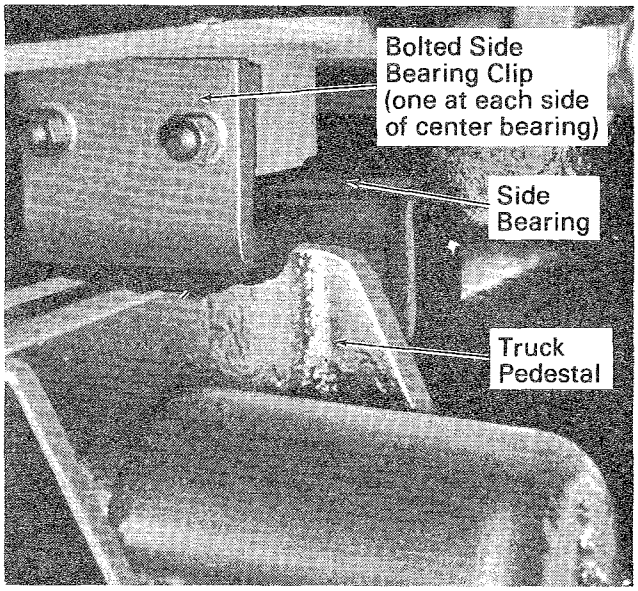
When removing only one truck it will be necessary to raise the entire locomotive until the carbody center bearings clear the truck bolster bearings to prevent bearing damage.

When jacks are used to raise the locomotive, ensure that all jacks are raised equal amounts. Unequal jacking may cause the carbody to be sprung out of shape. The locomotive should be supported on blocking located under the center sills near the jacking pads.



10859

Fig.7 – Underframe-To-Truck Safety Interlock Assembly, Three Axle Trucks



10996

Fig.8 – Underframe-To-Truck Side Bearing Clip Assembly, Two Axle Trucks

TANK IMMERSION CLEANING OF TRUCKS

When the truck assembly is removed from the locomotive, the traction motors, wheels, gears, axles, journal bearings, phenolic or composition wear plates, and brake cylinders should be removed if the truck is to be immersed in a cleaning tank containing an alkaline solution.

After removal of the above components, the truck frame and bolster may be immersed in the cleaning solution. After allowing sufficient time to assure removal of all foreign material, the assemblies should be removed and rinsed with hot water.

If the truck is equipped with screw-type brake shoe slack adjusters, the adjuster threads should be lubricated immediately to prevent seizing.

TRUCK DISASSEMBLY

The truck may be disassembled using one of two methods. Procedure A may be used when facilities are available to invert the truck. Procedure B may be used when it is desirable to disassemble the truck while in the upright position.

PROCEDURE A

1. Remove center bearing dust guard and wear plates. Wipe oil from center bearing and drain oil from traction motor support bearings.

2. Remove individual items such as brake cylinders and piping from truck.

NOTE

Brake rigging can more readily be removed with the truck in the inverted position.

3. On A-1-A truck assembly, disconnect the bolster safety link and pin assemblies (20 and 21, Fig. 4). On GB truck assembly, disconnect the bolster safety pin assembly (13, Fig. 5). On GC truck assembly, disconnect the safety link and pin assemblies (13 and 14, Fig. 6).

NOTE

Current model trucks have a spring pin driven through the cross bar of the friction snubber piston to prevent the piston from rotating and to help retain the piston during removal of the bolster. Previous model trucks had a tee-shaped stop bracket welded in place at the top of the snubber housing. When removing the bolster, a strip of steel (such as a brake shoe key) should be wedged in the slot at the top of the snubber housing and through the piston spring to ensure the piston is secure.

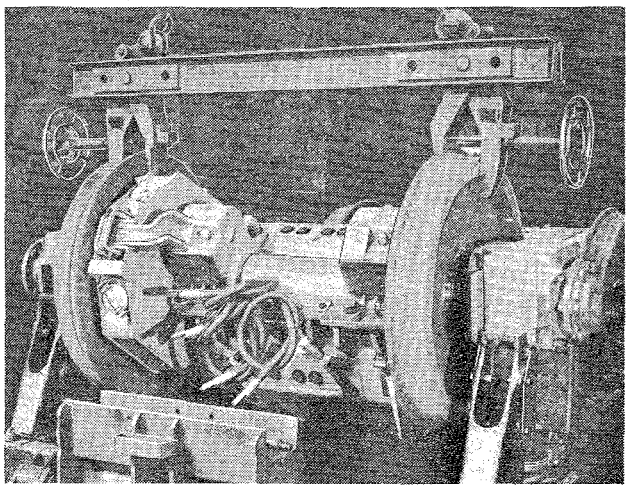
4. Remove bolster from truck using a suitable hoist and sling.

5. Remove bolster springs.

6. Using an overhead crane of sufficient capacity, turn truck upside down either sideways or endways.

7. On GB and GC truck assemblies, remove pedestal tie bars from pedestals. On A-1-A truck assembly, remove pedestal tie bars from pedestals on both ends of truck and remove

keeper assembly from center pedestals. Remove traction motor, axle, wheels, journal bearing assemblies, and gear cases as an assembly, using a lifting fixture as shown in Fig. 9. Refer to Service Data for File Drawing available to fabricate the lifting fixture.



23370

Fig.9 – Removal Of Wheel, Axle, And Motor Assembly

8. Remove wear plates, springs, traction motor nose suspension, and any other remaining smaller parts of the truck as desired.

PROCEDURE B

1. Remove the center bearing, dust guard, and wear plates. Wipe oil from center bearing and drain oil from traction motor support bearings.

2. Remove individual items such as brake cylinders, brake rigging, and piping from truck.

3. On A-1-A truck assembly, disconnect the bolster safety link and pin assemblies (20 and 21, Fig. 4). On GB truck assembly, disconnect the bolster safety pin assembly (13, Fig. 5). On GC truck assembly, disconnect the safety link and pin assembles (13 and 14, Fig. 6).

NOTE

Current model trucks have a spring pin driven through the cross bar of the friction snubber piston to prevent the piston from rotating and to help retain the piston during removal of the bolster. Previous model trucks had a tee-shaped stop bracket welded in place at the top of the snubber housing. When removing the bolster, a strip of steel (such as a brake shoe key) should be wedged in the slot at the top of the snubber housing and through the piston spring to ensure the piston is secure.

4. Remove bolster from truck using a suitable hoist and sling.

5. Remove bolster springs.

6. Remove the dust guard from commutator end of the traction motor.

7. Remove bolts that secure the gear case and pull out gear case clips.

8. The lower half of the gear case will drop down and the upper half can be lifted off.

9. Remove the support bearing cap bolts, the axle caps, the axle shield, and the upper half of the upper bearing shell.

10. Remove the bolts on the motor side of the flexible air duct.

11. Remove bottom guide pin keeper, Fig. 10, which holds the motor nose in place on the nose suspension assembly and allow the guide pins to drop.

12. Lift the traction motor slightly to compress the rubber nose pack of the suspension assembly. With the suspension assembly compressed, insert temporary blocks about 13 mm (1/2″) thick between the nose pack holder and the mounting bolts. The suspension assembly can be compressed by jacking under the motor as an alternate method.

13. Lower the traction motor slightly to free nose suspension assembly. Remove suspension assembly from truck frame.

CAUTION

Use care in lifting traction motor so that the lower half of the support bearing shell will not fall and be damaged.

14. Lift the motor out of the truck with the crane. Rotate the motor around the axle sufficiently so that the lower flange of the support bearing housing will clear the axle and lift vertically out of the truck, Fig. 11. Ensure the support bearing remains in place.

15. Apply a pinion protector to prevent damage to pinion after traction motor is removed.

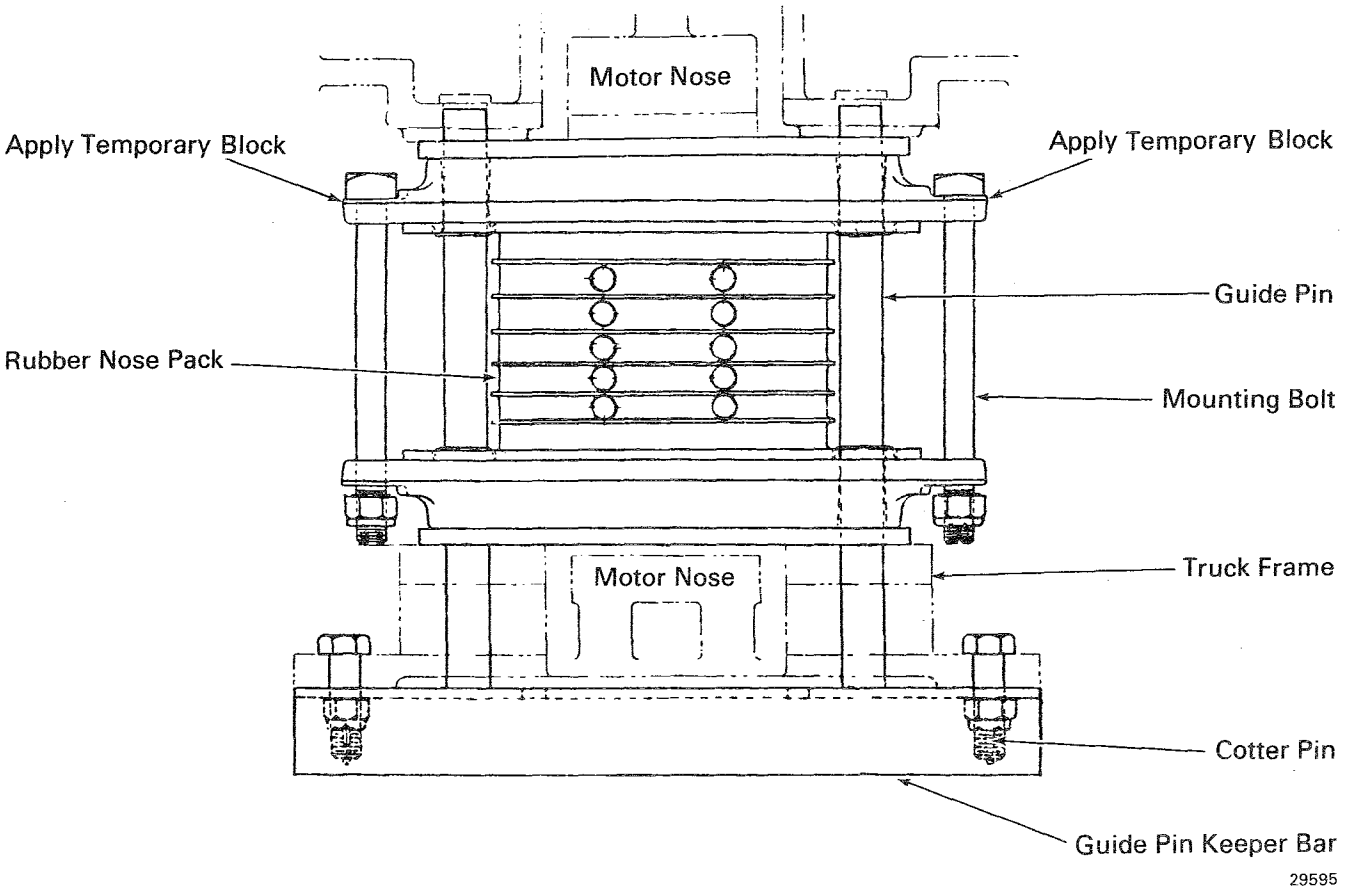


Fig.10 – Traction Motor Nose Suspension Assembly

16. Repeat Steps 6 through 15 and remove remaining traction motors(s).

WARNING

Remain clear of truck while lifting truck frame from wheel and axle assemblies in Step 15. Coil assemblies are not secure and could fail and cause injury.

17. On GB and GC truck assemblies, remove pedestal tie bars from pedestals. On A-1-A truck assemblies, remove pedestal tie bars from pedestals on both ends of truck and remove keeper assembly from center pedestals. Lift truck frame from wheel and axle assemblies.

WARNING

Use extreme care when removing pedestal liners. Springs and spring seats can fall and cause injury.

18. Remove any remaining brake equipment, pedestal liners, and any smaller parts of the truck as desired.

INSPECTION AND RECONDITIONING

Make a thorough inspection of the truck frame and bolster for the following items and recondition if necessary.

TRUCK FRAME

BROKEN OR CRACKED MEMBERS

Inspect entire truck frame for breaks or cracks. Perform magnetic particle inspection at any areas suspected of being cracked.

Breaks or cracks must be repaired by welding with AWS E-7016 electrode. If the broken section can be removed or straightened, it is permissible to weld it back into place after preparing the joint to obtain a 100% section of weld with reinforcement as shown in Fig. 12.

Broken cast sections may be duplicated with a like shape made from MS-4361 steel, and welded to the truck frame.

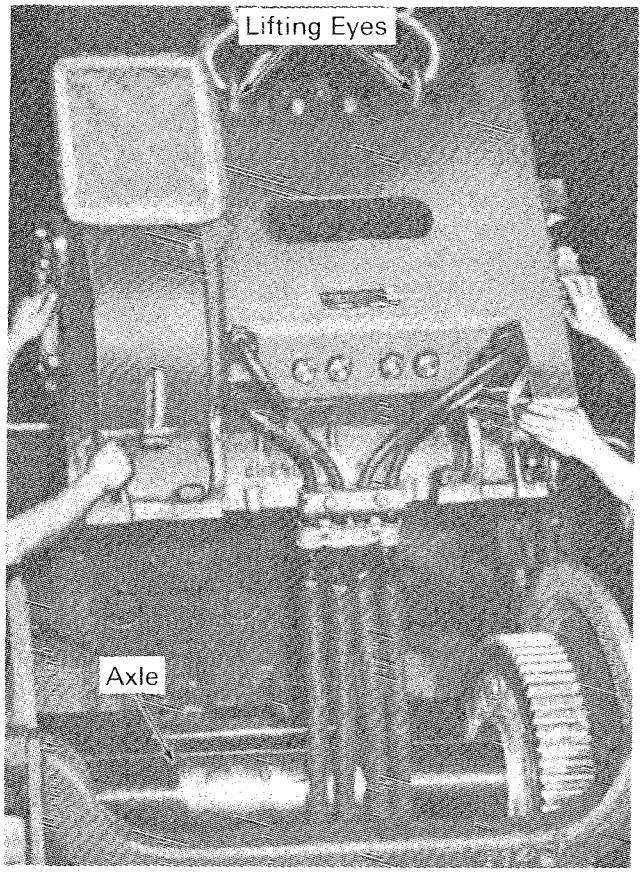


Fig.11 – Removing Traction Motor From Truck

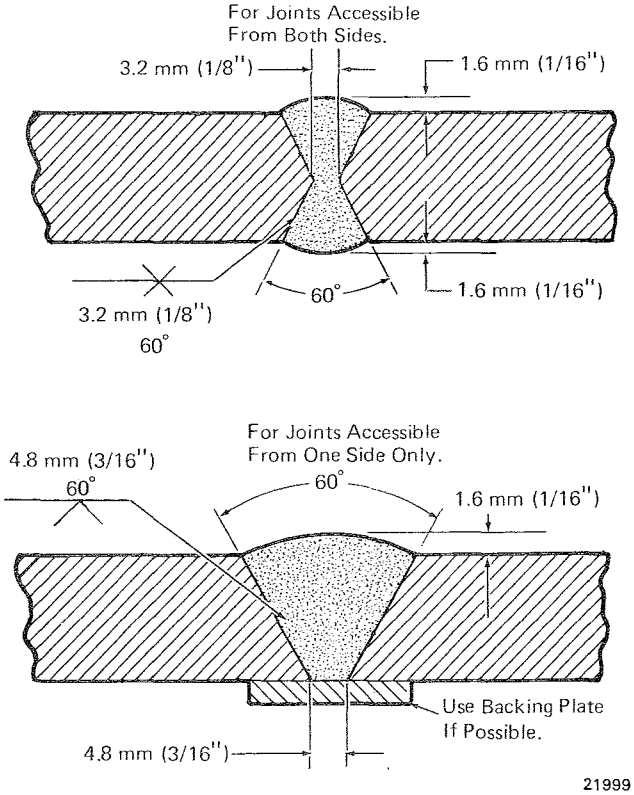


Fig.12 – Preparing Joints For Welding

All welds made on broken or cracked sections should be magnetic particle inspected after welds have cooled to below 204° C (400 ° F).

BENT SECTIONS

Bent sections may be straightened either cold or after the application of heat. Before straightening any bent section, determine what effect it will have on the adjoining sections. Jacks, turnbuckles or fixtures designed for straightening members will expedite the straightening of bent sections.

WORN SPOTS

The truck frame should be thoroughly checked for worn spots in areas normally not subject to wear. For example, loose brake levers may wear the clevis slots through which they are pinned. Also, excessive wear on the spring seats may necessitate their reconditioning or replacement.

Worn spots can be repaired by building up the affected area with weld using an AWS E-7016 electrode. After welding operation is complete, grind the area smooth to match its original form.

ELONGATED OR OVERSIZE HOLES

Drilled holes elongated by wear due to loose bolts, pins, sleeves or bushings, should be brought back to normal size as determined by comparison with similar locations on a truck in good condition. The holes should not be worn more than 1 mm (3/64″) on the radius of the supporting side or 2 mm (3/32″) on the diameter.

Holes which are beyond the above tolerances can be reconditioned by either ring or plug welding. Holes which are too small to permit proper manipulation of the welding electrode should be drilled oversize to permit proper access for the electrode. The hole should be redrilled to proper size after completion of the welding.

WORN BUSHINGS

Bushings worn 2 mm (3/32″) or more on the diameter should be replaced with new bushings. Where bushings are paired to carry a single load, both of the bushings should be replaced if one bushing is worn sufficiently to warrant its replacement.

Worn bushings can be pressed out. After the bushing is removed, inspect the drilled hole in the frame for wear or an out-of-round condition. Holes found unsuitable for a new bushing can be recondi-

tioned by ring welding and then drilling to accept the new bushing. Holes which are only slightly oversize may be shrunk by applying a band of heat parallel with the drilled hole.

DAMAGED THREADS

All threaded holes should be checked and retapped if required. If the threaded holes cannot be reconditioned by retapping they should be plug welded, redrilled and tapped. An alternate method of reclaiming unsatisfactory threaded holes is to retap them to accommodate an oversize bolt.

BROKEN OR BENT STUDS

Replace any broken or bent studs with studs which are in satisfactory condition.

MISSING PARTS

Make a thorough inspection to see that all the necessary parts are intact. Special attention should be given to wear plates, cotter pins, washers, bushings, studs, brake guides, and brake pins.

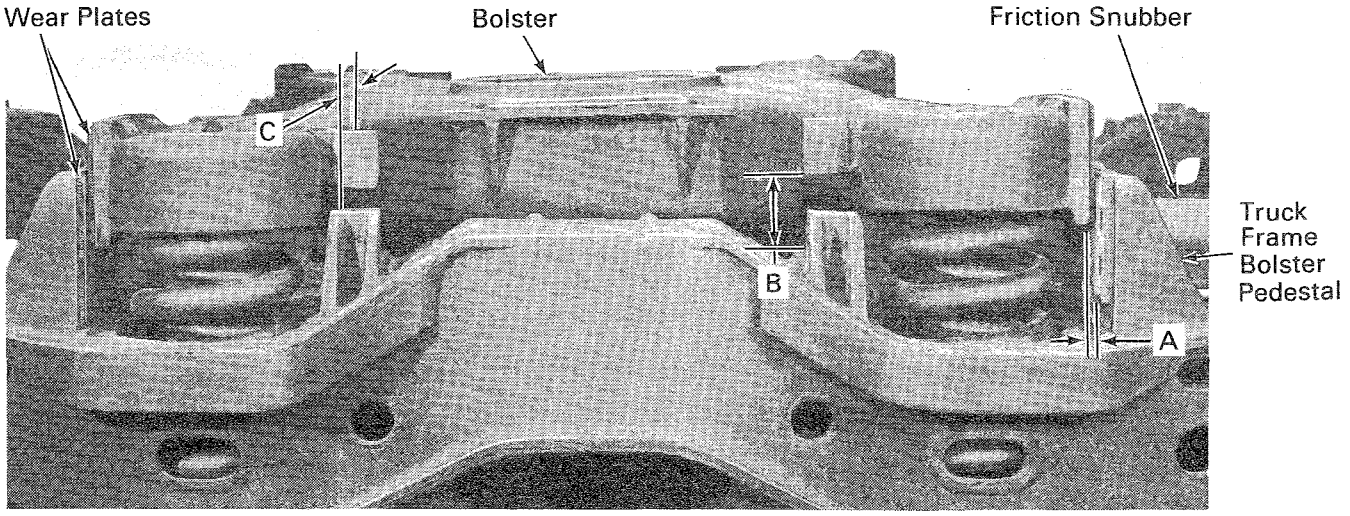
BOLSTER AND TRUCK FRAME PEDESTAL WEAR PLATES

The wear plates at the contact points of the truck frame pedestals and the bolster are provided to absorb the wear that occurs from the relative movement between the bolster and the truck frame. The wear plates are welded to the truck frame and bolster to provide a replaceable surface.

If the clearance between the truck frame pedestal and the bolster exceed the limits of Fig. 13, 14, or 15, either the bolster or truck frame pedestal wear plate or both should be replaced with new plates.

WEAR PLATE REMOVAL

The wear plates can be removed by chipping or grinding off the fillet welds that secure the plates. The wear plates should be replaced in pairs or complete truck sets so that the total clearance on one side of the truck is not more than 1.5 mm (1/16") greater than on the opposite side.



Clearance: A - New 1.6 mm (1/16") Per Side
Condemning Limit, 4.8 mm (3/16") Per Side
9.5 mm (3/8") Total

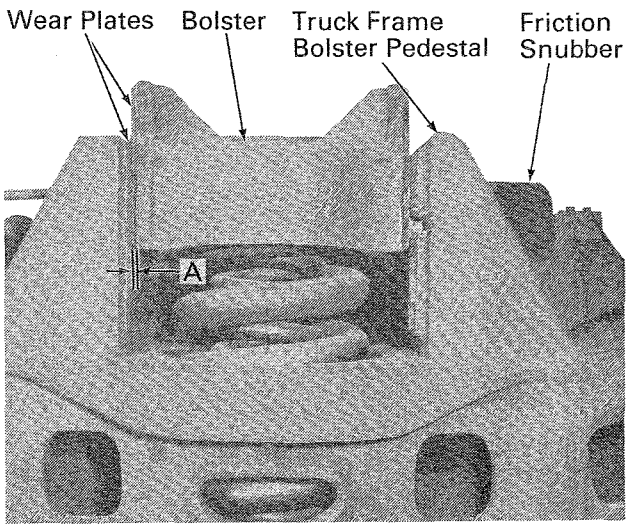
B - New 31.8 mm ±6.4 (1-1/4" ±1/4")

C - New 22 mm $^{+0.8}_{-4.0}$ (7/8" $^{+1/32}_{-5/32}$)

NOTE
Bolster wear plates and truck frame pedestal wear plates are 9.5 mm (3/8") thick when new.

29596

Fig.13 – A-1-A Truck Frame Pedestal And Bolster Wear Plate Clearance Limits



Clearance: A - New 0.8 mm (1/32") Per Side
Condemning Limit, 4.8 mm
(3/16") Per side

NOTE
Bolster wear plates and truck frame pedestal wear plates are 9.5 mm (3/8") thick when new.

29597

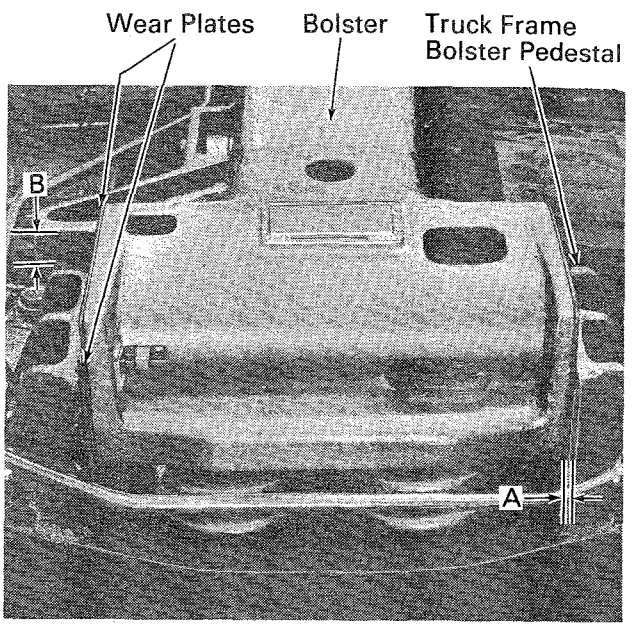
Fig.14 – GB Truck Frame Pedestal And Bolster Wear Plate Clearance Limits

Care must be exercised in grinding or chipping to avoid gouging the pedestal or bolster wear plate surface. Any gouges must be welded and ground smooth before applying new plates. The pedestal and bolster wear plate vertical surfaces must be in the same plane within 0.8 mm (1/32").

WEAR PLATE APPLICATION

The wear plates and the welds which hold them to the bolster or truck bolster pedestal should be inspected using a magnetic particle inspection method. Generally, residual magnetism of these parts is sufficient to provide an indication when the inspection particles are applied to their surfaces.

To assemble new plates to the pedestal or bolster, tightly clamp the wear plate to the surface to which it is to be welded to obtain contact over at least 75% of the wear plate area. This can be checked with a thin feeler gauge around the wear plate perimeter.



Clearance:
A - New 1.6 mm (1/16") Per Side
Condemning Limit, 4.8 mm (3/16") Per Side
9.5 mm (3/8") Total
B - New 31.8 mm $^{+3.2}_{-6.4}$ (1-1/4" $^{+1/8}_{-1/4}$)

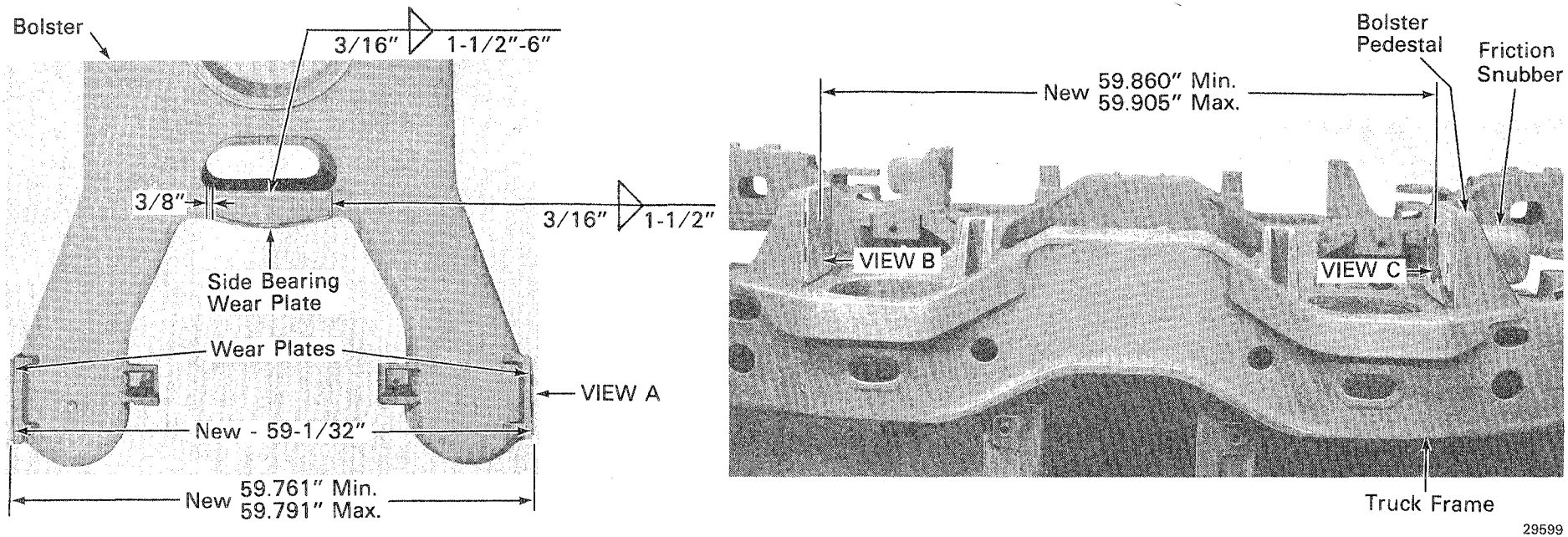
NOTE
Bolster wear plates and truck frame pedestal wear plates are 6.4 mm (1/4") thick when new.

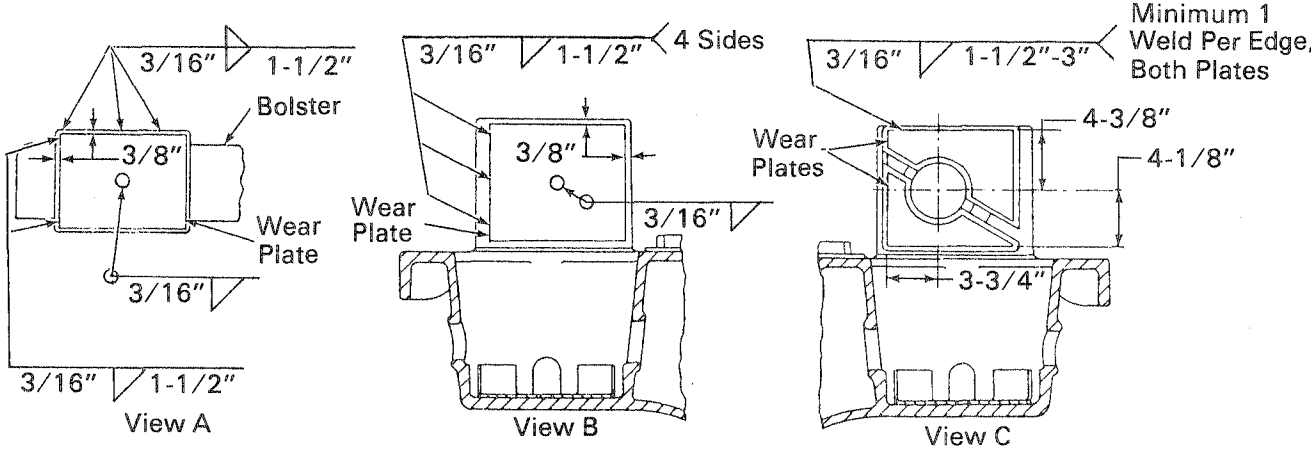
29598

Fig.15 – GC Truck Frame Pedestal And Bolster Wear Plate Clearance Limits

CAUTION
When welding the wear plates, use only one pass welding and do not weld over tack welds. Multiple pass welding and welding over tack welds will cause the wear plates to crack.

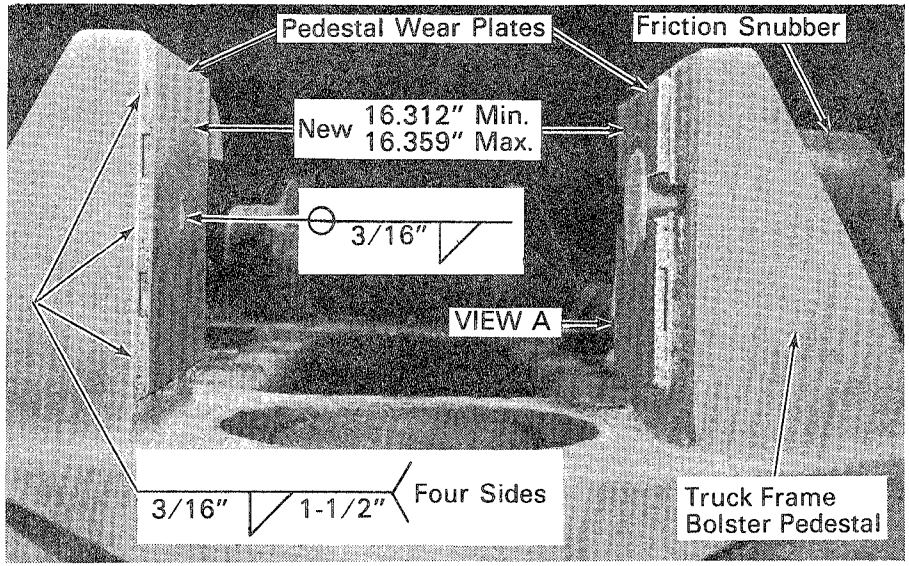
Weld the wear plates as shown in Fig. 16, 17, or 18, using AWS-E-FeMn-A, E-308-16, or E-310-16 electrode. Weld the hole of the wear plate first to secure contact with the surface at the center. Ensure fillet welds are not higher than the wearing surface of the plates. Grind down any weld material that overlaps onto the surface of the wear plate.

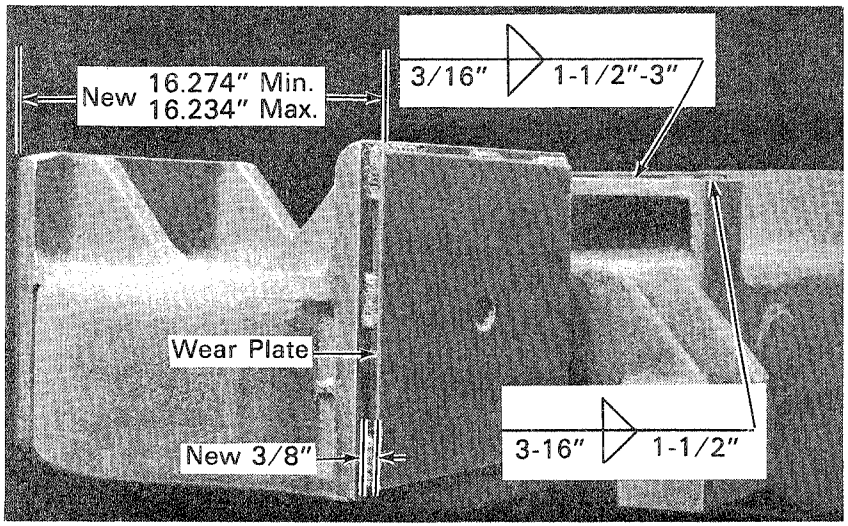




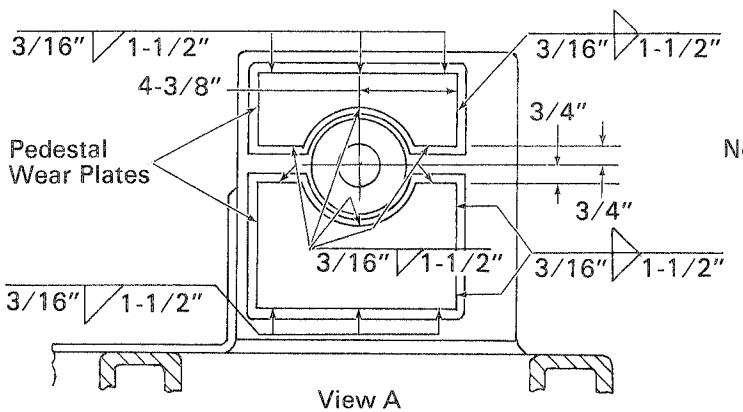
METRIC CONVERSION CHART			
(inch)	mm	(inch)	mm
3/16	4.8	4-3/8	111.12
3/8	9.5	59.761	1517.93
1-1/2	38.1	59.791	1518.69
3	76.2	59.860	1520.44
3-3/4	95.2	59.905	1521.59
4-1/8	104.8		

Fig.16 – A-1-A Truck Bolster Pedestal And Bolster Wear Plate Application

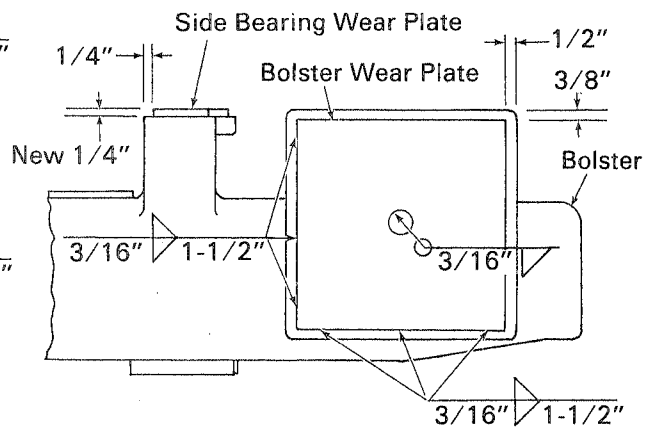




29603



TRUCK FRAME PEDESTAL WEAR PLATES



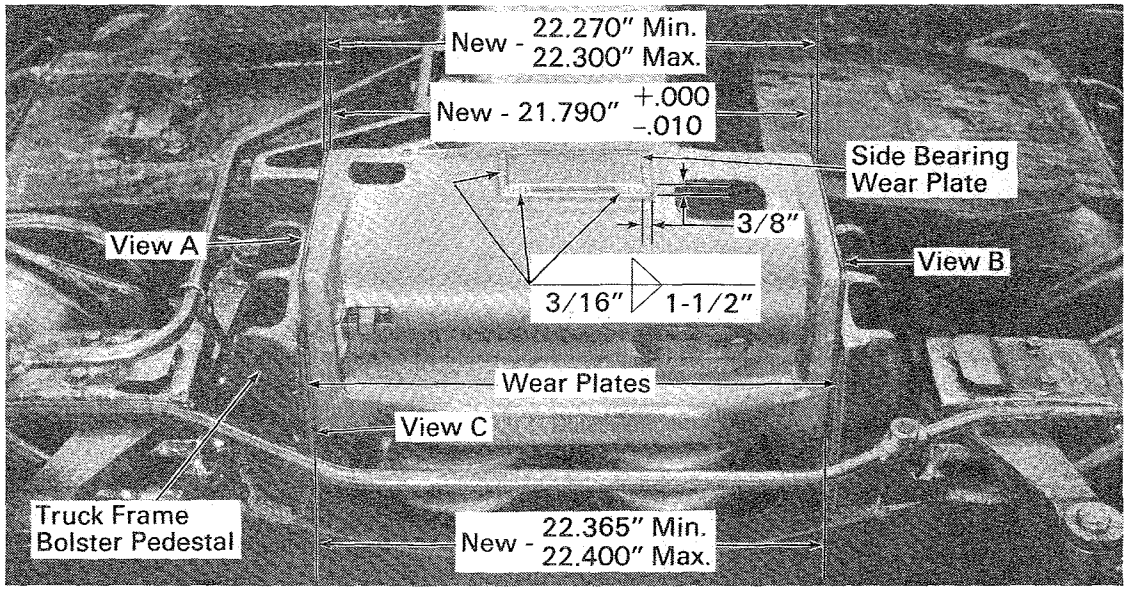
BOLSTER WEAR PLATES

NOTE
Wear plate surfaces to be in the same plane within 1/32".

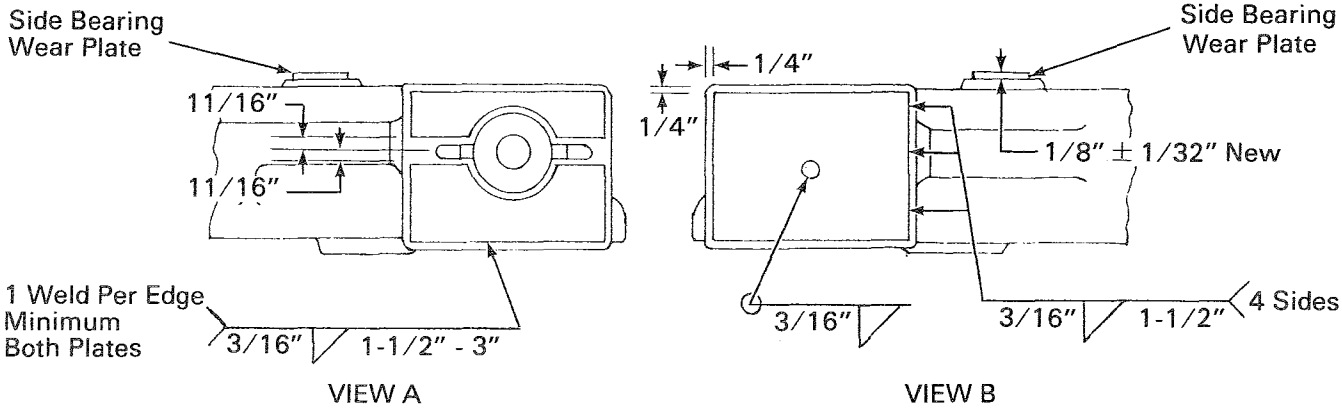
METRIC CONVERSION CHART			
(inch)	mm	(inch)	mm
1/32	0.8	3	76.2
3/16	4.8	4-3/8	111.1
1/4	6.4	16.234	412.34
3/8	9.5	16.274	413.36
1/2	12.7	16.312	414.32
3/4	19.0	16.359	415.52
1-1/2	38.1		

29604

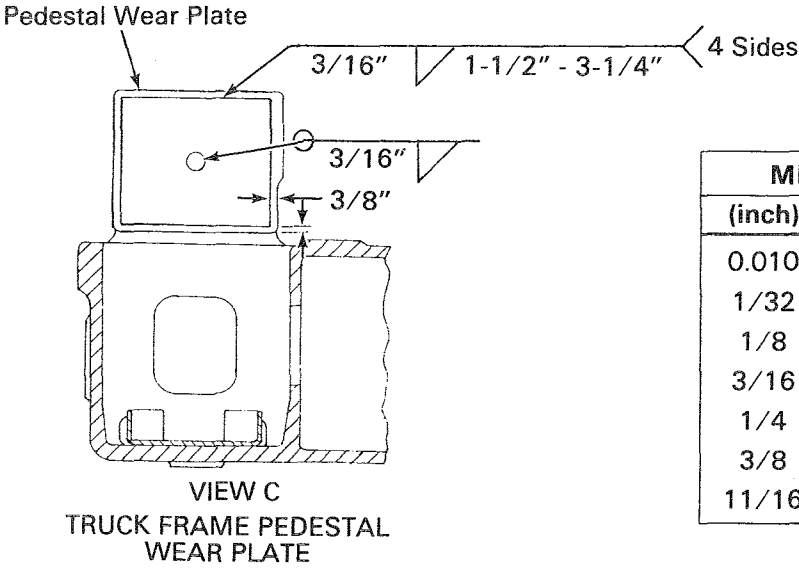
Fig.17 – GB Truck Bolster Pedestal And Bolster Wear Plate Application



29607



BOLSTER WEAR PLATES



TRUCK FRAME PEDESTAL WEAR PLATE

METRIC CONVERSION CHART			
(inch)	mm	(inch)	mm
0.010	0.25	1-1/2	38.1
1/32	0.8	21.790	553.46
1/8	3.2	22.270	565.66
3/16	4.8	22.300	566.42
1/4	6.4	22.365	568.07
3/8	9.5	22.400	568.96
11/16	17.5		

NOTE
Wear plate surfaces to be in the same plane within 1/32".

Fig.18 – GC Truck Bolster Pedestal And Bolster Wear Plate Application

29608

SIDE BEARING WEAR PLATES

The side bearing surfaces on the bolster are designed to mate with similar side bearings mounted beneath the carbody underframe as shown in Fig. 19.

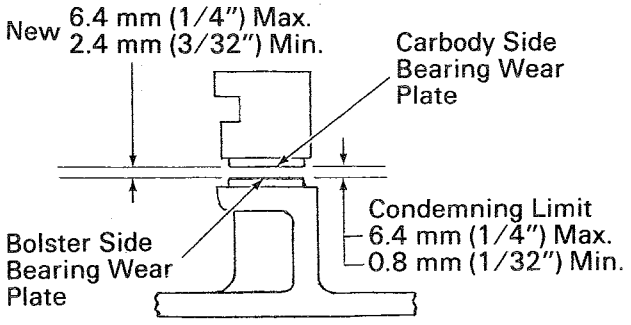


Fig.19 – Side Bearing Clearance

A clearance is provided between the truck bolster side bearings and the carbody side bearings during normal operation. Side bearings are designed to prevent excessive tilting or leaning of the locomotive, but are not designed to carry a continuous load.

Side bearing clearance on a new assembly is 4 mm (3/32″) minimum to 6.4 mm (1/4″) maximum. The minimum side bearing clearance is 0.8 mm (1/32″) as shown in Fig. 19.

Any time the side bearing approaches the minimum limit, the bolster center bearing wear plate should be checked for wear. Side bearings should be flat and in the same plane within 0.8 mm (1/32″) of the side bearing on the opposite side of the truck. If the side bearing is misaligned or uneven, it may be repaired by building up the surface with weld and grinding to a proper level.

The old wear plates can be removed by grinding off the fillet welds around the plate. New plates should be of mild steel material and should conform to the dimensions of the original plate being replaced. The thickness of the side bearing wear plate of a GC truck should be 3.2 mm ±0.8 (1/8″ ±1/32) and 9.5 mm ±0.8 (3/8″ ±1/32) for the A-1-A and GB truck.

CENTER BEARING WEAR PLATE AND WEAR HALF-RING

The center bearing on each truck supports half the weight of the locomotive. The center bearing also transfers tractive forces to the locomotive carbody. The load on these parts and the relative movement between them will cause the parts to wear.

Side bearing clearance close to the minimum limit is usually an indication of wear at the center bearing wear plate. The limits for the center bearing wear plate are shown in Fig. 20. The thickness of the plate should be checked whenever the plate is accessible. If the plate is above the minimum limit it may be reused. The truck center bearing can be used as long as it is not completely deteriorated or boken and as long as there is positive clearance between the side bearings.

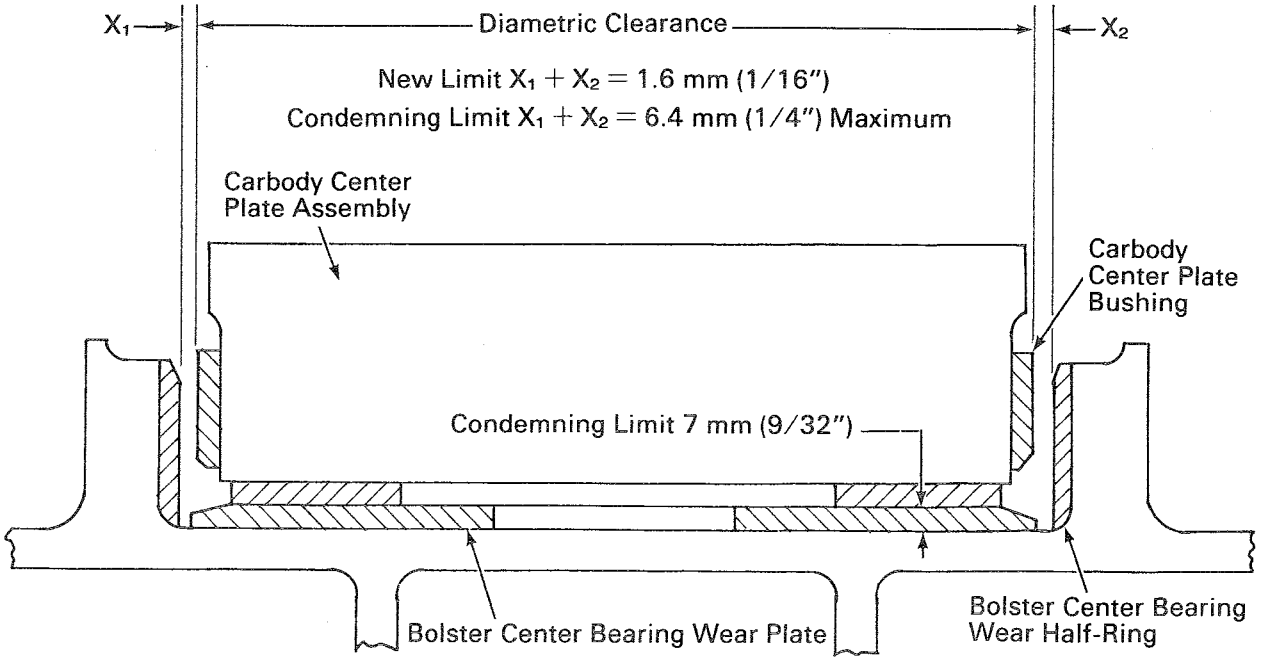


Fig.20 – Carbody Center Plate And Bolster Center Bearing Clearance

The outside diameter of the carbody center bearing assembly and the inside diameter of the bolster center bearing wear half-ring should be checked to determine the total clearance between them. The maximum clearance between these parts is 6.4 mm (1/4″) as shown in Fig. 20.

Center bearing wear plates and wear half-rings are made of 10 mm (3/8″) thick laminated phenolic material or Nylatron.

Check the center bearing area of the bolster to ensure there are no cracks or voids which might allow lubricating oil to leak out. If any cracks are found, they must be completely removed by flame cutting, chipping, or grinding and a 60° "V" groove provided for welding. Weld the crack with AWS E-7016 electrode. Peen the second weld pass and each pass thereafter to minimize distortion. Grind off excessive weld metal so the surface of the center bearing plate is flat within 0.51 mm (.020″).

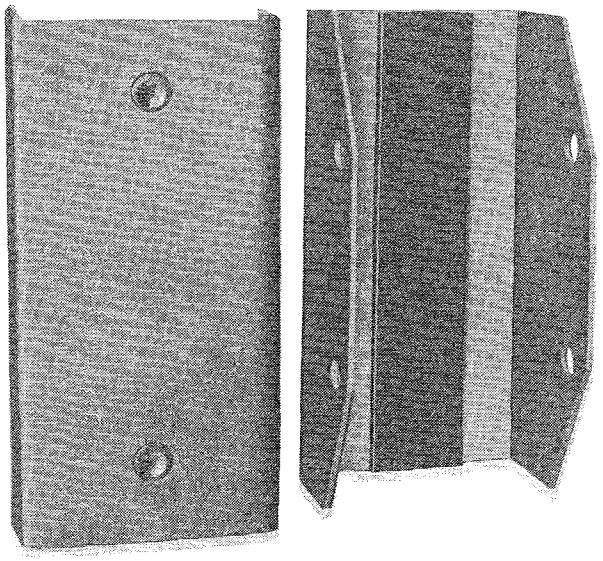
After the old wear plates and wear half-rings are removed and the necessary repairs are made, the bearing bore should be cleaned and the surfaces smoothed so they offer little resistance to the application of the replacement half-rings. Check the replacement half-rings to ensure that they are smooth. Apply a lubricant to the outside diameter of the half-rings and apply the half-rings to the center bearing bore. The half-rings have an interference fit in the bore, so they must be forced into position in the bolster center bearing. Apply half-rings to that the parting between the rings will be 90° from the longitudinal centerline of the locomotive.

PEDESTAL LINERS

Pedestal liners, Fig. 21, are provided to receive the wear that occurs from the relative movement between the journal bearing or journal bearing adapter and the pedestals. For convenience of replacement, the pedestal liners are bolted to the pedestal jaws.

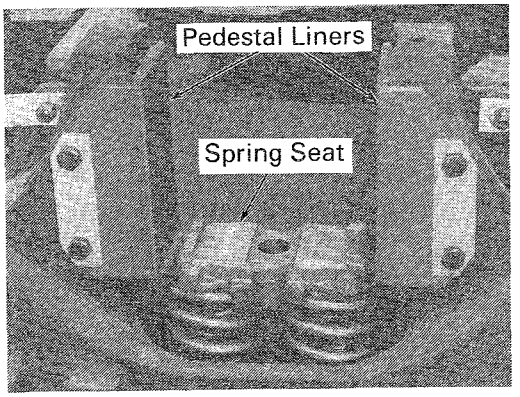
PEDESTAL LINER TO JOURNAL BEARING OR JOURNAL BEARING ADAPTER CLEARANCE

Clearance limits between the longitudinal or lateral wear surfaces are such that in normal operation the clearance will not exceed the maximum limit in the period between truck reconditionings. Refer to Fig. 22 for pedestal liner to tapered journal bearing adapter clearance limits or Fig. 23 for pedestal liner to cylindrical journal bearing clearance limits.



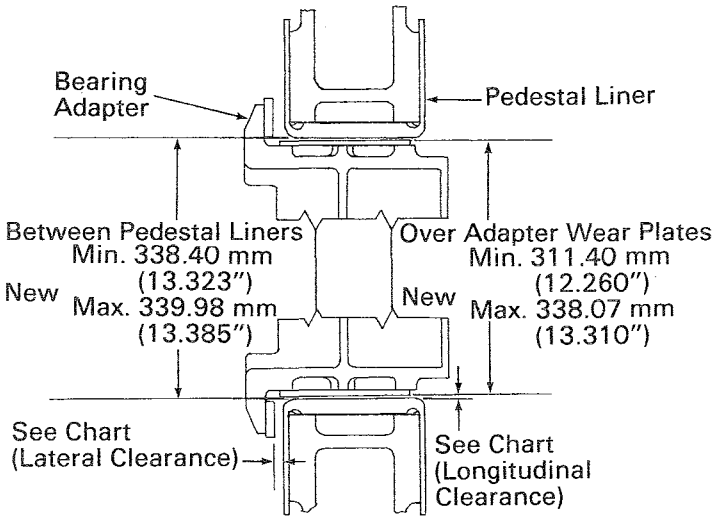
Face View Interior View

13036



29611

Fig.21 – Pedestal Liners



*NOTE
This tolerance should be maintained at 6.4 mm (1/4") maximum for trucks used in high speed (over 113 km/h [70 MPH]) service.

BEARING ADAPTER TO PEDESTAL LINER CLEARANCE	mm	(inch)
Lateral (Total)		
New	9.5	3/8
Max.	12.7	1/2
Longitudinal (Total)		
New	0.4 - 3.2	1/64 - 1/8
Max.	9.5*	3/8*

29605

Fig.22 - Truck Pedestal Liner To Tapered Journal Bearing Adapter Wear Limits

PEDESTAL LINER APPLICATION

NOTE

Effective mid 1986, pedestal liners are attached to the pedestals with a simplified through-bolt arrangement. Two 229 mm (9") bolts replace the four 83 mm (3-1/4") bolts.

Customers can, at their option, continue to use the four bolt application on existing truck frames.

Inspect the pedestal jaws to ensure the surfaces are smooth and free of any raised areas that might interfere with the application of the liners. The liners must fit tightly on the pedestal jaws with the mounting holes mating with the pedestal bolt holes. Refer to Service Data for File Number of tool drawing which may be constructed to aid in the installation of the pedestal liners.

CAUTION

Do not over-torque pedestal liner bolts. Damage to the pedestal liner and bolt can occur.

Torque pedestal liner bolts to 237-305 N·m (175-225 ft-lbs). The dimension between liner faces should be 338.40 mm (13.323") minimum or 339.98 mm (13.385") maximum as shown in Figs. 22 or 23, as applicable.

BEARING ADAPTER — TAPERED JOURNAL BEARING

The tapered journal bearing is contained in a journal bearing adaper, Fig. 25, which is held between the truck frame pedestal jaws.

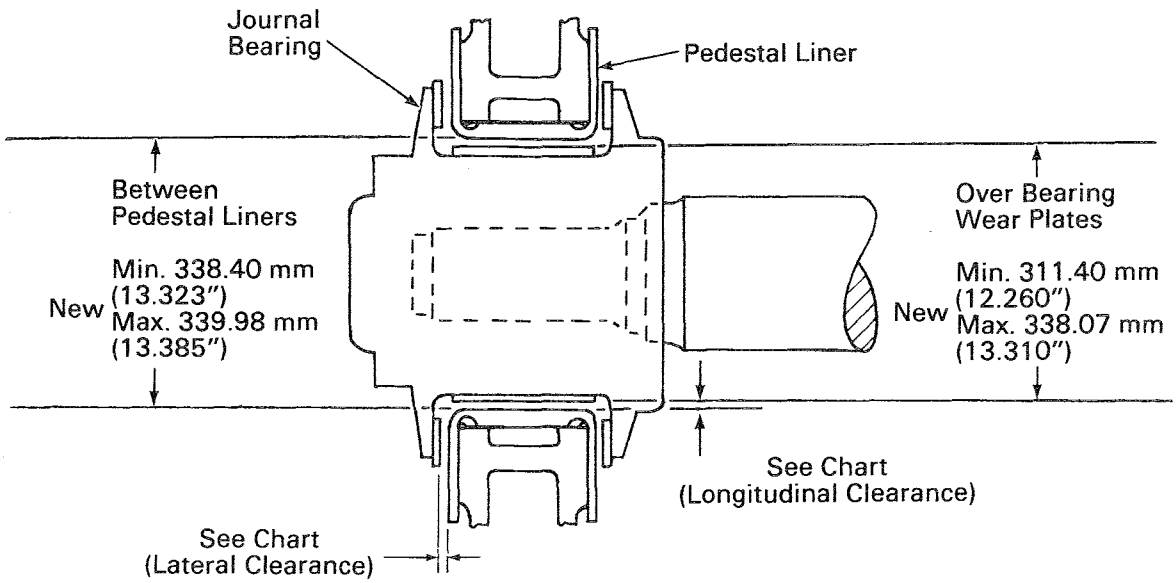
The outside dimension across the adapter wear plates, with new wear plates, should be 338.07 mm +0.00, -1.27 (13.310" +.000 -.050). The inside dimension, between new pedestal liners is 338.40 mm +1.57, -0.00 (13.323" +.062, -.000) as shown in Fig. 22. These dimensions provide for a maximum longitudinal clearance of 3.18 mm (.125") or a minimum clearance of 0.33 mm (.013") when all new parts are used. The rebuild clearance limit between the pedestal liner and adapter wear plate is 4.8 mm (3/16"). The condemning limit is 6.4 mm (1/4")

Refer to Fig. 22 for the lateral nominal clearance between the adapter lug and the pedestal liner.

Adapter wear plates which are cracked or worn beyond their limits, should be replaced. The old wear plates can be removed by grinding or chipping off the tack welds holding the plates. The wear plates should not be removed by any form of flame cutting. Care must be taken not to damage the surface of the bearing adapter to which the new parts are to be applied.

The journal bearing must be removed from the adapter prior to applying new wear plates. Welding electrode AWS-E-FeMn-A, E308-16, or E-310-16 is recommended for wear plate application. See Fig. 25 for welding details. Ensure weld is made with proper current to obtain a weld slightly convex and without craters. Welds extending beyond the wear surfaces of the plates should be ground off flush with the plate to prevent contact with mating surfaces of the pedestal.

Weld the holes of the wear plates first to ensure contact at the center and to prevent warping.



***NOTE**
This tolerance should be maintained at 6.4 mm (1/4") maximum for trucks used in high speed (over 113 km/h [70 MPH] service).

BEARING ADAPTER TO PEDESTAL LINER CLEARANCE	mm	(inch)
Lateral (Total)		
New	9.5	3/8
Max.	12.7	1/2
Longitudinal (Total)		
New	0.4 - 3.2	1/64 - 1/8
Max.	9.5*	3/8*

29619

Fig.23 – Truck Pedestal Liner To Cylindrical Journal Bearing Wear Limits

Clamps should be used to hold the wear plates tightly against the bearing adapter during welding.

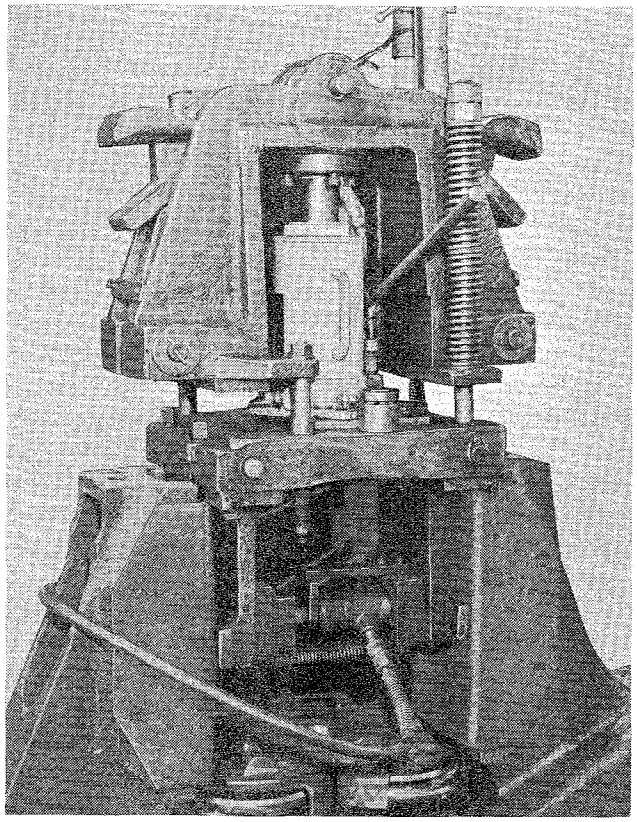
TRACTION MOTOR NOSE SUSPENSION ARRANGEMENT

The traction motor suspension arrangement, Fig. 26, functions as a cushioning device to absorb the torquing or turning effort of the traction motor. Each time power is applied to the traction motors, the pinion of each motor tries to ride around the axle gear, raising the motor up or pulling it down, depending upon the direction of motion. The movement is arrested by securing the motor to the truck frame transom through a shock damping rubber suspension pack.

WEAR PLATES

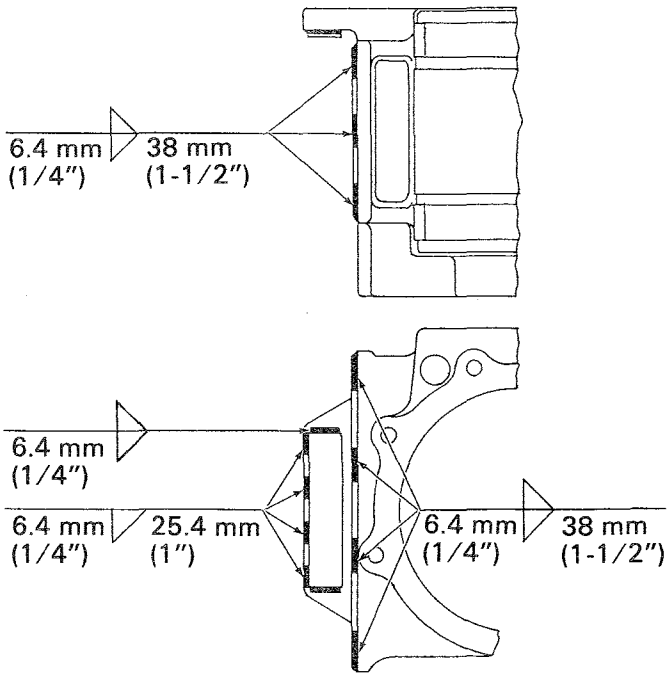
The wear plates on the suspension assembly are subjected to severe shocks and tremendous pressures, causing them to wear, resulting in free movement between the traction motor frame and the suspension assembly. As this movement increases due to wear, the severity of shocks increases, especially during rapid changes of torque caused by wheel slip.

To obtain maximum cushioning effect from the suspension pack, wear plates should be periodically replaced to ensure there is not more than 6.4 mm (1/4") free movement in the traction motor nose suspension. If the wear plates, which are 12.7 mm



13492

Fig.24 – Pedestal Liner Application



29612

Fig.25 – Journal Bearing Adapter Wear Plate

(1/2") thick when new, are worn enough to permit 6.4 mm (1/4") free movement, or if the wear plates are worn more than the limits given in Fig. 26, the suspension pack should be removed and the wear plates replaced with new plates.

The upper and lower holder assemblies (including wear plates) are identical. The upper wear plate has a minimum thickness limit of 10.3 mm (13/32") and the lower wear plate has a minimum thickness limit of 11 mm (7/16"). The lower holder can be moved to the upper holder assembly position if the lower wear plate is within the 10.3 mm (13/32") thickness limit.

The old wear plate can be removed from the holder assembly by grinding or chipping off the tack welds holding it. The new wear plate should conform to the dimensions of the original plate. The wear plate must be centered so that the guide pin holes line up.

The steel wear plate of holder assembly 9087386 should be applied with 6.4 mm (1/4") fillet welds, 50.8 mm (2") long, on 139.7 mm (5-1/2") centers, along both sides of the length of the plate. Use AWS Class E-7016 or E-7018 electrode.

The steel wear plate of holder assembly 8104189 should be applied with 9.5 mm (3/8") fillet welds, 57.2 mm (2-1/4") long. On 152.4 mm (6") centers, along both sides of the length of the plate. Use AWS Class E-7016, E-7018, or E-310-16 electrode.

MOTOR NOSE SUSPENSION LUGS

The steel wear pads on the truck frame transom lugs that support the traction motor suspension assembly are subject to wear due to the chafing of the traction motor suspension assembly. The dimension between these surfaces when new is 305 mm +0.51, -1.27 (12" +.020, -.050). The wear pads should be replaced with new pads when the dimension between the surfaces is 308 mm (12-1/8").

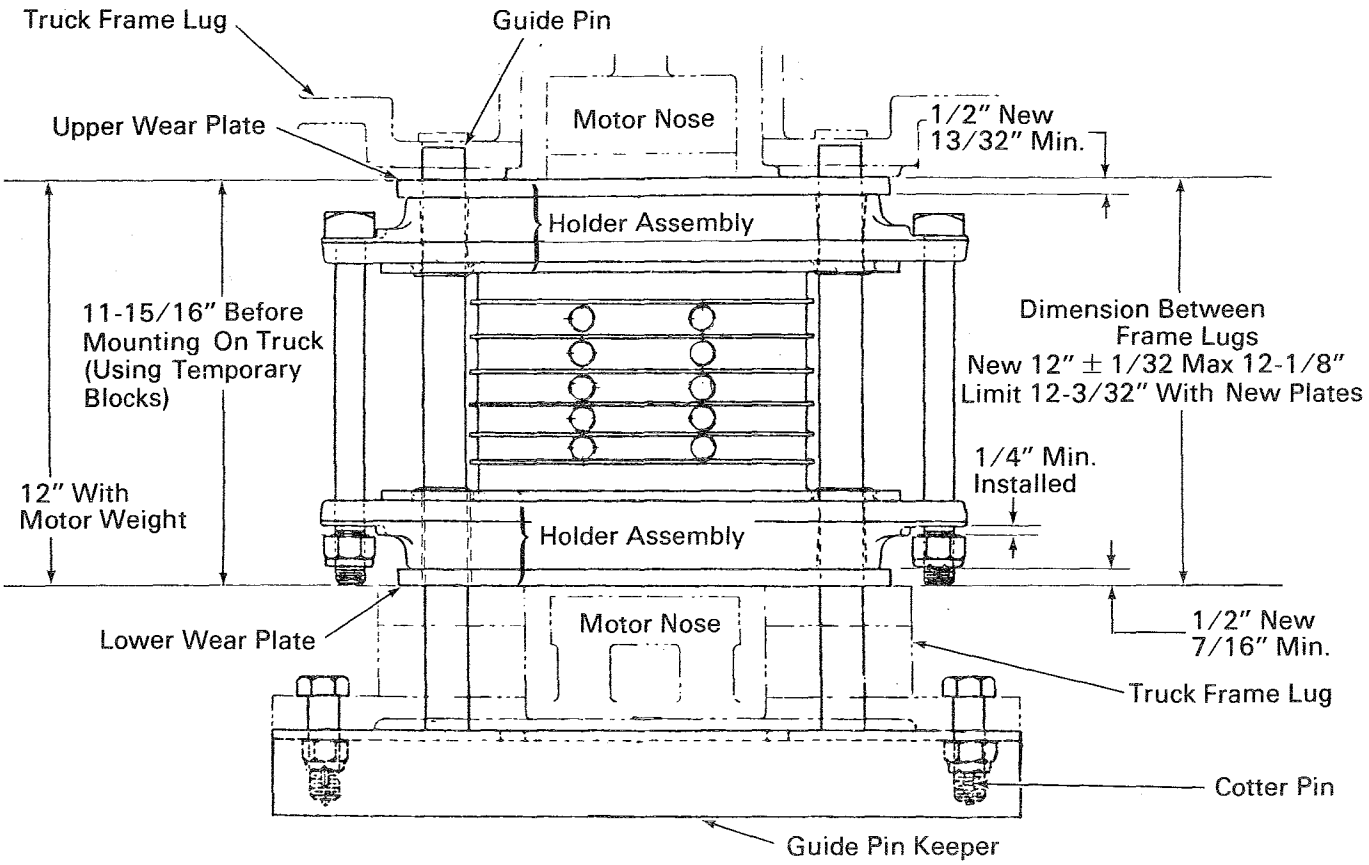
Worn wear pads can be removed by chipping or grinding. Any gouges in the lugs should be welded and ground smooth before applying new pads. The surfaces of the lugs should be in the same plane within 0.8 mm (1/32").

Check guide pin holes in the frame lugs. If the holes are worn or elongated by 2.4 mm (3/32") or more, the holes should be reworked as follows:

NOTE

If it is not desired to bush the upper holes as outlined in the following step, the elongated holes can be welded and re-drilled to 33.3 mm (1-15/16").

The holes should be built up with weld and drilled and reamed to 47.62 mm ±0.05 (1.875" ±.002). Press in spring bushing 8308240. Weld bushing to support lugs after bushing is pressed into position.



METRIC CONVERSION CHART			
(inch)	mm	(inch)	mm
1/32	0.8	13/32	10.3
1/4	6.4	11-15/16	303.2
7/16	11.1	12	304.8
1/2	12.7	12-1/8	307.9

29613

Fig.26 – Traction Motor Nose Suspension

Ensure wear pads are fully annealed. This can be determined by checking with a magnet. Annealed pads are non-magnetic.

To apply wear pads to suspension lugs, tightly clamp the wear pads to the truck frame to obtain contact over at least 75% of the wear pad contact area. This can be checked with a thin feeler gauge around the wear pad perimeter. The contact is critical to prevent bending stress on the welds.

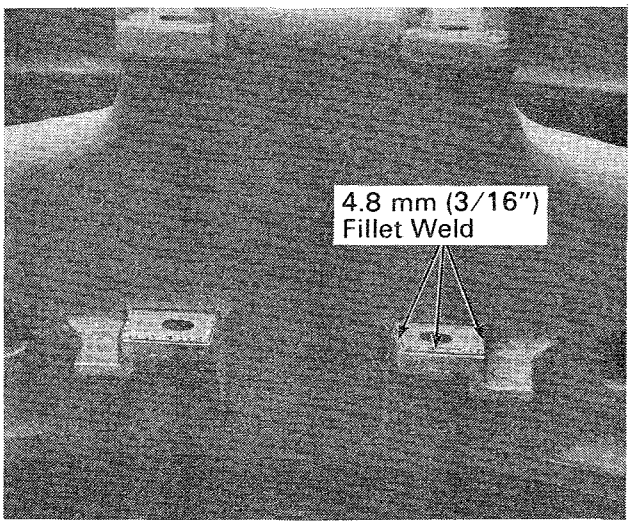
Position the wear pads to avoid obstructing the keeper pin holes.

CAUTION

Weld the wear pads to the lugs with one pass welding and do not weld over tack welds. Multiple pass welding and welding over tack welds will cause the wear pads to crack.

Weld the wear pads on three sides with a 4.8 mm (3/16″) fillet weld as shown in Fig. 27 with AWS-E-FeMn-A, E-308-16, or E-310-16 electrode.

After the wear pads are applied, the surfaces must still be in the same plane within 0.8 mm (1/32″) and the dimension between the upper and lower lugs should be 305 mm +0.51, –1.27 (12″ +.020, –.050).



23382

Fig.27 – Traction Motor Nose Suspension Wear Pads

TRUCK FRAME PEDESTAL REPAIRS

WHEELBASE SPACING

The wheelbase spacing is the distance between the axle centerlines. These dimensions are shown as the "X" dimension in Fig. 28 for the A-1-A and GC (three axle) trucks and in Fig. 29 for the GB (two axle) truck.

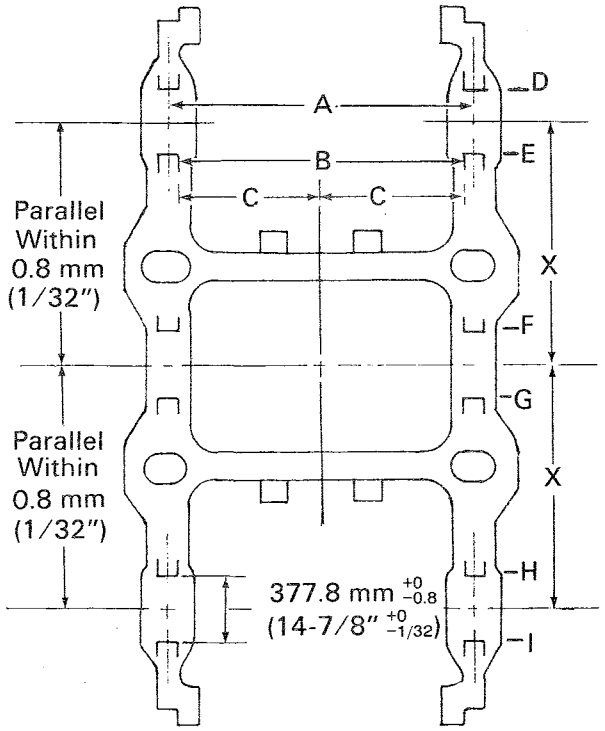
To determine the wheelbase spacing, use a straightedge as shown in Fig. 30 and measure the distance between points D and F of Fig. 28 or 29. This dimension can be checked by measuring points E and G. The three axle truck, Fig. 28, should also be checked between points F and H and checked at points G and I.

Refer to Table A for the new dimension and service limits for wheelbase spacing.

The axle centerlines should be parallel within 0.8 mm (1/32") at the outer face of the pedestal jaws.

TRANSVERSE PEDESTAL SPACING

The transverse pedestal spacing refers to the dimension between the inside machined surface of the pedestal jaw and the longitudinal centerline of the truck. These dimensions are determined by rail gauge and are designated in Fig. 28 for the A-1-A



NOTE
Refer to Table "A" for "X" dimension.

Narrow Gauge	A – 1.613 m ± 1.6 mm (63-1/2" ± 1/16) B – 1.436 m ± 1.6 mm (56-17/32" ± 1/16) C – 0.718 m ± 0.8 mm (28-17/64" ± 1/32)
Standard Gauge	A – 1.956 m ± 1.6 mm (77" ± 1/16) B – 1.779 m ± 1.6 mm (70-1/32" ± 1/16) C – 0.889 m ± 0.8 mm (35-1/64" ± 1/32)
Broad Gauge	A – 2.197 m ± 1.6 mm (86-1/2" ± 1/16) B – 2.020 m ± 1.6 mm (79-17/32" ± 1/16) C – 1.010 m ± 0.8 mm (39-49/64" ± 1/32)

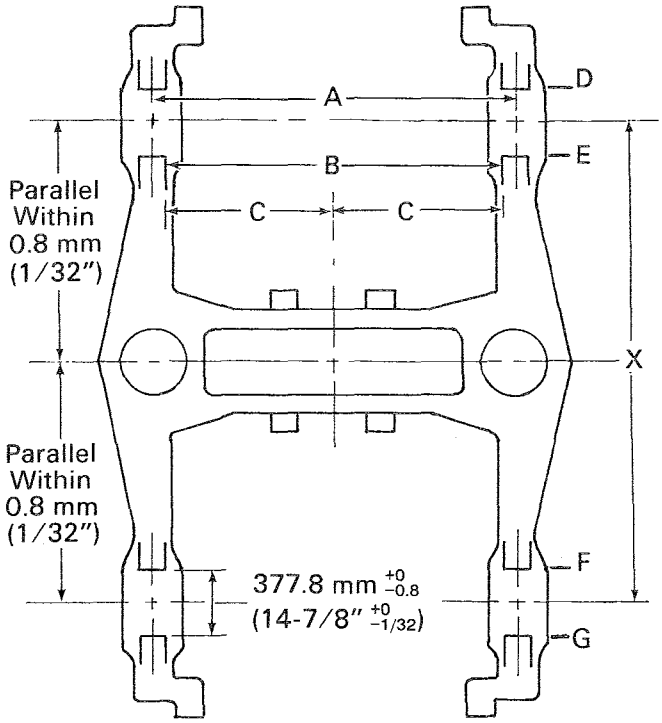
29614

Fig.28 – A-1-A And GC Truck Frame Pedestal Spacing Dimensions

and GC truck and in Fig. 29 for the GB truck. Narrow, standard, and broad gauge refers to the following rail gauge dimensions:

Narrow Gauge	Meter Gauge - 1.000 m (3' 3-3/8") 1.067 m (3' 6")
Standard Gauge	1.435 m (4' 8-1/2")
Broad Gauge	1.600 m (5' 3") 1.677 m (5' 6")

The transverse measurements are made as shown in Fig. 30. The pedestals may lean in or lean out providing both pedestals of each set lean in the same direction and are within the tolerance allowed from the longitudinal centerline of the truck frame to the longitudinal centerline of the truck frame to the inside face of the pedestal.

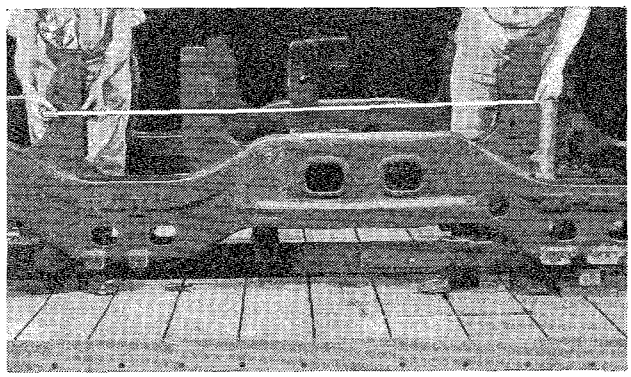


NOTE
Refer to Table "A" for "X" dimension.

Narrow Gauge	A – 1.613 m ± 1.6 mm (63-1/2" ± 1/16) B – 1.436 m ± 1.6 mm (56-17/32" ± 1/16) C – 0.718 m ± 0.8 mm (28-17/64" ± 1/32)
Standard Gauge	A – 1.956 m ± 1.6 mm (77" ± 1/16) B – 1.779 m ± 1.6 mm (70-1/32" ± 1/16) C – 0.889 m ± 0.8 mm (35-1/64" ± 1/32)
Broad Gauge	A – 2.197 m ± 1.6 mm (86-1/2" ± 1/16) B – 2.020 m ± 1.6 mm (79-17/32" ± 1/16) C – 1.010 m ± 0.8 mm (39-49/64" ± 1/32)

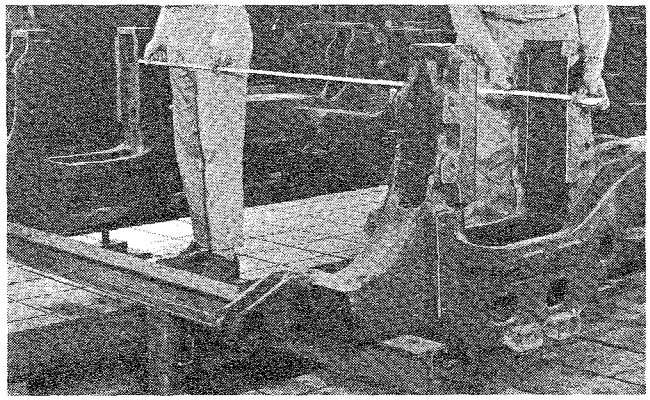
29615

Fig.29 – GB Truck Frame Pedestal Spacing Dimensions



MEASURING WHEELBASE SPACING

11251



MEASURING TRANSVERSE SPACING

11256

Fig.30 – Measuring Wheelbase Dimensions And Transverse Pedestal Spacing

Truck Designation	Wheelbase "X" Dimension Figs. 29 and 30			
A-1-A	New		Limit	
	1600 mm ±1.6 (63" ±1/16)		1600 mm ±3.2 (63" ±1/8)	
GB	1219 mm ±1.6 (48" ±1/16)		1219 ±3.2 48" ±1/8)	
GC	Short End Of Truck	Long End Of Truck	Short End Of Truck	Long End Of Truck
	1689 mm ±1.6 (66-1/2" ±1/16)	2019 mm ±1.6 (79-1/2" ±1/16)	1692 mm ±1.6 (66-1/2" ±1/16)	2019 mm ±3.2 (79-1/2" ±1/8)

Table A – Truck Wheelbase Dimensions

Pedestals which do not conform to the dimensional limits can be corrected by straightening the truck frame hot or cold.

LONGITUDINAL PEDESTAL SPACING

The longitudinal pedestal spacing refers to the distance between the inside surfaces of the pedestal jaws on the same side of the truck as shown in Fig. 28 or 29. This dimension is 377.8 mm +00 -0.8 (14-7/8″ +0 -1/32).

Incorrect longitudinal pedestal spacing may be caused by a bent frame, bent pedestals, or wear between the pedestal liner and pedestal face.

A bent frame or bent pedestals require straightening to obtain correct pedestal spacing.

Wear between the pedestal liner and pedestal face should be corrected by welding and remachining the pedestal face.

HORIZONTAL PEDESTAL ALIGNMENT AT BASELINE

The horizontal pedestal alignment at the baseline is the relationship from one pedestal jaw to any other pedestal jaw on the truck frame, Fig. 31. This alignment can be determined by measuring from a straight edge tool or piano wire spanning the pedestals. The pedestals can be above or below the pedestal baseline by no more than 3.2 mm (1/8″). Re-alignment of the pedestals can be accomplished by straightening the truck frame or bent pedestal.

LOCATION OF PEDESTAL COIL SPRING SEATS

The centerline of each coil spring seat should be held to within 3.2 mm (1/8″) on either side of the centerline of the pedestal opening, Fig. 32. The coil spring seats should be checked for alignment when any rework is done on the pedestals. If misalignment is more than 3.2 mm (1/8″), it will be necessary to remove the spring seat and relocate the seat to the center of the spring pocket. Any high spots in the welds should be ground off to avoid localized loading of the coil springs.

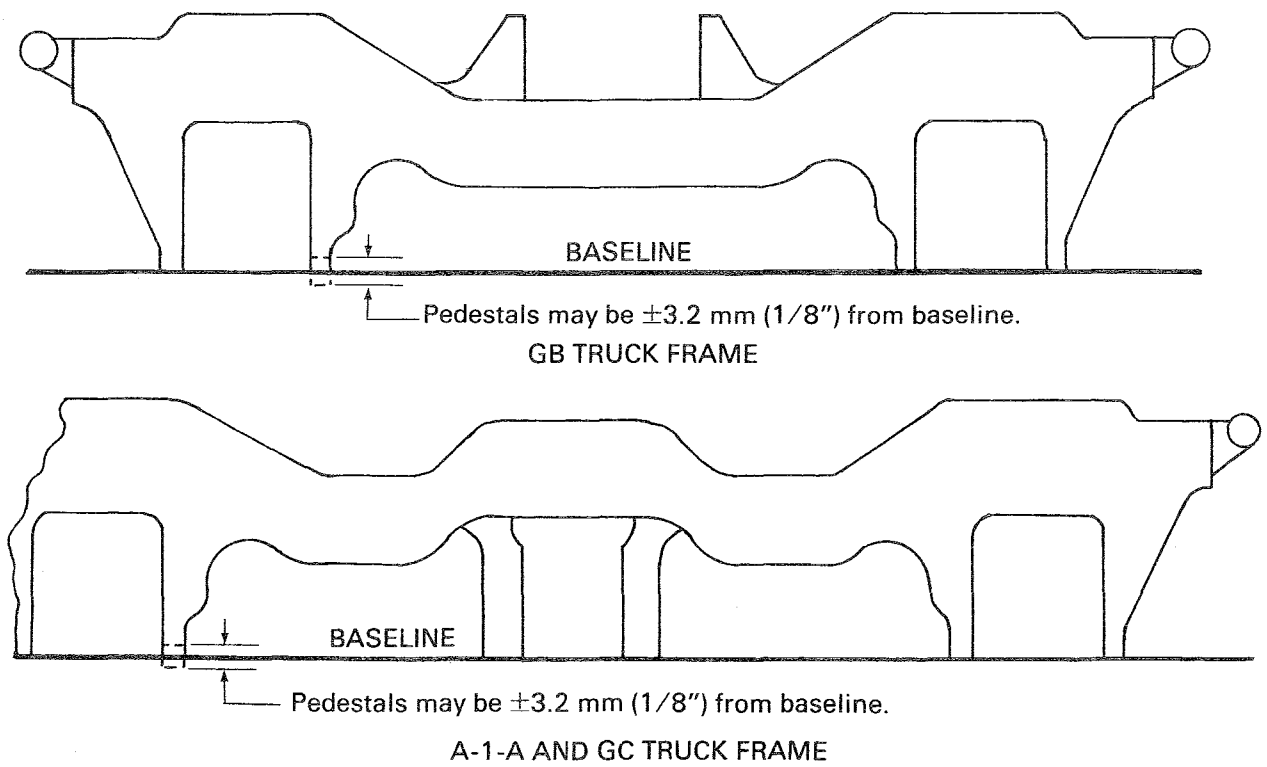


Fig.31 – Pedestal Base Horizontal Alignment

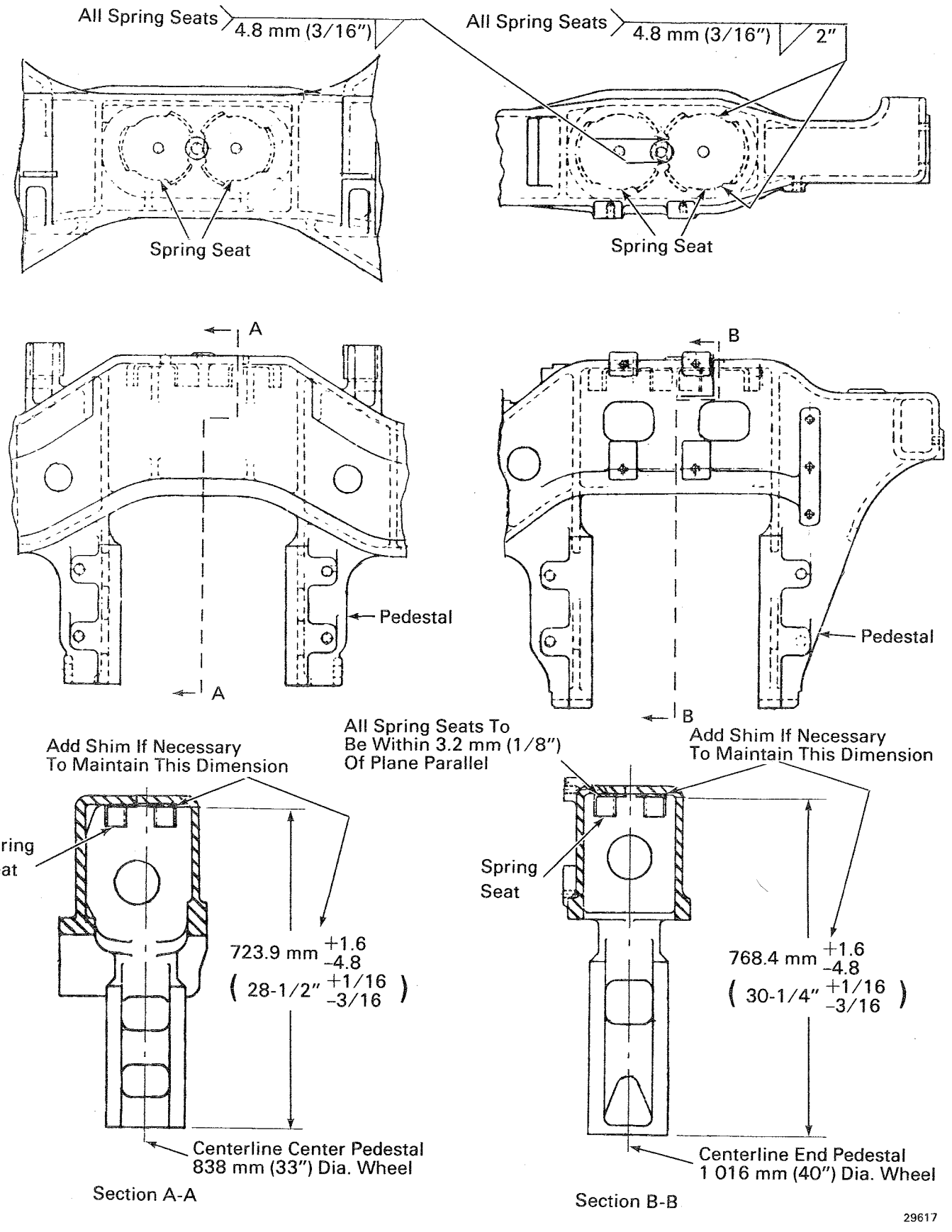


Fig.32 – Pedestal Coil Spring Seats

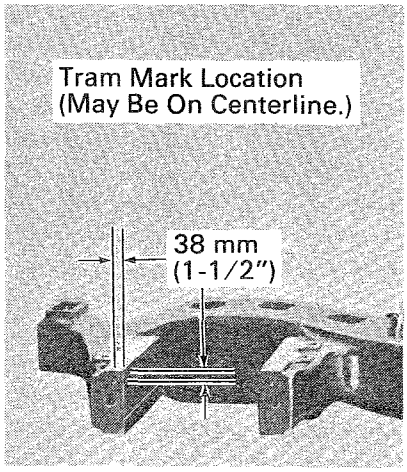
TRAMMING OF TRUCKS

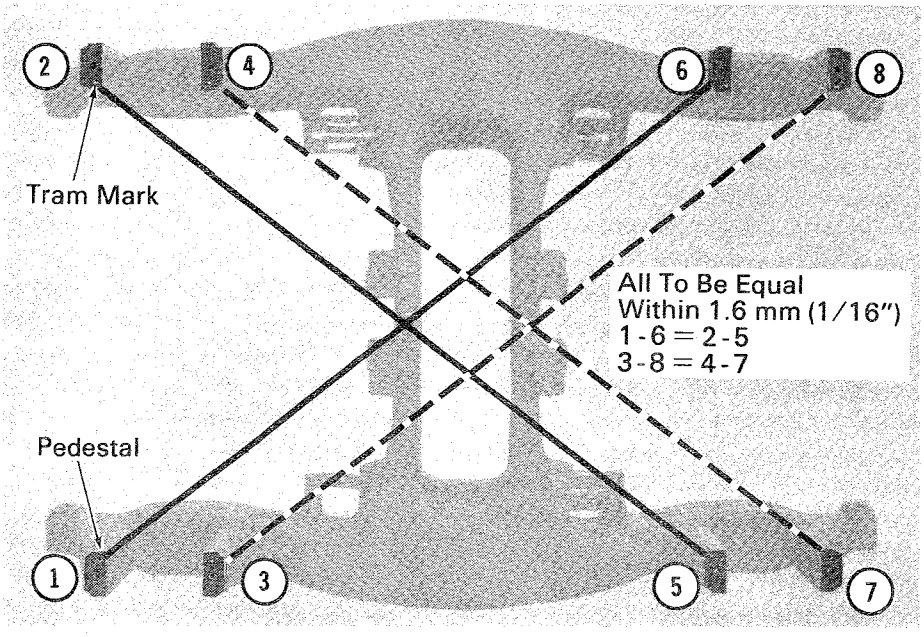
The truck pedestals are trammed to determine if they are in correct alignment with each other, that is to determine if the distance between pedestals is equal or within the allowable limits. The diagrams shown in Fig. 33 indicate which pairs of pedestals should have equal distances between them.

Tramming is accomplished by using a trammel beam with the truck frame inverted on a level table or level location. In addition to the diagonals shown in Fig. 33, it may be necessary to check the tram of the pedestals both longitudinally and transversely as indicated in Fig. 34.

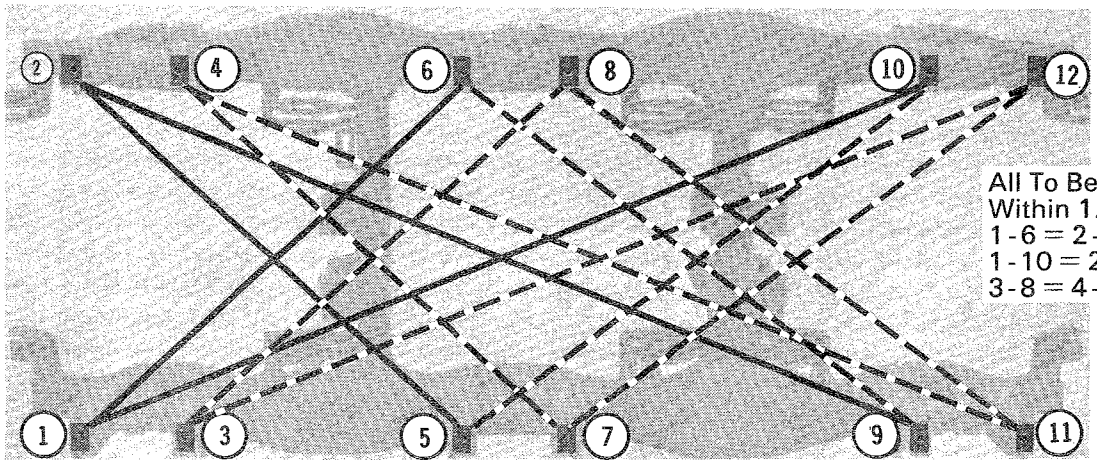
The tram assembly is made up of two trammels attached to a wooden or metal beam of such construction that it will hold the assembly rigid. This assembly facilitates taking comparative measurements of varying lengths, which could not be done using conventional dividers. The trammels permit any distance separation on the beam so the various dimensions to be trammed can be compared.

Tram marks are made on the end or bottom of each pedestal at the time of original manufacturing inspection of the truck frame. These marks, which are small punch indentations, are placed at identical





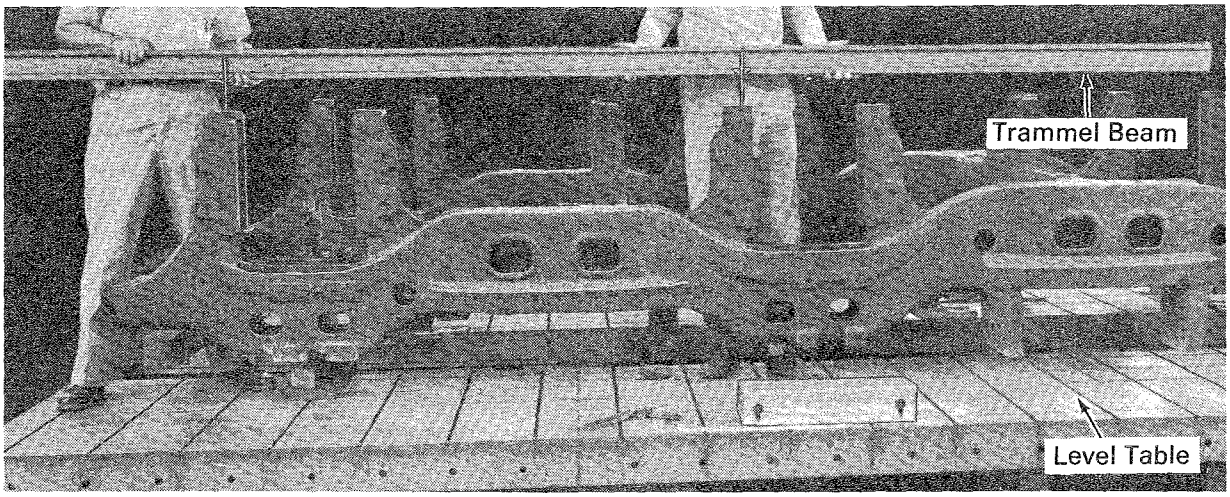
GB TRUCK FRAME



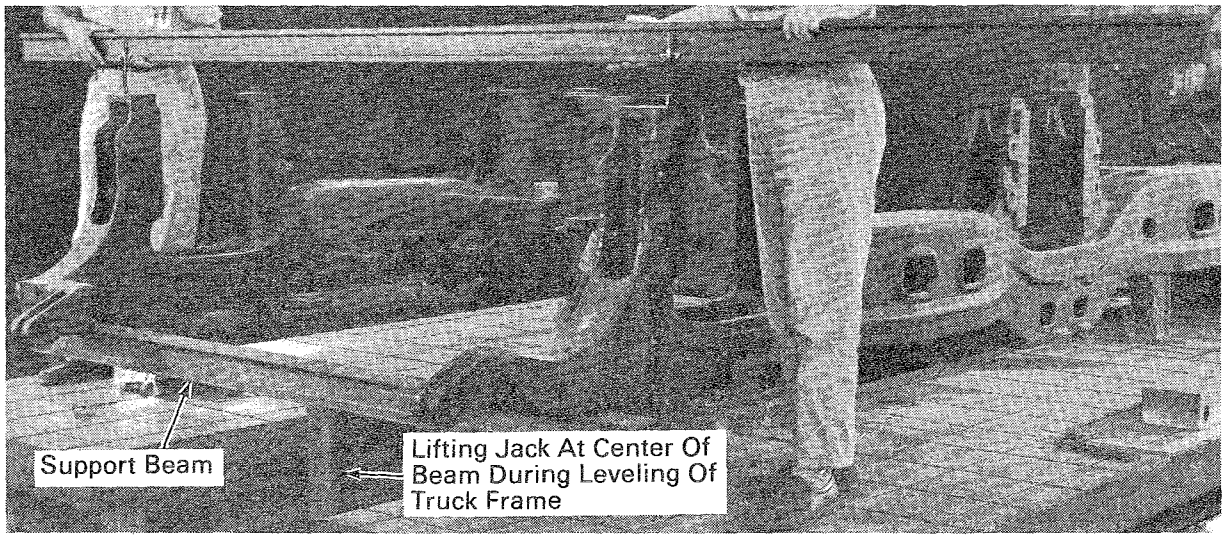
A-1-A AND GC TRUCK FRAME

29618

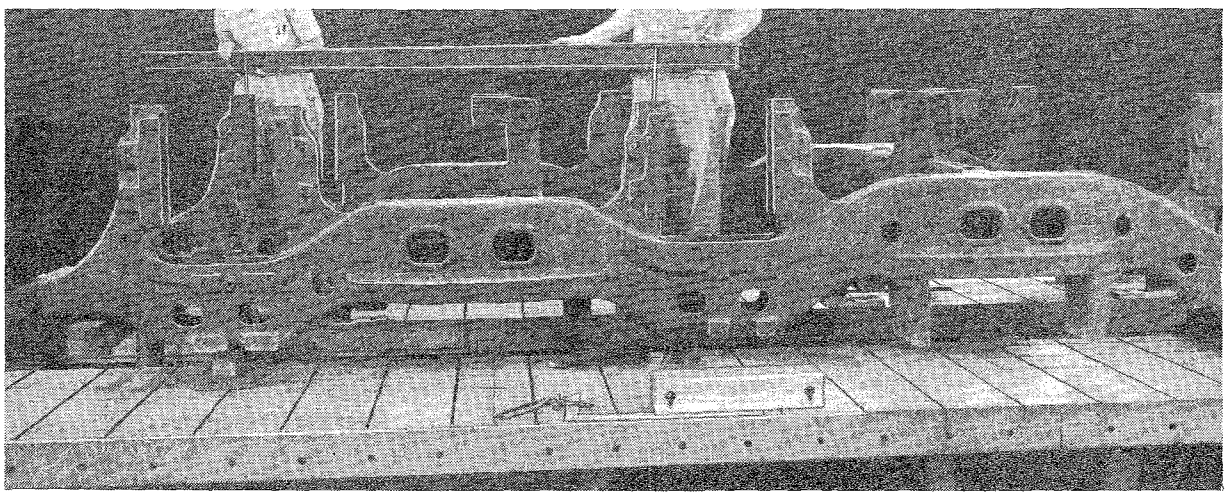
Fig.33 – Truck Frame Tramming Diagrams



11252



11249



11255

Fig.34 – Application Of Trammel Beam Between Pedestals

locations on each pedestal to assure an accurate comparison. They may be either 38 mm (1-1/2″) from each inside face of the pedestal or on the longitudinal centerline of the pedestal just inward from the tie bar bolt hole. The important consideration is that the mark is made at an identical location on each pedestal.

A special tool shown in Fig. 35 for locating the tram marks on the pedestal can be made from File Drawing 615, which is available upon request. This tool is used to make two scribe marks at right angles to each other at the 38 mm (1-1/2″) or other required dimension on the bottom of the pedestal. The hardened end of the scriber on the tool is placed at the intersection of the scribe lines and is lightly tapped with a hammer, to make a small indentation in the metal for the tram points. To aid in locating the tram marks, the bottom of the pedestal should first be cleaned and then coated with blue layout dye.

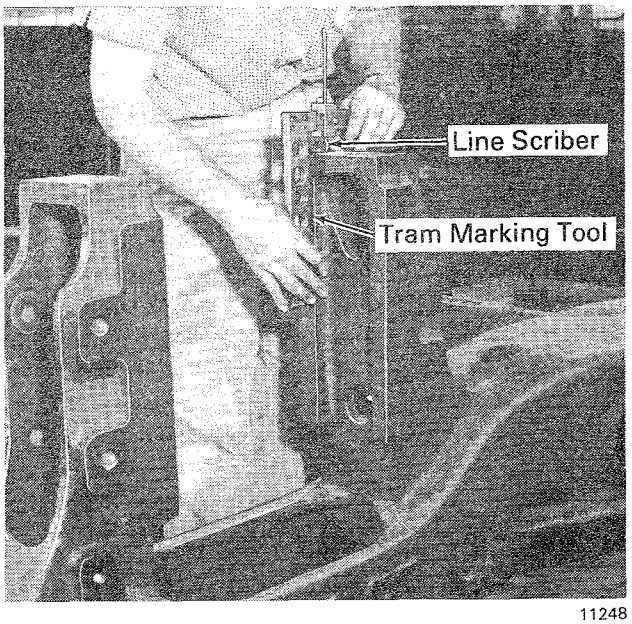


Fig.35 – Tram Marking Tool

In the event of rework on the truck such as straightening of bent pedestals, it will be necessary to remove the old tramming mark and relocate a new mark.

The truck frame should be leveled before tramming. Support the truck frame on two small jack screws under the end pedestal spring pockets at one end of the frame and by one jack screw or hydraulic jack placed on the longitudinal center line at the opposite end of the frame, similar to the support shown in Fig. 34. It will be necessary to bridge the sides of the frame or trucks without end sills so as to accommodate the jack at the frame longitudinal centerline. The end supported by the two jacks is raised to any convenient height, and measured at the top of the end pedestals as shown in Fig. 36. The end pedestals at the center supported end of the frame are brought up to the same height as the other end. If one pedestal cannot be brought up to a height equal to that of the other pedestal, it indicates that the frame has a slight twist at the end of the lower pedestal.

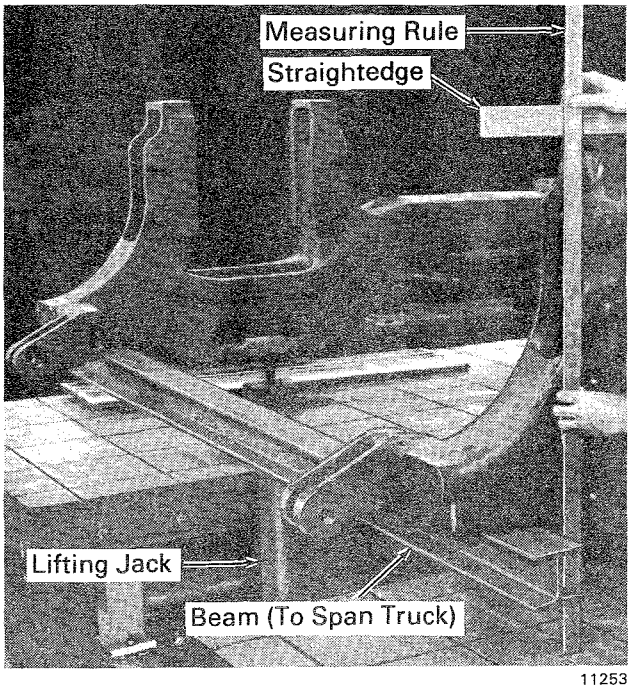
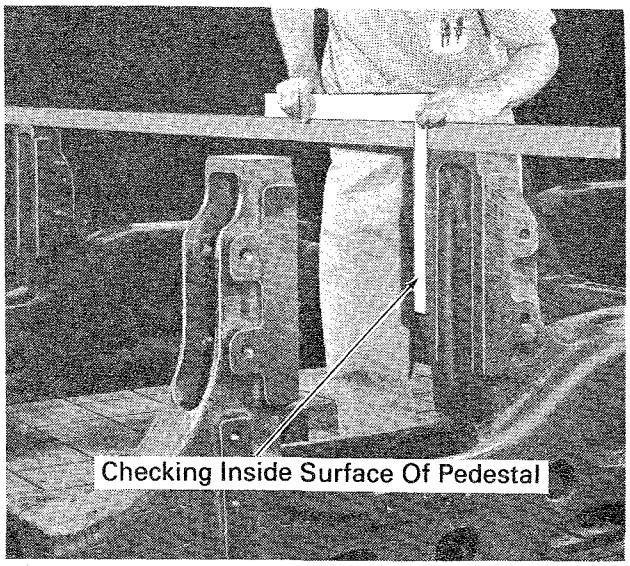


Fig.36 – Leveling Truck Frame

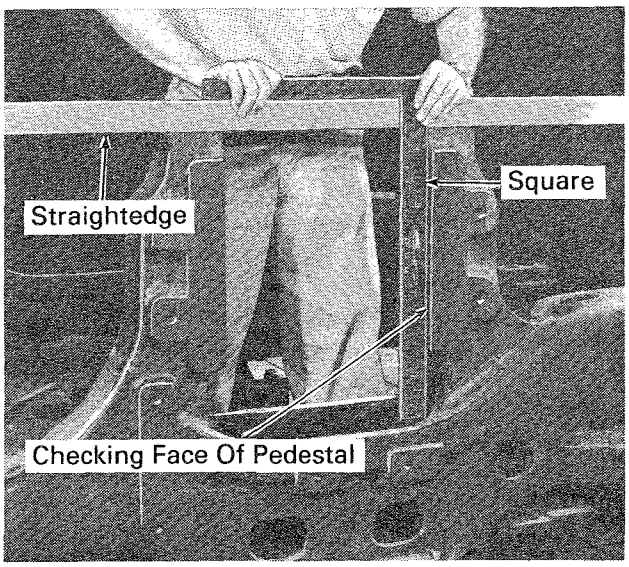
Each pedestal should be checked for leaning at the inside surface and the side facing the center of the truck before tramming. The pair of pedestals opposite each other (one on each side of the frame) which are found to be square or nearly square, are used as starting points for tramming. The pedestals are checked using a straight edge and square, Fig. 37.

If the diagonal measurements shown in Fig. 33 are not equal, it will be necessary to tram the pedestals longitudinally and transversely as shown in Fig. 34, to locate the pedestals that are out of alignment and determine how much they are out of alignment.

A typical example of the tram measurements is shown in Fig. 38. The diagonal trams 3-8, 1-6, 2-5, and 4-7 are shown to be unequal by plus 3.2 mm (1/8″), 0, plus 0.8 mm (1/32″) and plus 1.6 mm (1/16″) respectively. The diagonal trams are allowed a tolerance of ±1.6 mm (1/16″) so the only pedestals exceeding this limit are on the 3-8 diagonal. This indicates that pedestals 3-8 are out of alignment

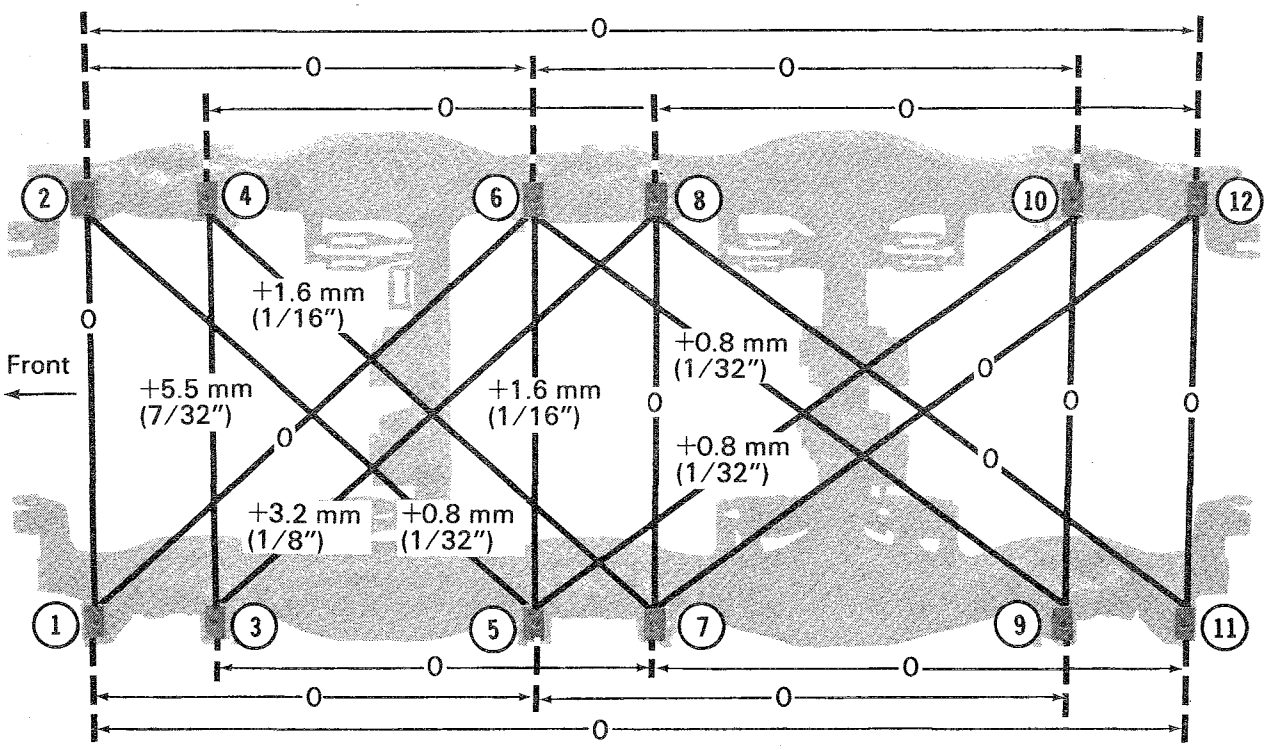


11247



11254

Fig.37 – Checking Pedestal Squareness



(Some lines omitted for simplicity)

29621

Fig.38 –Typical Example Of Tramming
Measurements On Three Axle Truck

either longitudinally or transversely. Tramming also indicates that longitudinally all the pedestals are equal as shown by the equal "0" longitudinal measurements. Transverse tramming indicates that pedestals 7-8 are equal to pedestals 1-2, but pedestals 5-6 and 3-4 are wider than the other two pair by 1.6 mm (1/16") and 5.5 mm (7/32") respectively.

Since pedestals 3-4 are plus 5.5 mm (7/32") it accounts for the plus 3.2 mm (1/8") and plus 1.6 mm (1/16") length of the diagonal trams 3-8 and 4-7 going to these pedestals. Since 3-8 plus 3.2 mm (1/8") is twice the plus 1.6 mm (1/16") of 4-7, it can be seen that pedestal No. 3 needs to be bent inward twice as much as pedestal No. 4. If pedestal No. 3 is bent inward 4.0 mm (5/32") and No. 4 is bent inward 1.5 mm (1/16"), the diagonals 3-8 and 4-7 will be reduced and diagonal 3-8 will be within the limit of 1.6 mm (1/16"). The same correction would be necessary for pedestals 5-6 if diagonals 1-6 or 2-5 were out of their limits.

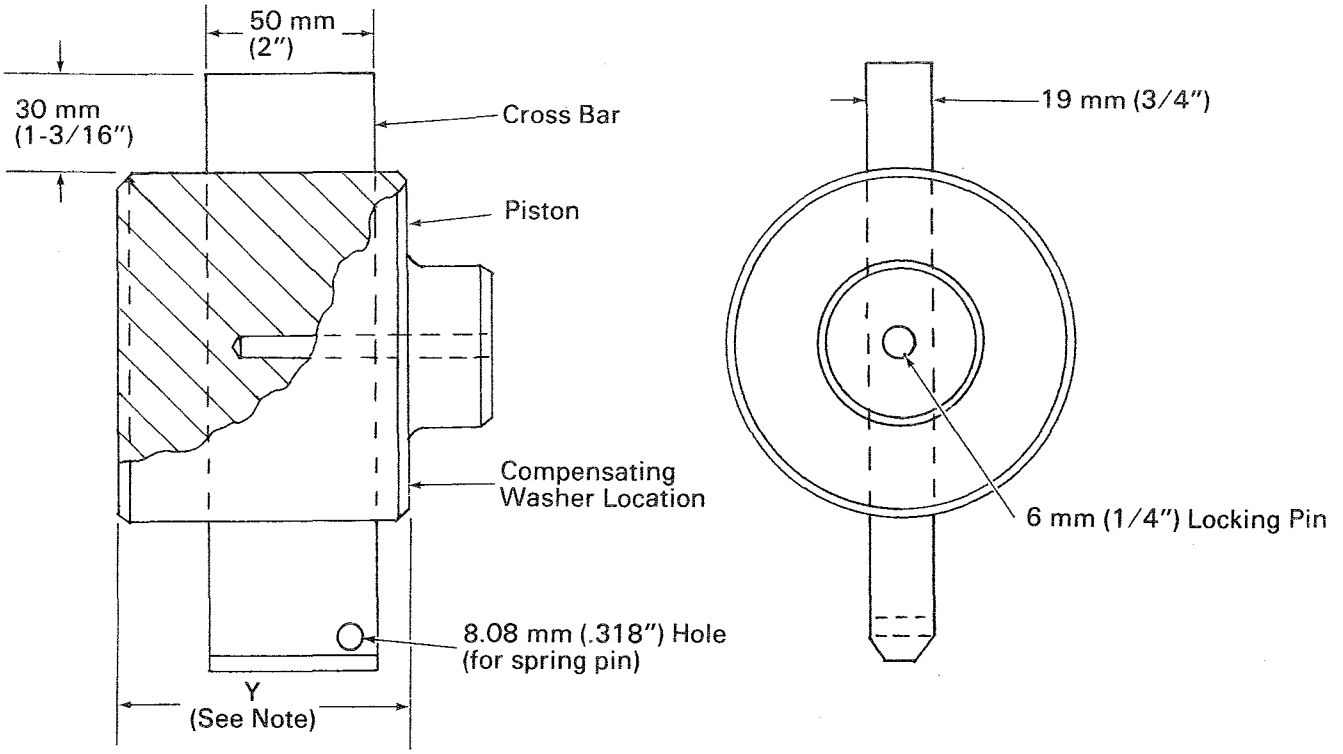
FRICTION SNUBBER ASSEMBLY

Spring-loaded friction snubber assemblies are installed on each truck. The pistons of the friction snubber assemblies press against the bolster of a A-1-A and GB truck. The pistons of the snubber assembly press against the truck pedestals of a GC truck assembly.

The friction snubber consists of a piston, washer, and spring in a cylindrical housing. The snubber damps the spring action of the bolster spring to prevent harmonic spring action. The snubber also prevents continued spring bounce.

After continued use, the piston, Fig. 39, becomes worn and lessens the effect of the spring. The piston new length is 86 mm (3-3/8"). When the piston is worn to 79 mm (3-1/8"), a 6.4 mm (1/4") compensating washer may be added to the body of the piston. When piston is worn to 73 mm (2-7/8"), the piston should be replaced with a new piston.

The piston cross bar will also be worn by movement in its guide slot. The cross bar new dimension is 51 mm (2"). When the bar is worn 9.5 mm (3/8") to 41 mm (1-5/8"), the piston should be replaced with a new piston.



NOTE: Y DIMENSION - New, 86 mm (3-3/8")
When worn to 79 mm (3-1/8") - Add 6 mm (1/4")
Compensating Washer
Maximum Wear Limit - 73 mm (2-7/8")

29622

Fig.39 - Friction Snubber Piston

On current model trucks, after assembly of the friction snubber, a spring pin is driven through the bolster or truck pedestal to secure the cross bar of the piston to prevent the cross bar from going through the slot in the pedestal or bolster. Refer to Fig. 40.

On previous model trucks, a tee-shaped safety stop is welded to secure the piston. Refer to Fig. 40.

TRUCK SPRINGS

The truck assembly is equipped with various combinations of coil springs at the truck bolster and pedestals to accommodate the loads which may be applied according to weight specifications of a particular locomotive. Spring shim plates and shims of different thickness are used to maintain proper coupler height.

Refer to Maintenance Instruction M.I. 1512, "Coil, Elliptic, And Rubber Truck Spring Qualification And Replacement" for inspection, qualification, and application of the coil springs.

TRUCK ASSEMBLY

The truck may be assembled using one of two methods. Procedure A may be used when facilities are available to invert the truck. Procedure B may be used when it is desirable to assemble the truck while in the upright position.

PROCEDURE A

1. Set the truck frame in an inverted position on the floor.

2. Install coil spring assemblies, spring seats, spring shims, and pedestal liners. Bolt in place where required.

3. Install traction motor nose suspension assemblies in place between frame lugs. Compress traction motor suspension pack assembly by placing temporary blocks between nose pack holder and mounting bolt heads and tightening the nuts. Install suspension pack keeper pins and pin keeper bar.

4. Install brake levers in place, leaning them back to provide enough clearance for the wheel and axle assembly.

5. Install pre-assembled wheel, axle, and motor assemblies in place by lifting the assembly with a lifting fixture similar to the one in Fig. 41, and lowering between the truck frame pedestals until the journal box adapters rest on the coil spring seats. Remove temporary blocks from traction motor nose suspension assembly. Refer to Service Data for File Drawing available to fabricate the lifting fixture.

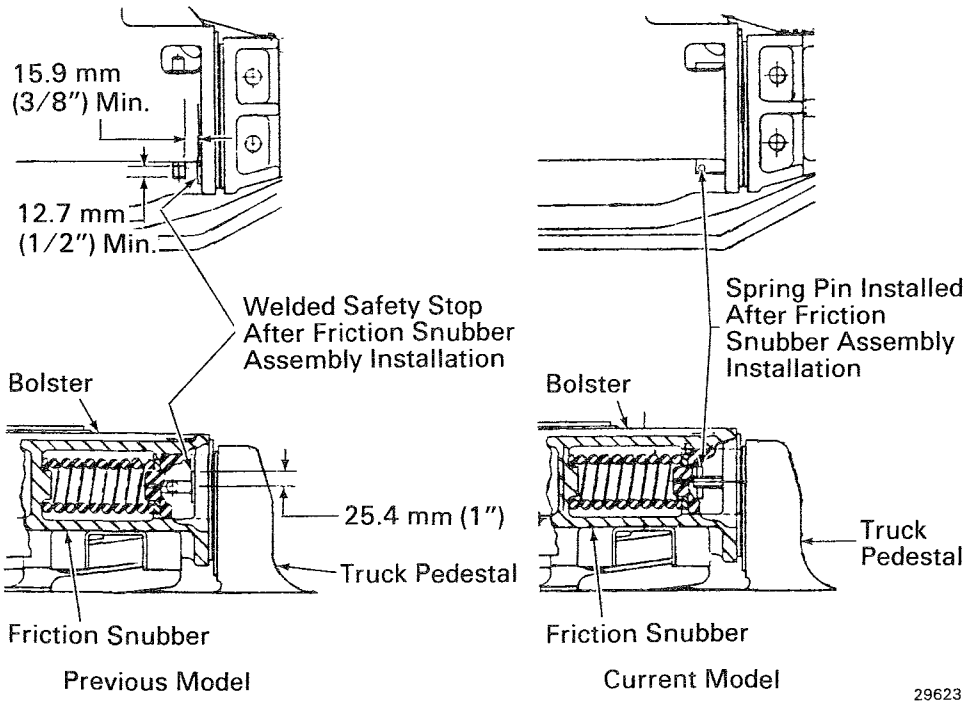
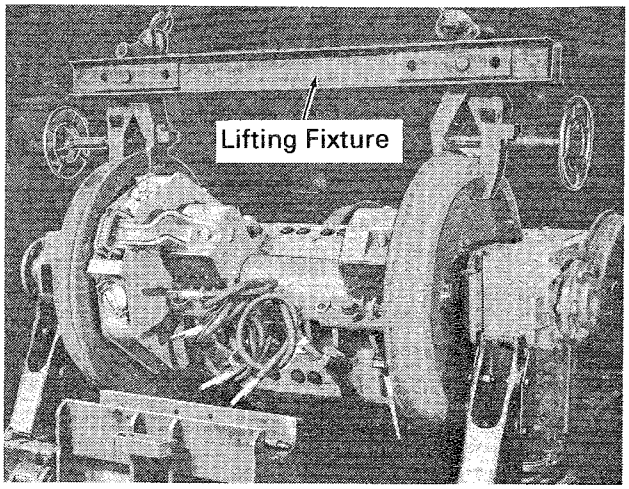


Fig.40 – Locking Friction Snubber Piston



23370

Fig.41 – Installing Wheel, Axle, And Motor Assembly

6. On GB and GC truck assemblies, install pedestal tie bars to pedestals. On A-1-A truck assembly, install pedestal tie bars to pedestals on both ends of truck and install the keeper assembly to the center two pedestals. Install slack adjusters and sanders guide assemblies.

7. Turn truck over onto its wheels and install air brake piping, brake cylinders, any remaining brake rigging.

8. Apply a jack to force the piston of the friction snubber back into the snubber housing as shown in Figs. 42 or 43. Jack the piston back far enough so that the piston can be wedged with a strip of steel (such as a brake shoe key) through the slot in the snubber housing. Refer to Service Data for File Drawing available to fabricate a piston compression fixture for a GC truck assembly.

9. Install bolster in place between bolster pedestals. Remove wedges from spring loaded pistons of the friction snubber assemblies.

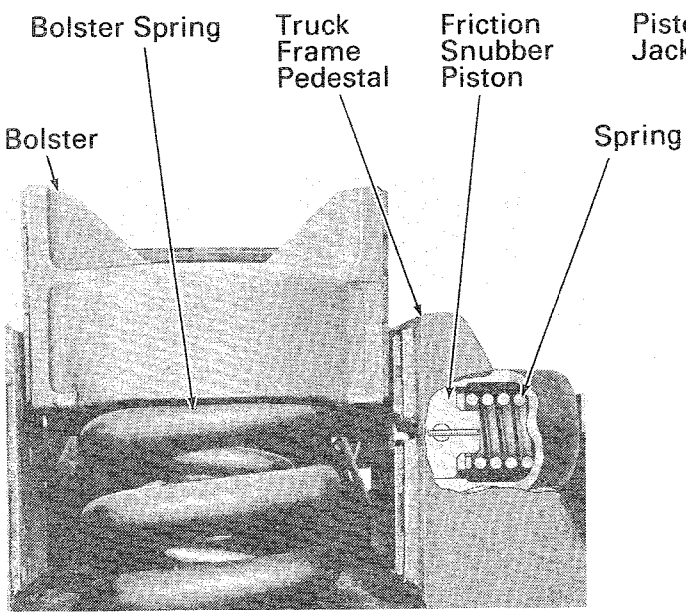
10. Install center bearing wear plate and wear half-rings. Apply a coat of grease to the dust guard and install it to bolster center bearing.

11. Apply oil to the bolster center bearing as explained in the Lubrication section.

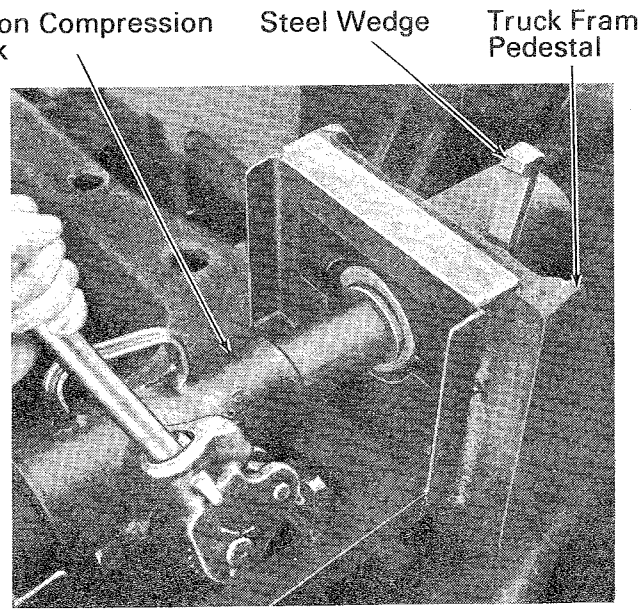
PROCEDURE B

1. Space wheel and axle assemblies so that when the truck frame is lifted it can be placed over the assemblies.

2. Lift truck frame and lower it over the wheel and axle assemblies. Install coil spring assemblies, spring seats, and shims before fully lowering the frame.



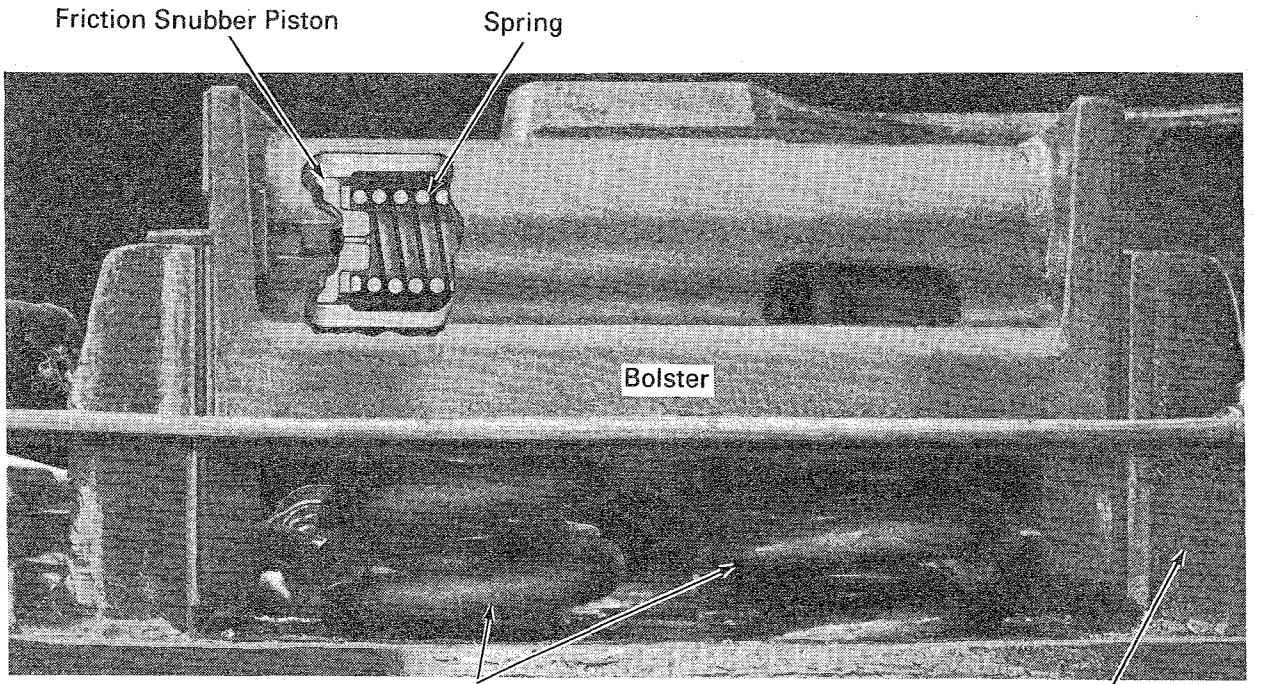
Friction Snubber Assembly

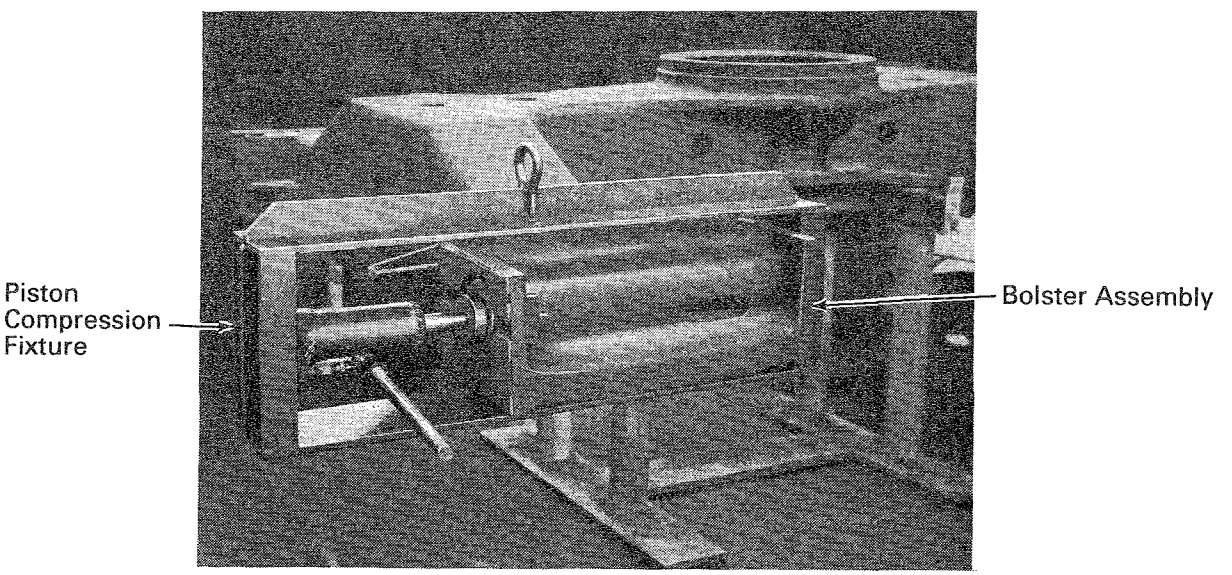


Friction Snubber Piston Compression Method

29624

Fig.42 – Securing Friction Snubber Piston, GB And A-1-A Truck Assemblies





Friction Snubber Piston, Compression Method

29626

Fig.43 – Securing Friction Snubber Piston, GC Truck Assembly

3. On GB and GC truck assemblies, install pedestal tie bars to pedestals. On A-1-A truck assembly, install pedestal tie bars to pedestals on both ends of the truck and install keeper assemblies to the center two pedestals.

4. Compress traction motor suspension pack assembly by placing temporary blocks between nose pack holder and mounting bolt heads and tighten the nuts.

5. Apply lifting hoist to lifting eyes at nose suspension side of traction motor. Connect hoist to chains.

6. Hoist motor with the crane, Fig. 44, and place lower flange of traction motor support bearing housing on top of the axle. Rotate the motor on the axle until traction motor nose suspension assembly can be mounted. Install suspension assembly guide pins and guide pin keeper and remove the temporary blocks.

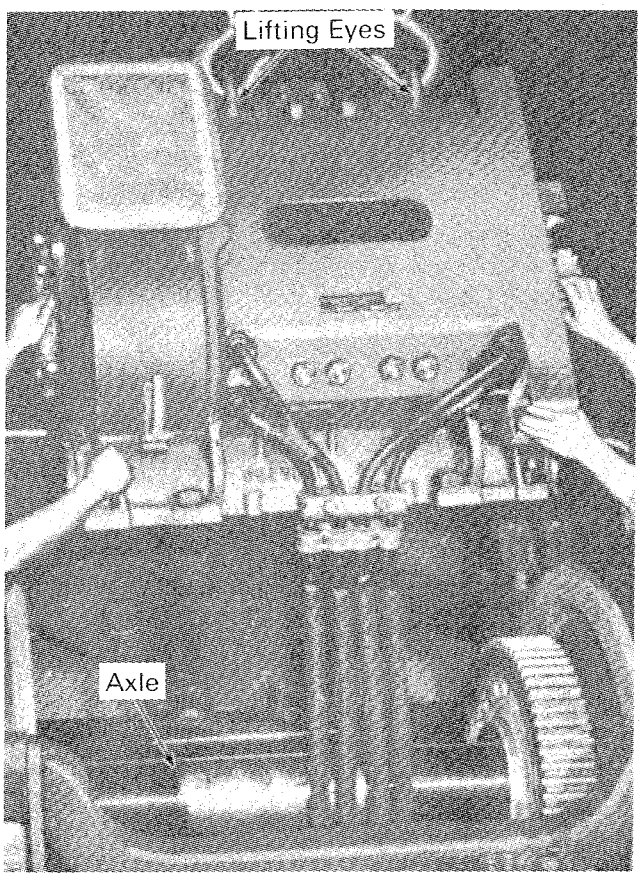
7. Carefully slide the lower half of the axle support bearing shell around the axle journal. Install upper half of the bearing shell, axle shield, traction motor axle cap, and dust guard.

8. Apply axle bore gear case seals and motor gear case. Refer to Maintenance Instruction M.I. 1520 for assembly procedures.

9. Install brake lever assemblies and traction motor cooling ducts.

10. Install slack adjusters and sander guide assemblies.

11. Apply a jack to force back the piston of the friction snubber back into the snubber housing as shown in Figs. 42 or 43. Jack the piston back far enough so that the piston can be wedged with a strip of steel (such as a brake shoe key) through the slot in the snubber housing. Refer to Service Data for File Drawing available to fabricate a piston compression fixture for a GC truck assembly.



27214

Fig.44 – Installing Traction Motor

12. Install bolster in place between bolster pedestals. Remove wedges from spring loaded pistons of the friction snubber assemblies.

13. Install center bearing wear plate and wear half-rings. Apply a coat of grease to the dust guard and install it to bolster center bearing.

14. Apply oil to the bolster center bearing as explained in the Lubrication section.

SERVICE DATA

REFERENCES

Coil Elliptic, And Rubber Truck Spring Qualification And Replacement	M.I. 1512
Wheels, Axles, Axle Gears And Pinions	M.I. 1519
Traction Motor Gear Case Inspection And Repair	M.I. 1520
Cylindrical Roller Oil Lubricated Journal Boxes	M.I. 1552
Grease Lubricated Cartridge-Type Journal Bearings	M.I. 1553
Lubrication Specifications	M.I. 1756

EQUIPMENT

Pinion Protector	8054871
Lifting Fixture (traction motor, wheel and axle assembly)	*File No. 288
Tram Marking Tool	*File No. 615
Pedestal Liner Pressing Tool	*File No. 649
Friction Snubber Piston Compression Fixture	*File No. 650

*File number drawings represent facility drawings that are available (at no charge) from EMD Service Department. These drawings include construction details of tooling that can be manufactured.

• • • • A Service Department Publication • • • •

Electro-Motive Division Of General Motors La Grange, Illinois 60525

Litho in U.S.A.