PCC 322 Truck Mechanical Repair Documentation

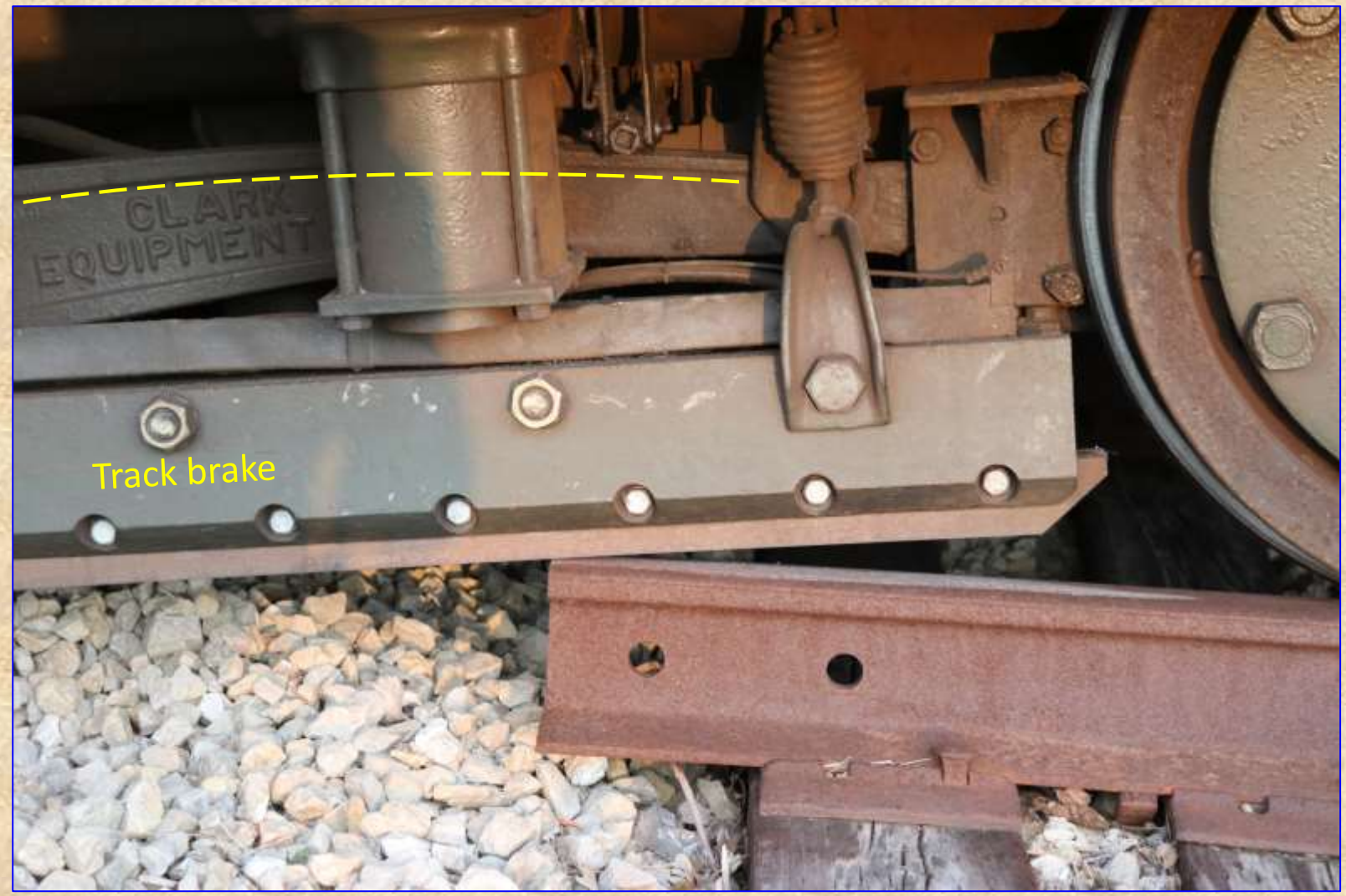
August 2023- March 2024

PCC 322 Dedication, September 30, 2002

George and Florence Isaacs

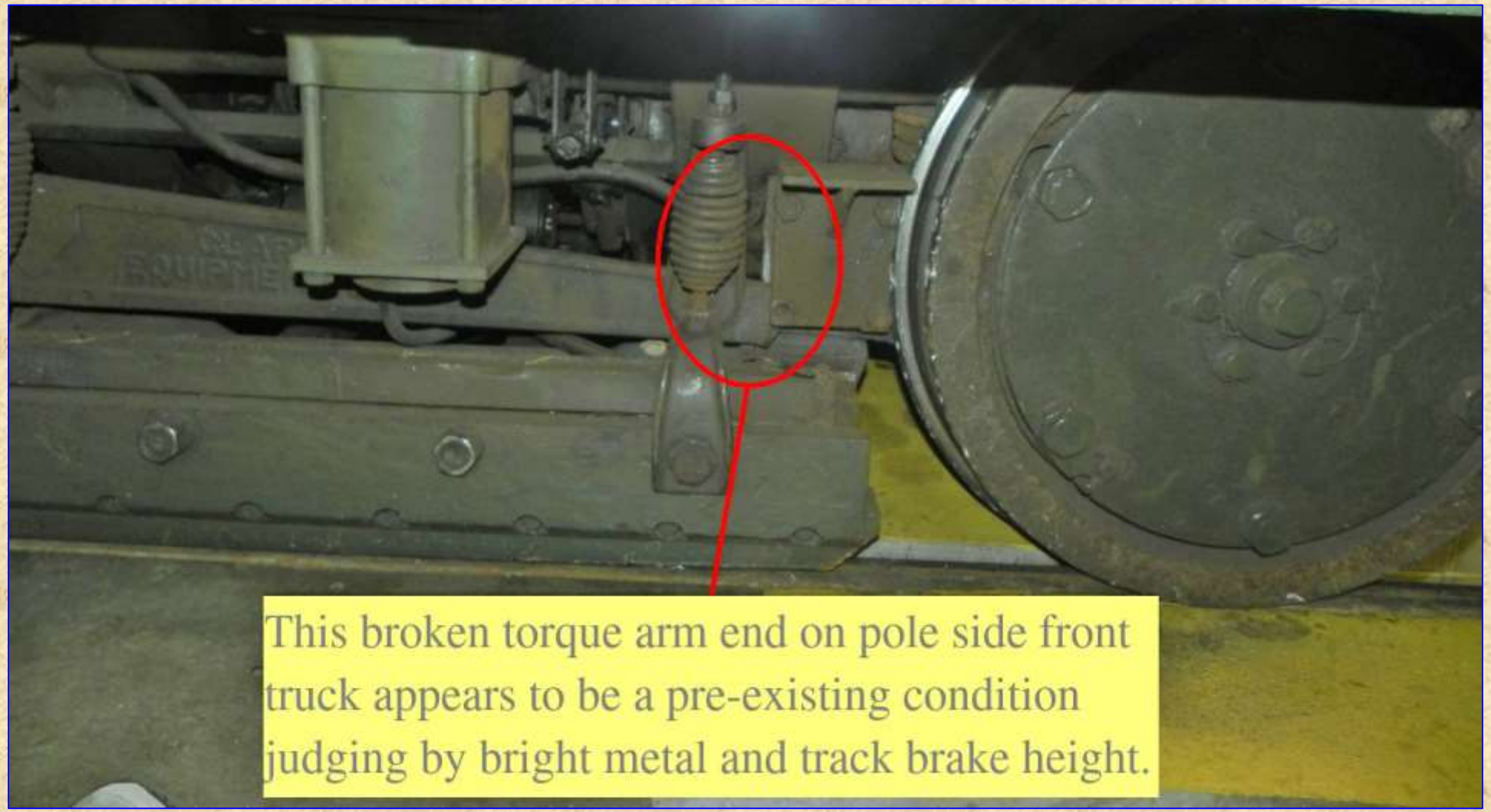
Incident at north end of CHSL line; July 20, 2023

Rear truck, pole side torque arm deformed during derail (Bill Arends photo)



Incident at north end of CHSL line; July 10, 2016

Front truck, pole side damage (Mark Digre)



Major surgery after 2+ decades of MSM service

- Brake failure caused the car to run off the north end rails
- Investigation and probable cause are documented elsewhere
- The pole side, rear truck torque arm was badly deformed.
- The pole side, front truck torque arm was found to be broken- a pre-existing condition.
- Both torque arms require replacement.
- Two original, Clark Equipment torque arms were procured with the critical assistance of Bill Wall, Shore Line Trolley Museum.
- Documentation may simplify future truck maintenance/repair.

Separation of trucks from body

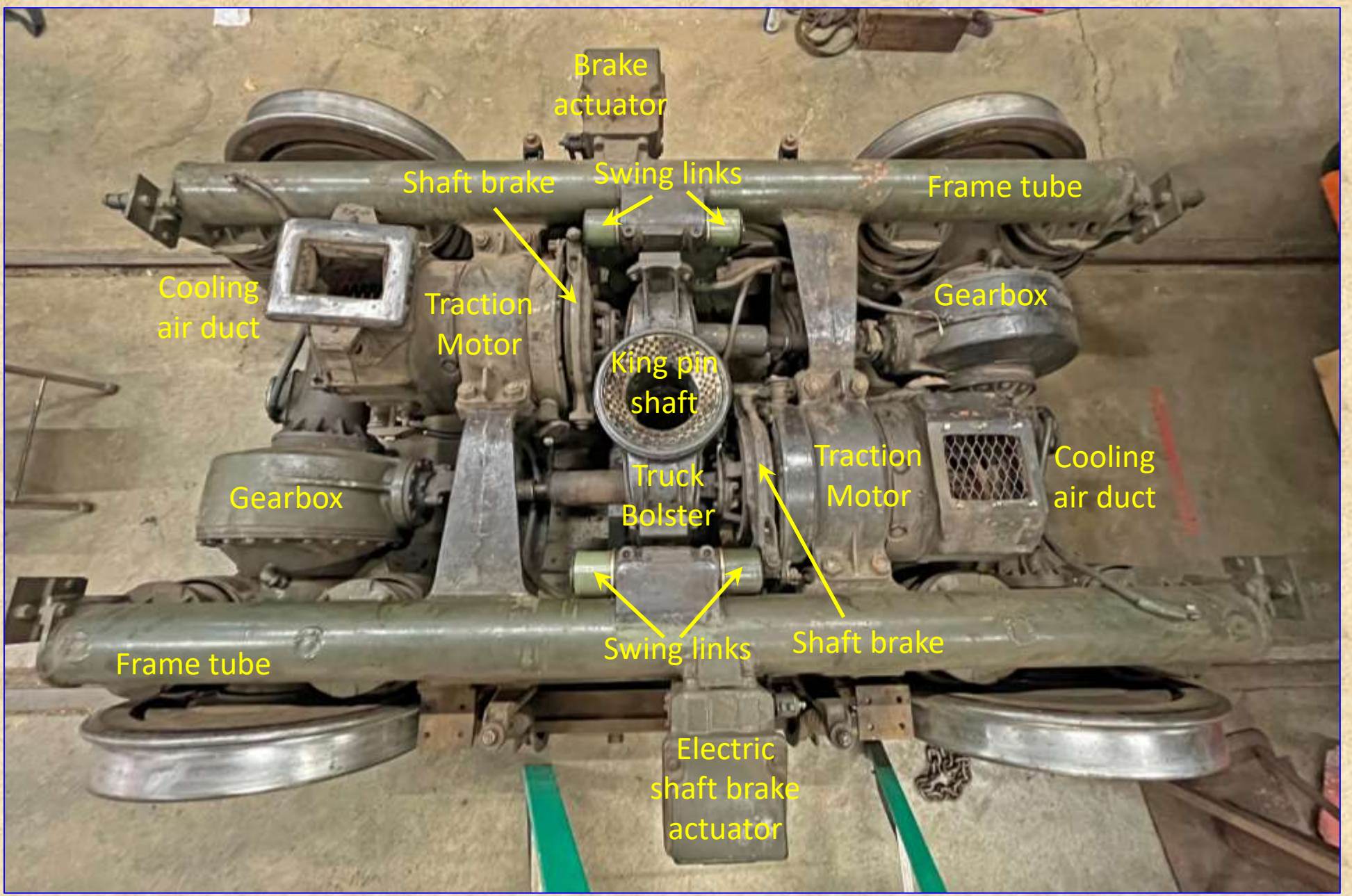
- PCC 322 has oversized wheels (26” dia. vs 25”), installed in New Jersey to permit higher speeds (+4%). Wheel treads are also wider to allow running through the Hudson River tunnel to Penn Station.
- One wheel rim partially covers two torque arm bolts. Consequently, that wheel must be removed, requiring separation of the truck from the body.
- In this case, trucks are removed individually; the truck not being serviced remains on the rails with shaft brakes set.
- Lifting is coordinated to prevent twisting of the car body. Progress is monitored with a spirit level on the rear bumper (or front anti-climber).
- Our Duff screw jack height exceeds the 28-1/2” car bolster-to-ground clearance. Lifting is a multi-step process, described in the next slide.

1. A shop-made bracket (red outline) hooks over the head of the jack and drops below the bolster at the car sill. The car body is then lifted high enough to insert wood blocking between bolster and truck frame.
2. The jack is then let down and the bracket removed.
3. The jack is repositioned under the bolster, inboard of the sill and the lift proceeds (see next slide).
4. We plan to modify this step to eliminate the offset bracket.

The jack is set under the bolster, inboard of the sill. A section of skirt has been removed to permit access. Jim Willmore and John Prestholdt are on the gate side here; Mark Digre is working the pole side lift. Unlike hydraulic jacks, it is not possible for a screw jack like this to collapse under sustained load.

Jim Willmore and Mark Digre remove one of two flexible cooling air transitions that would interfere with the king pin during roll out.

Blocking on the truck frame was used when repositioning jacks. Karl Jones is on the pole side; Jim Willmore and Tom Schramm are on the gate side here.



Overhead view of the PCC rear truck

KING PIN AND BOLSTER

To position the car over the truck, a **king pin**, welded to the underframe of the car body, fits into a hollow shaft on a unit known as the truck **bolster**. (See figures 2.8 and 2.9)

Figure 2.8 King Pin

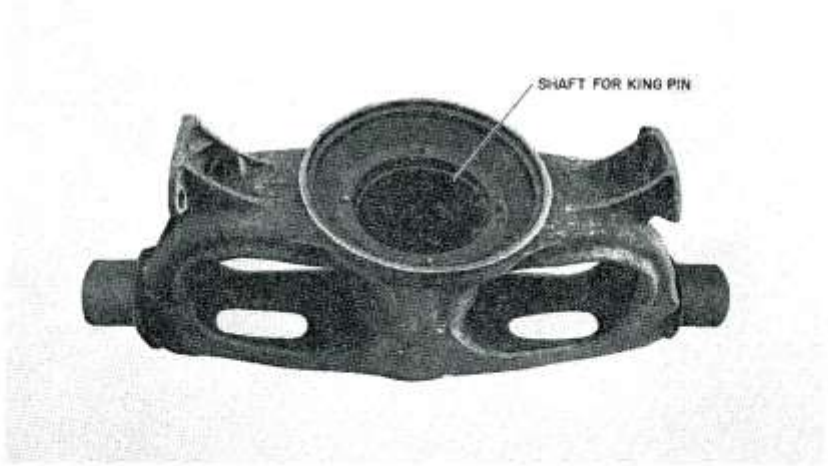


Figure 2.9 Truck Bolster

KING PIN AND BOLSTER

Replaceable bushings between the **king pin flange** and its seat on the upper edge of the bolster prevent wear to the parts themselves. (See figure 2.12)

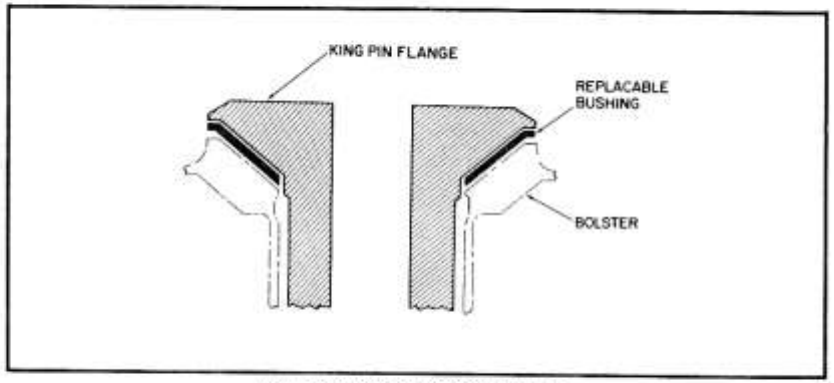


Figure 2.12 King Pin/Bolster Bushing

SWING LINK AND TRUNION ASSEMBLY

Since the bolster directly supports the car body, welding the bolster directly to the truck frame would give a very rough ride. To overcome this problem, the bolster rides free in the center of the truck, hanging from the **swing link and trunion** assembly. (See figure 2.13)

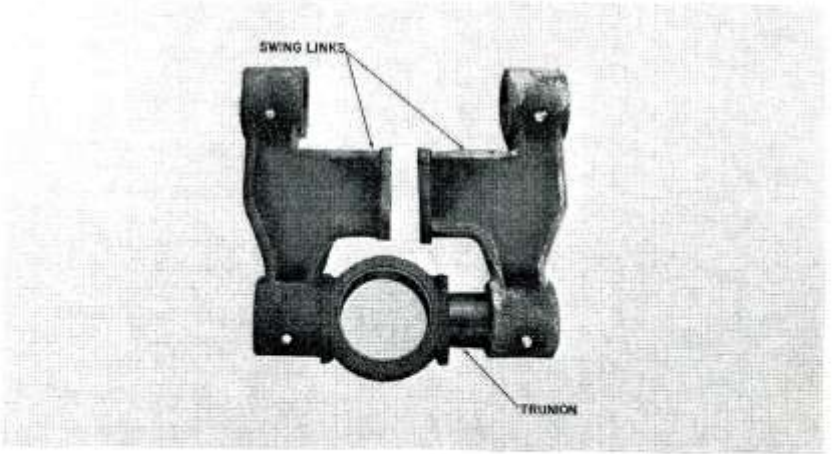
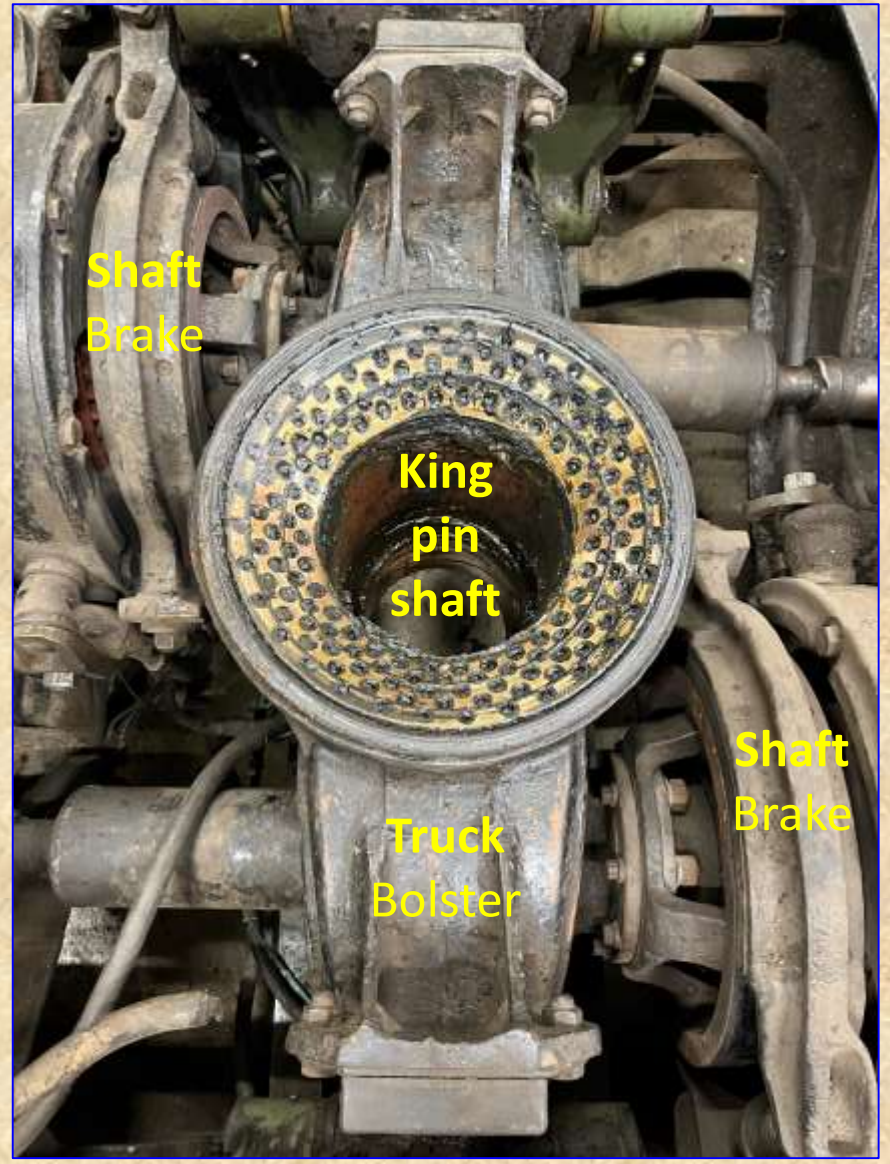
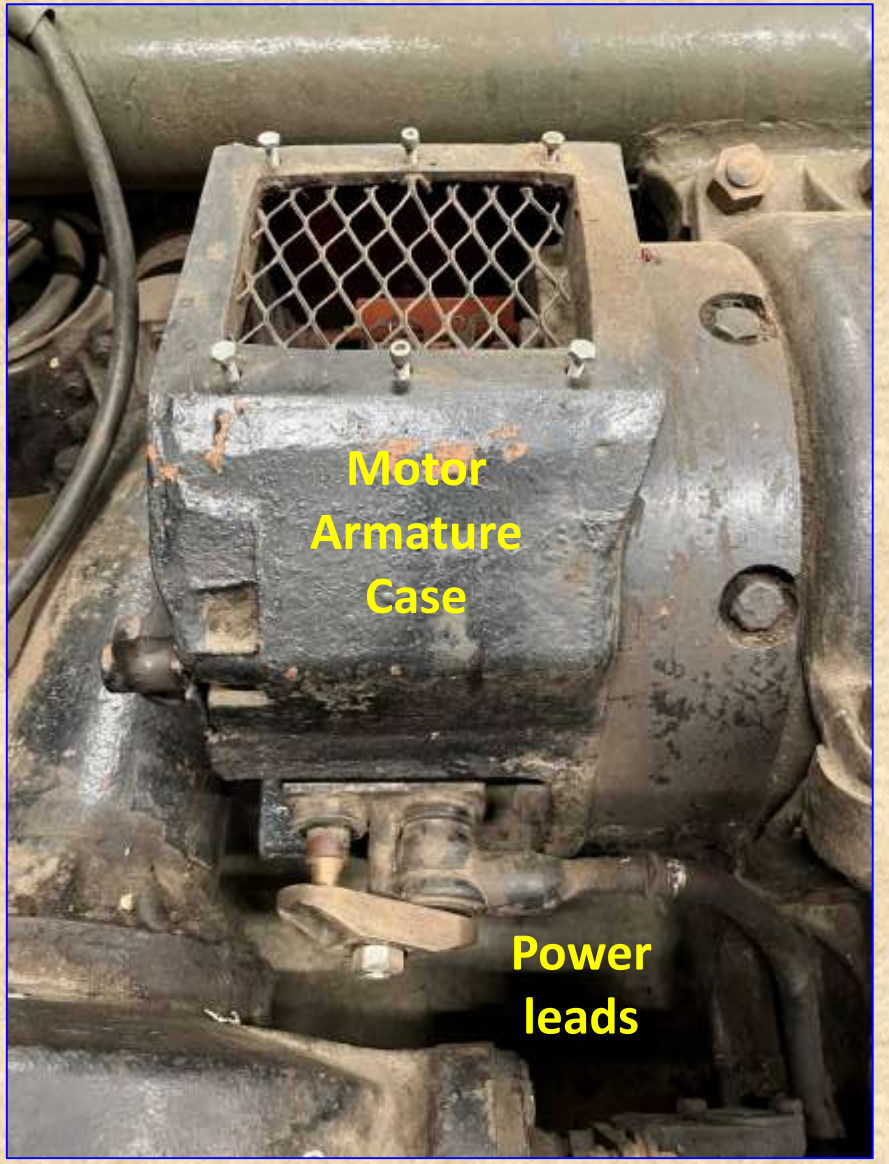


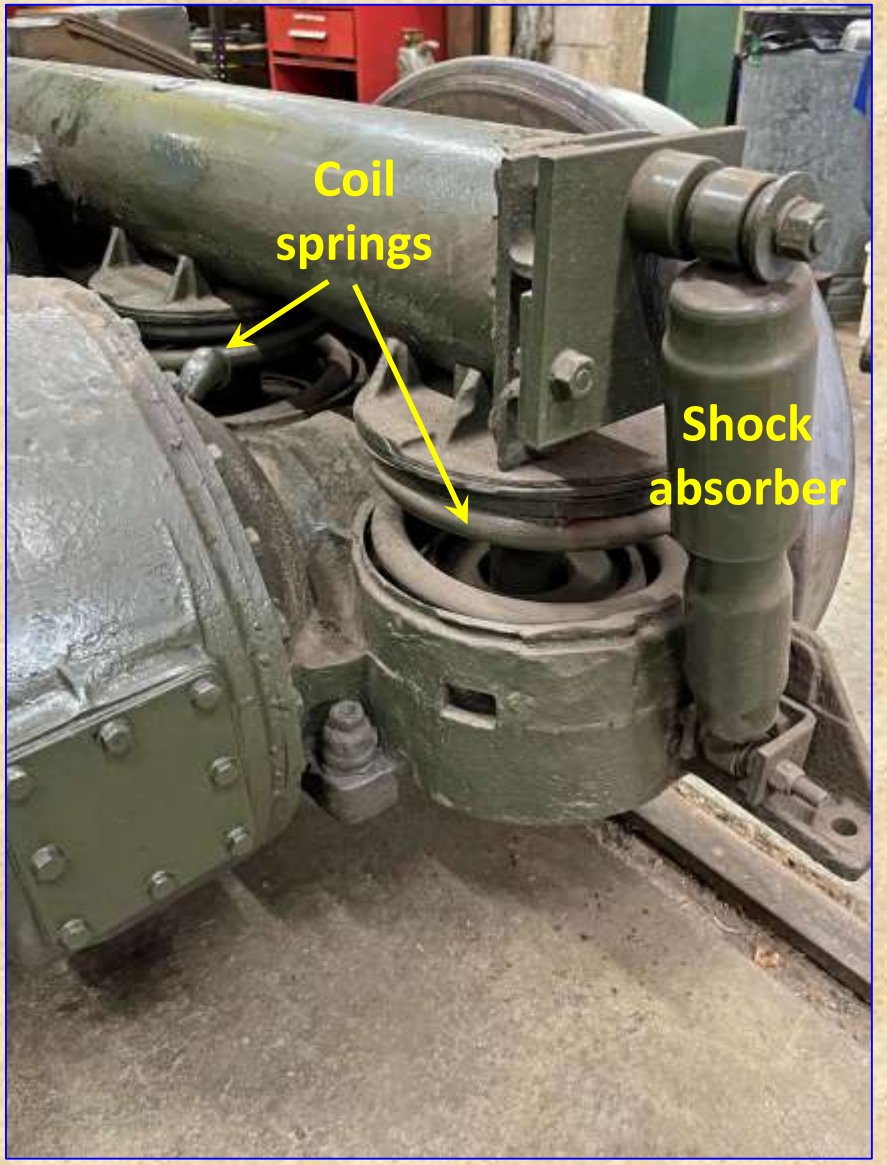
Figure 2.13 Swing Links and Trunion



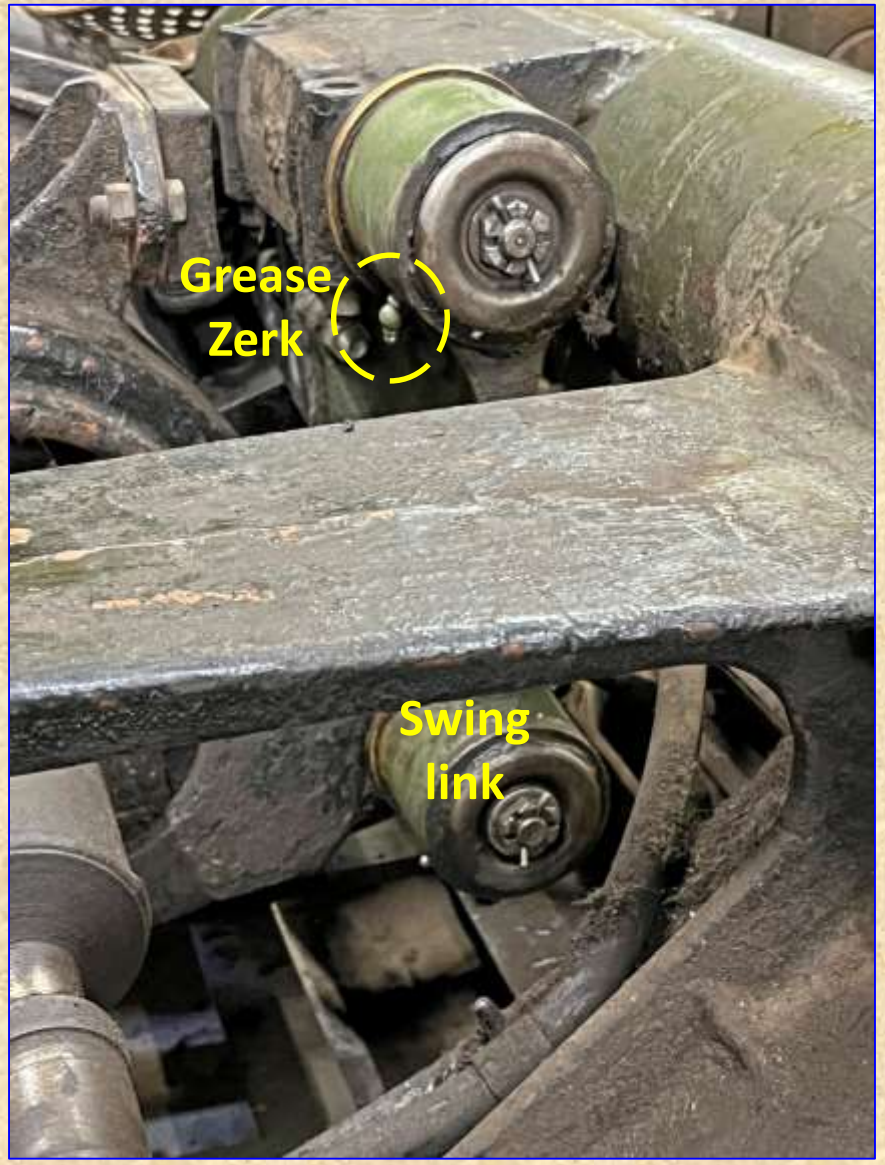
King pin shaft & bronze thrust bearing



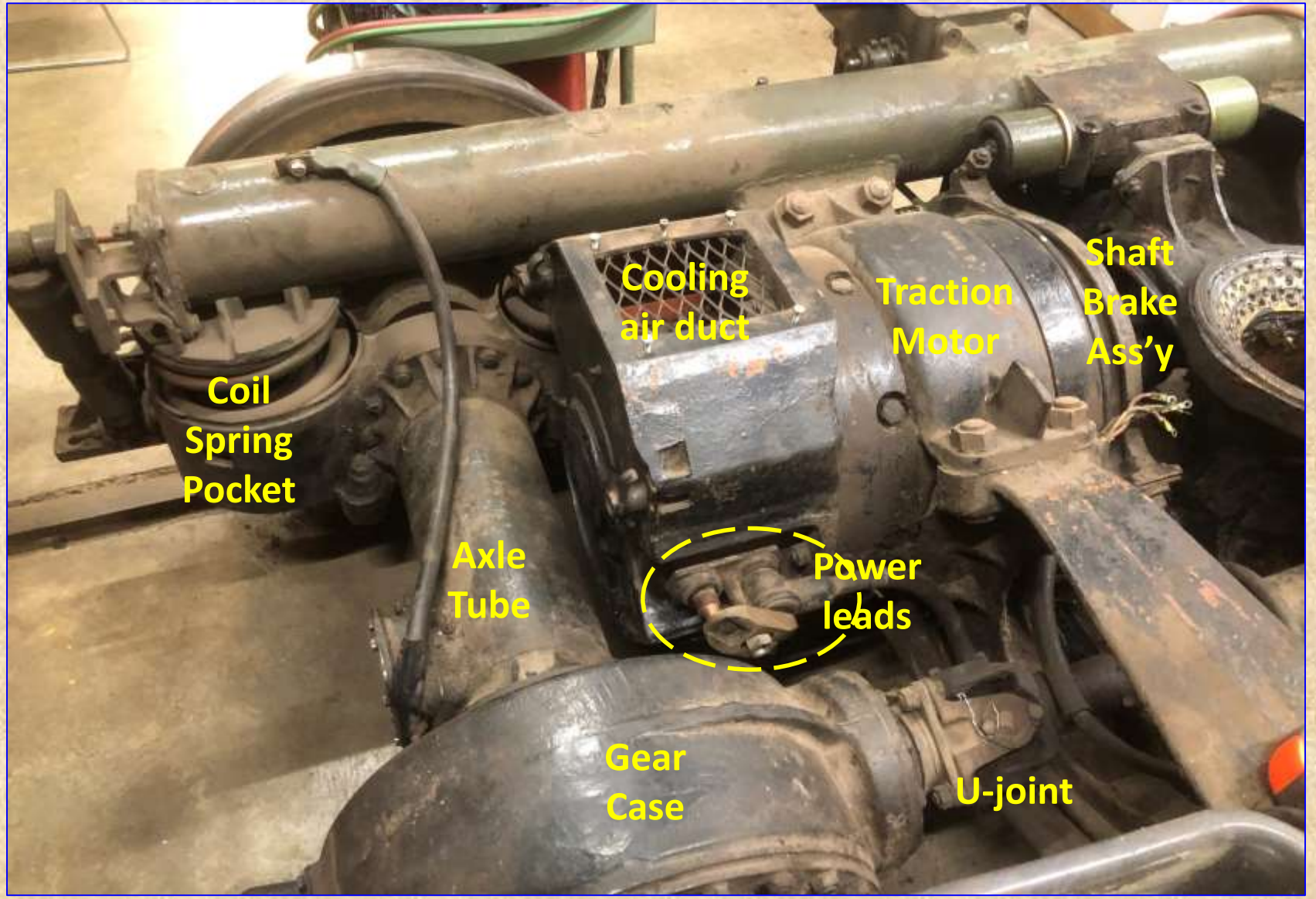
Flexible cooling duct removed



2 springs, 1 shock absorber per wheel

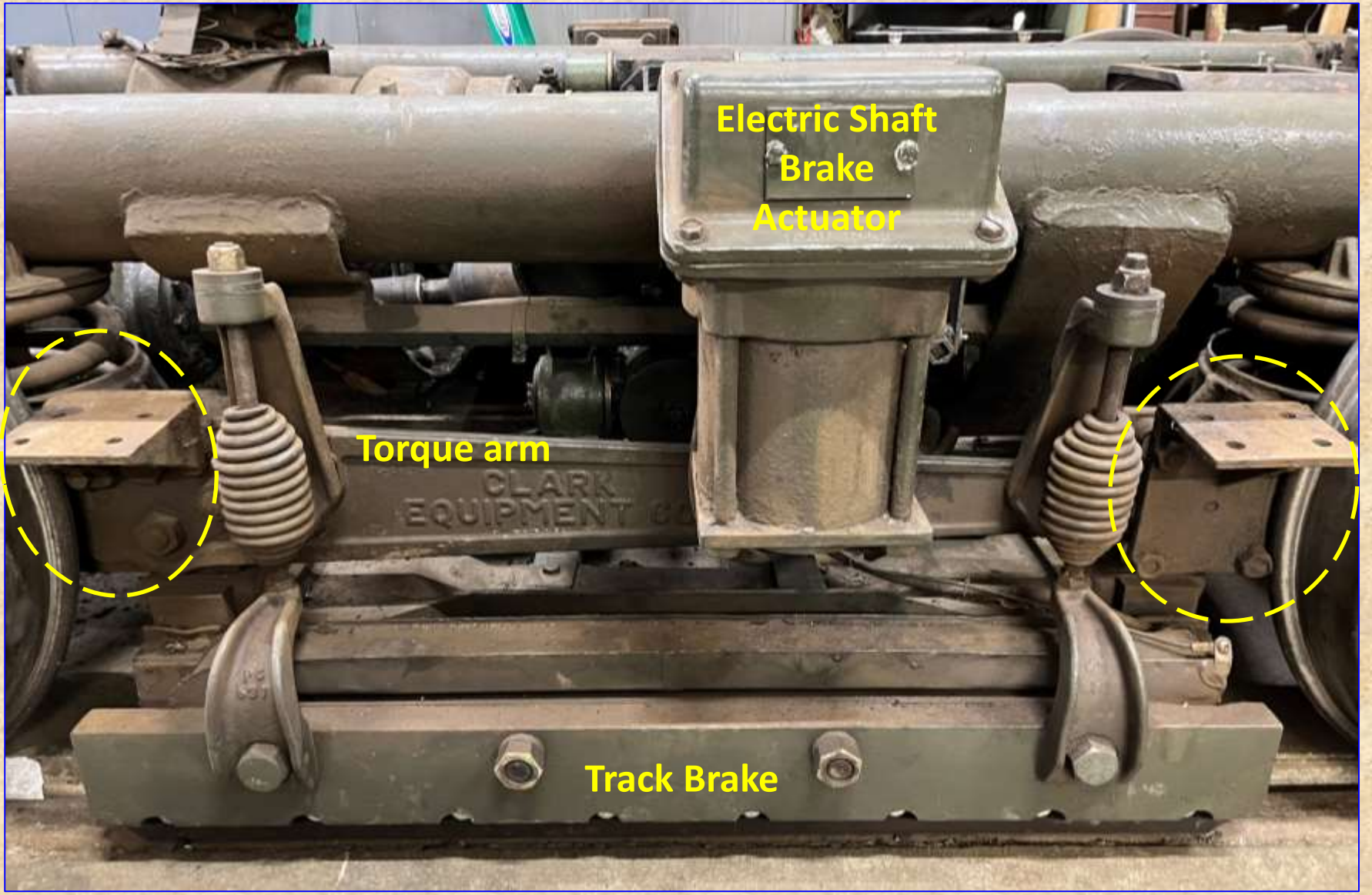


2 pairs of swing links per truck



Rear truck, axle 3: key components. Isbrandt photo

Rear truck / gate side is undamaged and provides a useful model



Circled brackets related to air actuated brakes are obsolete

SHAFT BRAKES

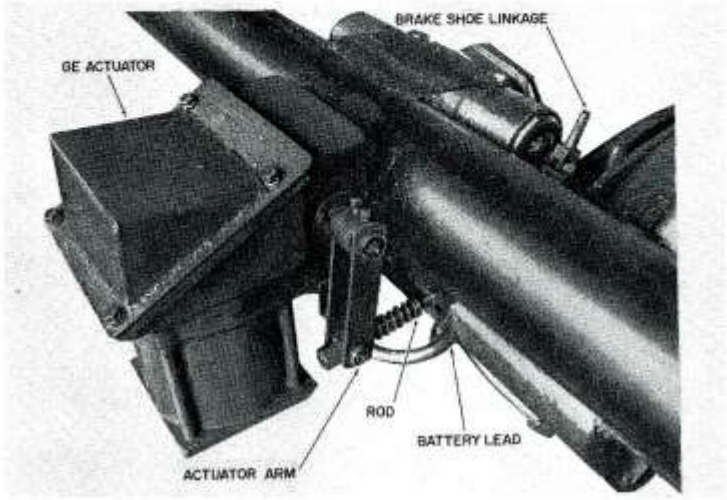
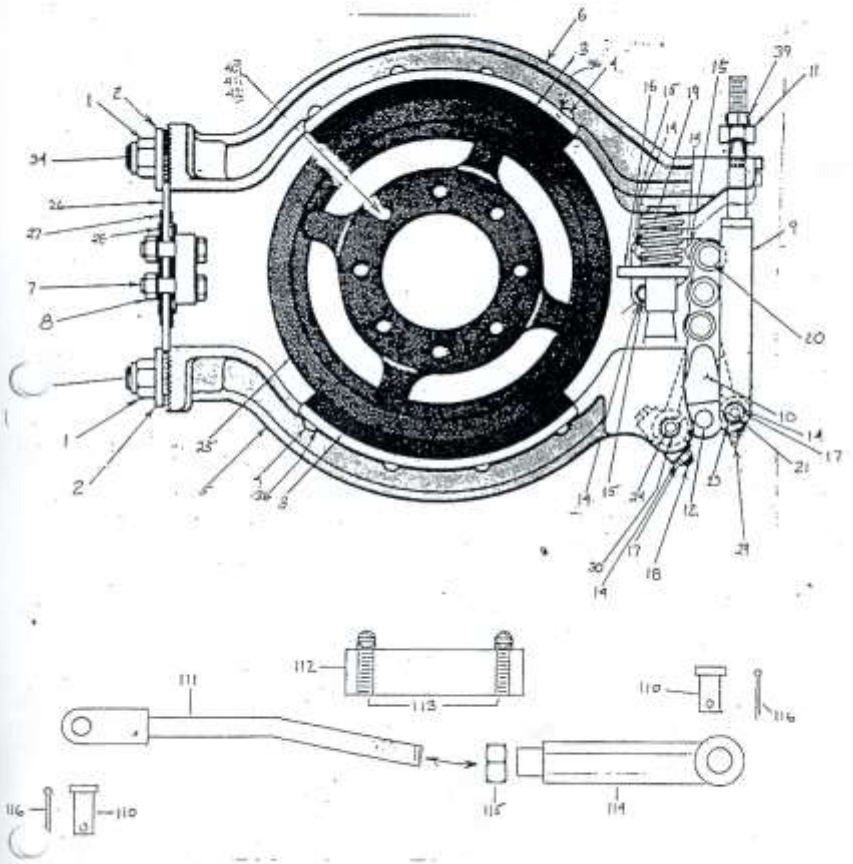


Figure 2.61 G.E. Actuator and Brake Linkage

4.3 Parts Call Out: Clark External Shoe Shaft Brake

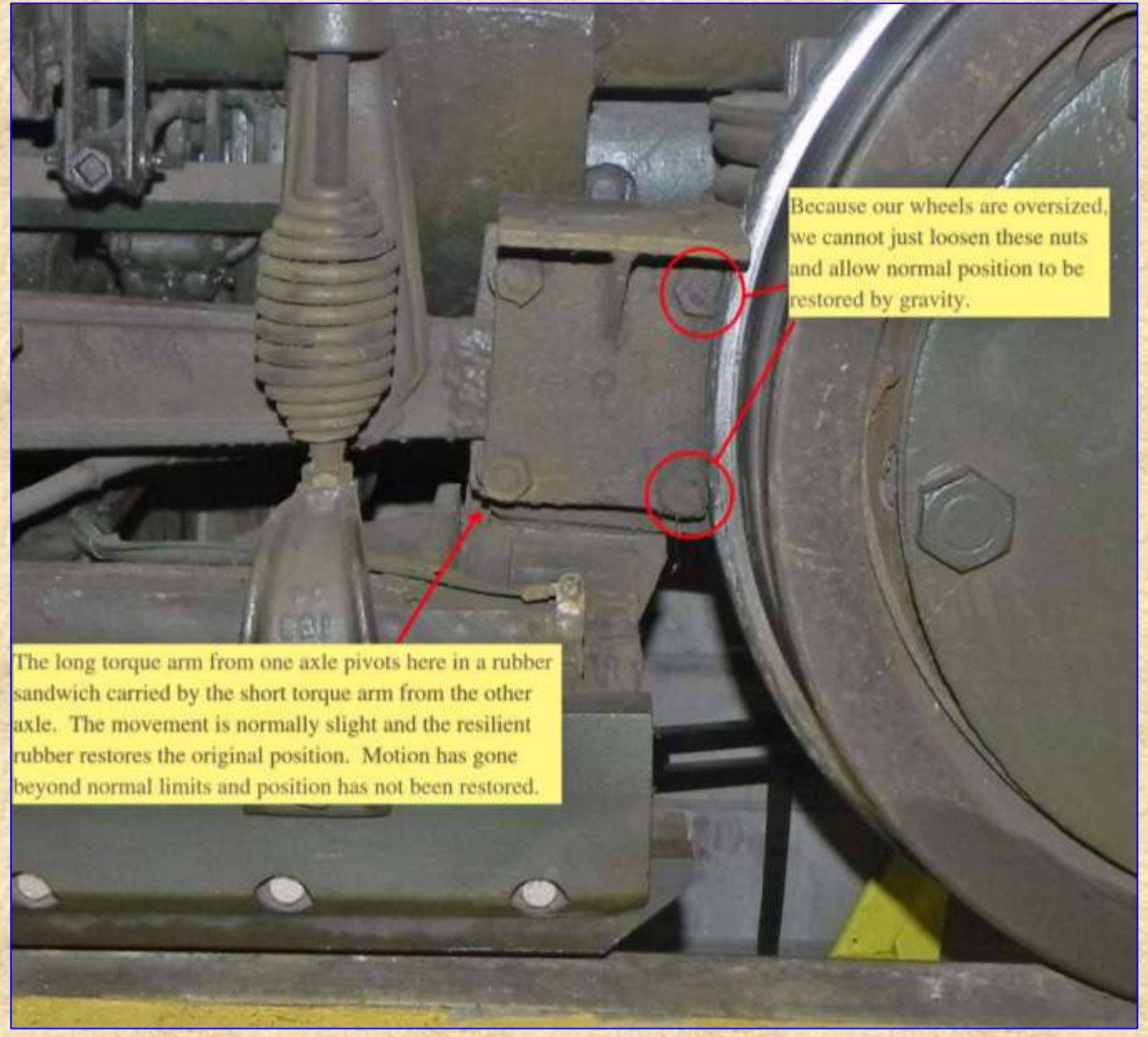


Clark External Shoe Shaft Brake Details

Only one pair of shaft brake shoes was badly worn; they have been relined locally.

Vendor: Brake & Equipment Warehouse, 455 Harrison St. NE, Mpls., 55413

Problems removing Clark Torque Arms from PCC 322 (Mark Digre)



Wheel supported by sling after nuts and bolts are loosened; note the index line

7/8”-14 UNF threaded guide rods maintain wheel component registry