

Liverpool No.245 Restoration Progress Report



After years of protracted negotiations, Baby Grand 245 turned up at the MTPS base at Wirral Transport Museum in Birkenhead during May 2006. It arrived from the Large Objects Store at Sandhills, Liverpool, after a lengthy journey via the Runcorn bridge. In a tripartate agreement, ownership remained with National Museums Liverpool, but the tram would be restored by the MTPS with the help of a Heritage Lottery grant, and operate on Wirral Council's heritage tramway. NML insisted as much of the original fabric of the tram as possible should be retained in the restoration.



Securing a lottery grant of £50,000 took years to attain, with the o.k. finally coming in February 2010. In the meantime, Society volunteers had stripped down the car sufficiently to reveal widespread rot in the car's ash framework, which had been accelerated during the years of storage at the Steamport Museum in Southport. The tram had been stored directly below a badly leaking roof and rainwater had poured through the car in cascades. Many of the panels were dented, punctured or badly corroded, while the steel screws used throughout were rusted in place and very difficult to remove without damage to aluminium beadings etc.



By the autumn of 2011, the following tasks had been completed: The four roof ventilators had been removed, stripped of rust, treated and repainted. The trolley plank which was twisted and rotten in parts was removed and an exact replica constructed. The ash cushions on which the trolley base sat were mostly rotted and a number of replicas were made. The trolley base was stripped down, all rust removed by grit blasting, and the metal painted in red oxide plus best quality exterior undercoat before reassembly.



All of the plywood roof between the two domes was stripped away. Much of the ply had delaminated with damp. The ash roof sticks were mostly in sound condition, and after soaking in preservative were all re-used. The steel carlines were all derusted, and painted appropriately. Several new carlines were added near the middle of the roof to support the weight of the trolley base.

A large steel plate which fits to the lower side of the trolley plank and is bolted to the trolley base with large bolts passing through the ash trolley plank was replaced because of excessive rust disintegration. New marine grade plywood was fitted down the centre of the roof between the two domed ends. For the sharp curves bending to the sides of the tram, laminations of bendy ply was used. All of the wooden section of the roof was then covered with canvas fitted in the traditional way, using paint, and with metal beadings covering all the edges.



Throughout, the thick plywood and cork layer forming the upper saloon floor was generally in sound condition although water ingress had caused substantial rotting along its outer edges. This in turn had affected the ash cantrails running the length of the tram, and the pillars at almost all of the joints where they met. Replacing the cantrails and splicing in new ash to virtually all of the pillars was a major joinery feat. Thick new plywood sections were also installed along the floor edges. Sections of the ash seat rail also had to be replaced with new timber. Many of the interior plywood panels were rotted and removing rusted steel screws caused further damage. Consequently virtually all the side ply panels are new.

All the 16 curved ply ceiling panels were saved bar one which disintegrated through rot, and these were carefully treated with preservative. The original linen surface was retained and painted appropriately. The four 'canoe' shaped aluminium panels which fit on the ceiling at the domed ends were stripped of all corrosion (which meant losing their original linen) and new linen was carefully put back.



The advertisement panels over the end windows were refurbished and put back, along with original restored beadings. All the seats were removed and the leather cushions and backs stored. The steel seat frames were shotblasted to remove all rust and old paint, and then painted in oxide and undercoat. The aluminium pedestals were carefully stripped down, painted in acid etch primer, and undercoat then stored ready for eventual fitting.

Around 'A' end, the intricately curved ash cantrail around the end of the tram was found to be rotted and this was carefully replaced with great difficulty. Around the staircase, rot was detected in the pillars and sills of the lower saloon windows and more ash was spliced in. On the upper deck, the sills of the D shaped end windows were badly rotted through rain ingress, and all had to be replaced with new ash hardwood.



The three seized up winding mechanisms for the indicator blinds at this end of the car were removed, stripped down, derusted and cleaned out, and then reassembled in working order. Original 1950s indicators have been fitted to them. The indicator glazing was badly fitting with jagged edges and was replaced with 6 mm toughened

glass with smooth edges, set in a waterproof sealant and the original beadings.

The small cupboard on which the air pressure gauges are mounted below the left of the driving position, was stripped down and the gauges cleaned and tested. After some new ash was incorporated, the cupboard was reassembled as new.



The windscreen from 'A' end was stripped out and rebuilt, incorporating new parts to replace those too worn or rusted to re-use. New toughened glass was fitted to the lower section to replace a broken original. New windscreen wiper motors were sourced and parts from them incorporated into the original air operated motor wipers which were completely stripped down and rebuilt.



The step at 'A' end was found to have extensive rot and a new one was made and fitted. All the steel floor strips were gritblasted and re-used. This process is now being repeated at 'B' end of the car. The steel risers on both steps were stripped down for re-use and both were found to be carrying adverts for toothpaste under layers of green paint - obviously they had been cannibalised from other trams as an economy measure during 245's building in 1938, or fitted after subsequent accident damage.



Rot on the lower deck sills at 'A' end resulted in a new ash sill for the windscreen, and a new curved sill for the D window next to the step. The same process is being carried out at 'B' end in the autumn of 2011. Low voltage wiring has been installed throughout the upper deck, and the bell wiring is also in place. Great care has been taken to keep traction cables (not yet fitted) and lighting wiring, as far apart as possible.

One of the controllers has been overhauled plus one of the handbrake columns. Their tops, match strikers/stubbers and platform warning bells have all been rechromed. The tram's two motors have been overhauled at a local firm, and it is hoped the truck will also be overhauled before the end of 2011. The tram's underframe has suffered badly over the years with rust and a number of heavy collisions which have buckled some of the steelwork. This too, will hopefully be addressed in the near future. All the pitchpine tongue and groove planking forming the lower saloon floor has been removed prior to this work being carried out.

With the upper deck out of bounds during the early months of 2012, work has been concentrated on the eight folding platform doors which have been dismantled, and then reassembled. New toughened glass was fitted to one set of four, and all the glazing was bedded in traditional linseed oil putty. New beadings were fitted where necessary, and all the original brass raised head screws were re-used and any rusted steel ones discarded for new brass screws.

All the aluminium panels on the doors were taken off, and any corrosion removed. They were rubbed down, painted in acid etch and filled where necessary. The panels were put back using new zinc plated countersunk steel screws, replacing all the badly rusted originals. All brass fittings were stripped down and repainted and any steel parts de-rusted and primed in red oxide before further painting. Some of the brass hinges had been beefed up by the use of countersunk steel or brass bolts in place of screws and these were added to where necessary.

Because the doors are panelled and the nuts are fitted to bolts which are behind these panels, the heavy doors have had to be paired up already. The original plywood ceiling panels have been put back in the lower saloon. Of the eight curved ones along the sides, seven had rot along the bottom edge, and new plywood was carefully spliced in. The original glazed windows for the side indicators are still set in these panels (though two are now fitted with ply) but painted over, and patches where the winder handles once protruded, have also been retained as in 1957.

All four original large flat panels have been fitted down the middle of the ceiling, plus new beadings held by brass raised head screws. The original curved beadings have been retained down the sides of the ceiling. The two bell push pattresses have been put back in place on the ceiling, and have been wired up.

Painting is in progress during April. The final three lower saloon drop down windows have been recently removed for repair and new sills and side fillets have been made as needed to replace wood that was rotten or had broken due to stubborn rusted steel screws. All will be fitted using brass screws.

The eight new aluminium panels which fit above the lower saloon windows have been drilled and countersunk, painted in acid etch, and grey undercoat. The outer face has been painted in several coats of white undercoat, prior to fixing to the car.











**LIVERPOOL 245 PROGRESS REPORT.
by TERRY MARTIN.**

OCTOBER 2012.

New aluminium panels have been fitted along both sides of the upper deck. These have been painted in acid etch primer and exterior grey undercoat and set in mastic. Original aluminium horizontal beadings have been fitted along the car sides. At B end of the car the front upper saloon window has been fitted with new toughened glass.

Many of the beadings which fitted around the curved glass windows were damaged in removal or badly rotted and all these have been painstakingly copied in new ash which has been treated with cuprinol, then exterior primer, and undercoat. The restored headlamp and two side lamps have been fitted at A end, while the corresponding parts have also been fitted to the panel which will eventually go back at B end.

Original indicator blinds are fitted at both ends of the tram, those at A end having all the lamps wired in, along with bells and lamps on the platform. The platform ceiling has been put back at A end, mostly using original parts. The lower saloon ceiling has been put back in situ and is painted up in cream gloss finish. The chromed lamp fittings along B side have been wired in and new aluminium panels fitted above the lower saloon windows on this side of the tram.

Latest news on the truck (mid Sept) is that the fully restored frame is bolted together and being painted before the wheel sets are put back. New leather washers are being fitted to the brake cylinders to replace originals which had perished. Eight new rain deflectors are being made to add to the eight already in hand, and these will be fitted shortly.

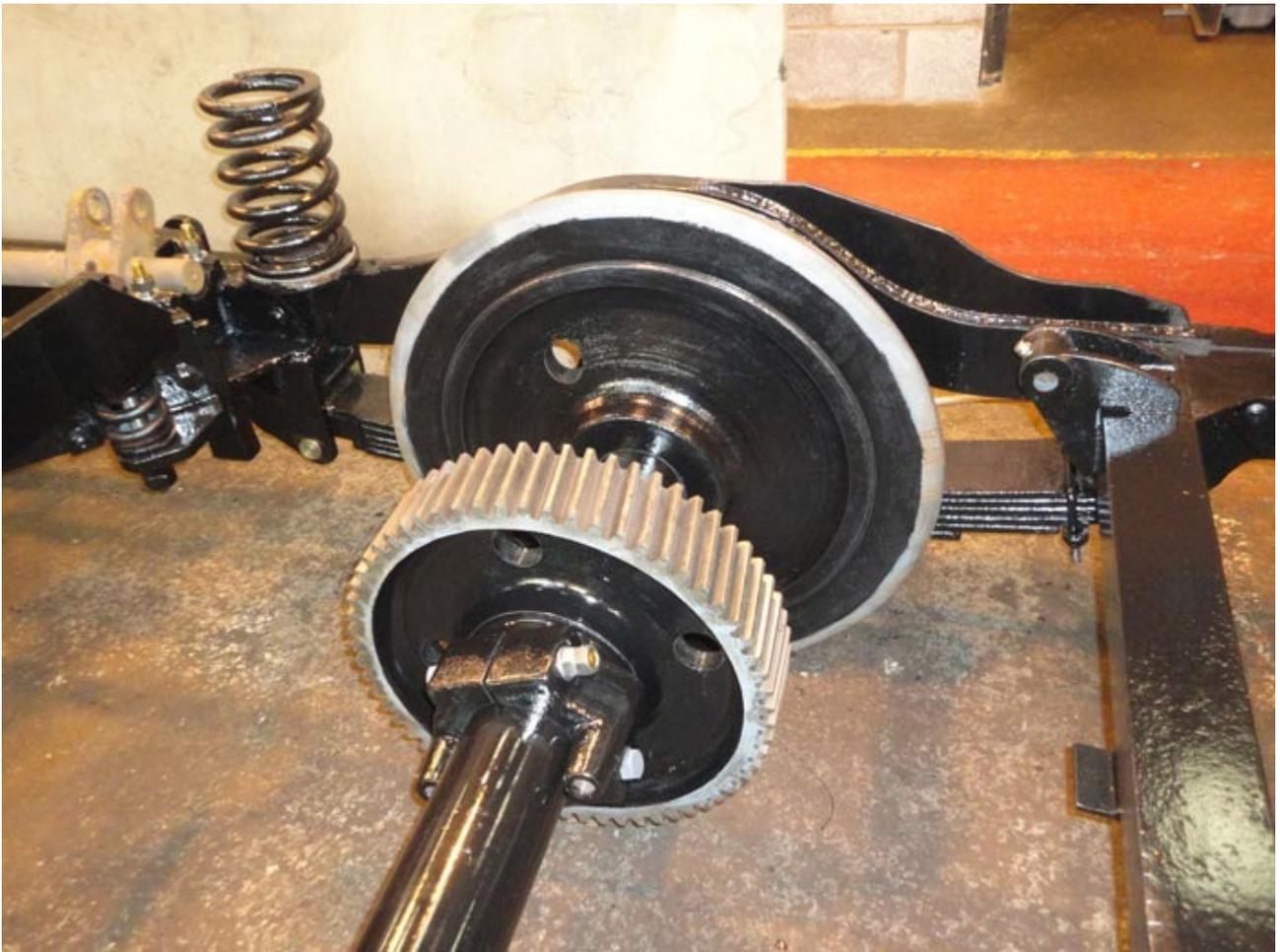
LIVERPOOL 245 PROGRESS REPORT.
by TERRY MARTIN. Photographs by John Hewitt.

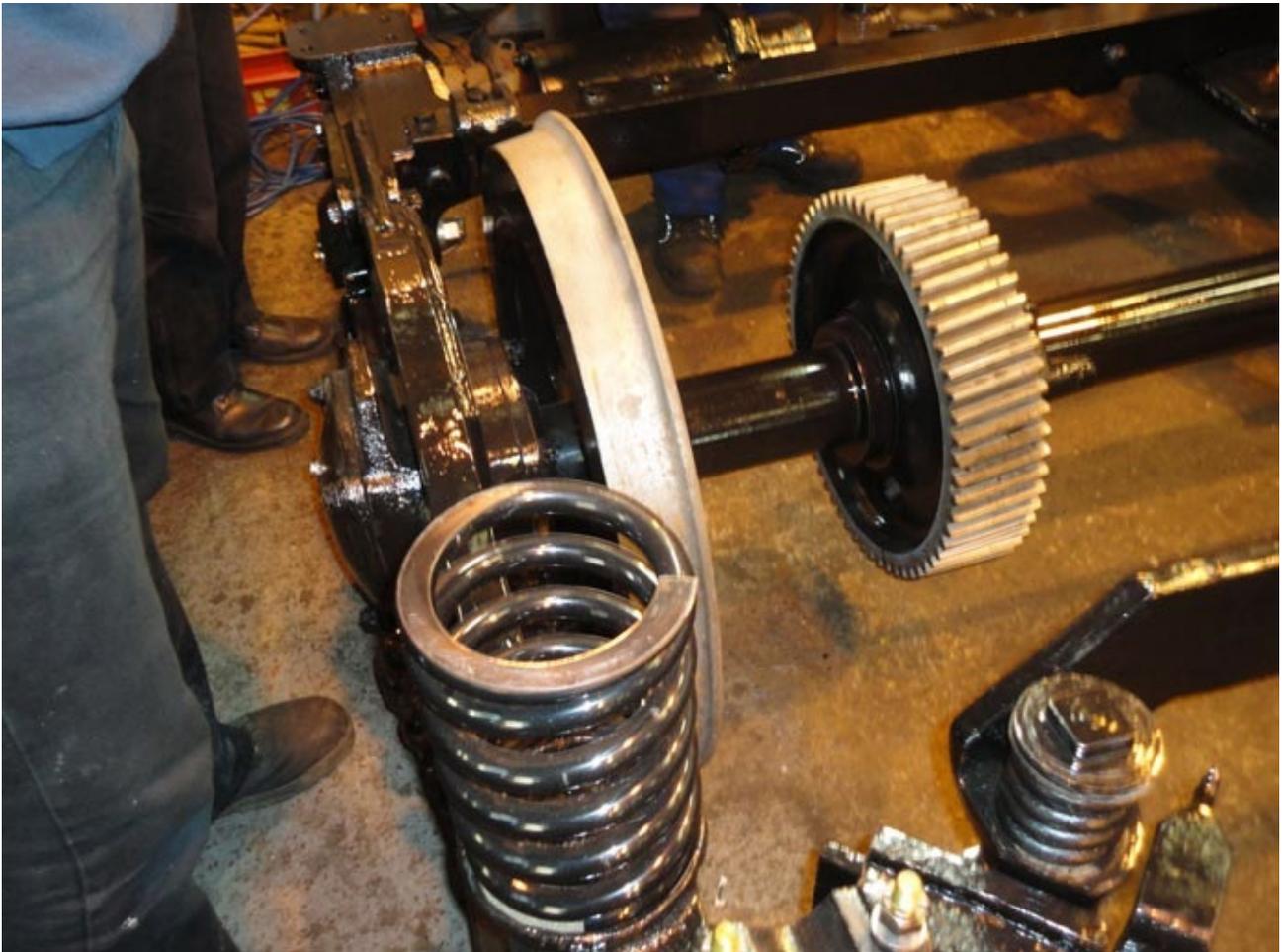
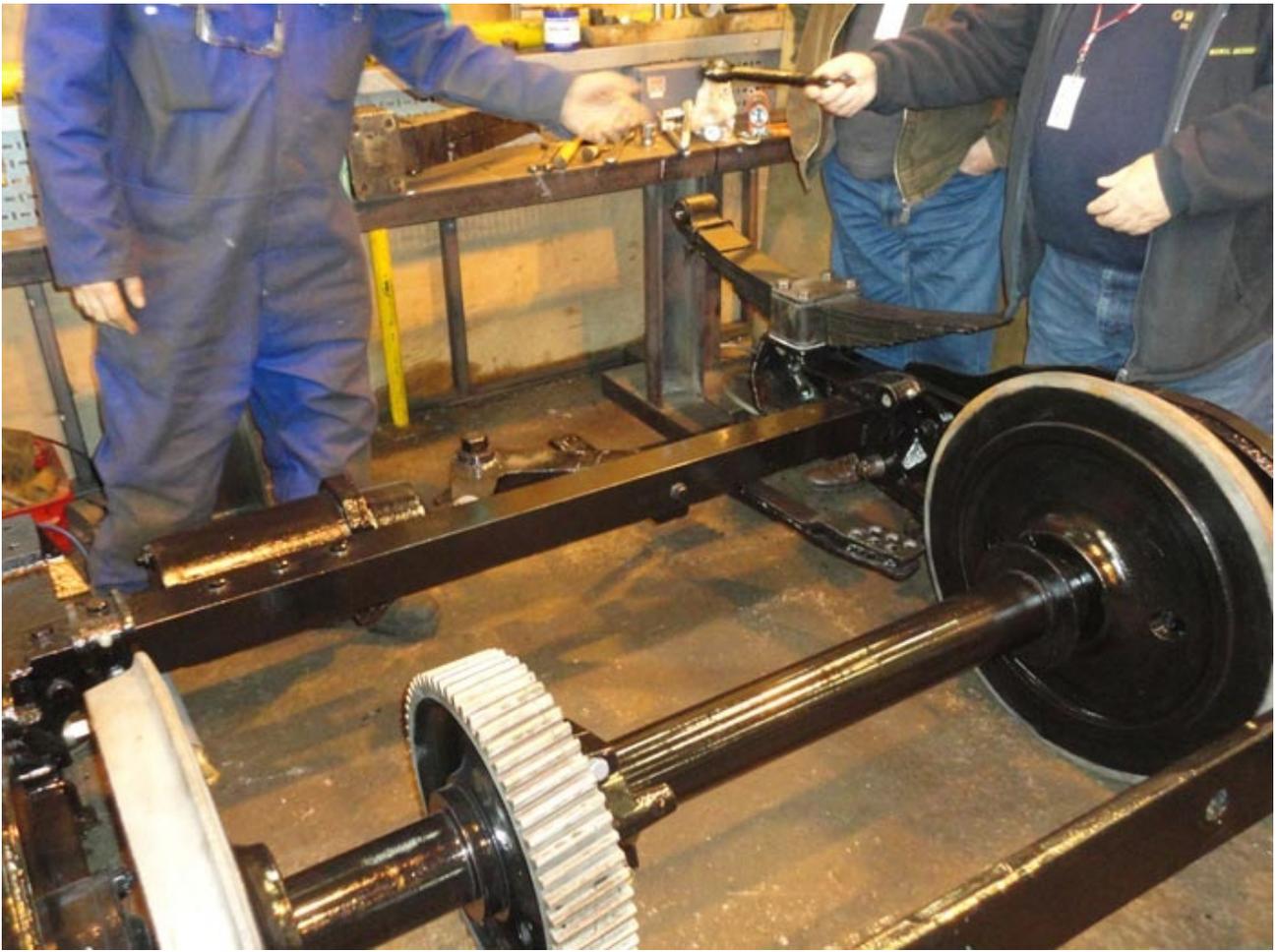
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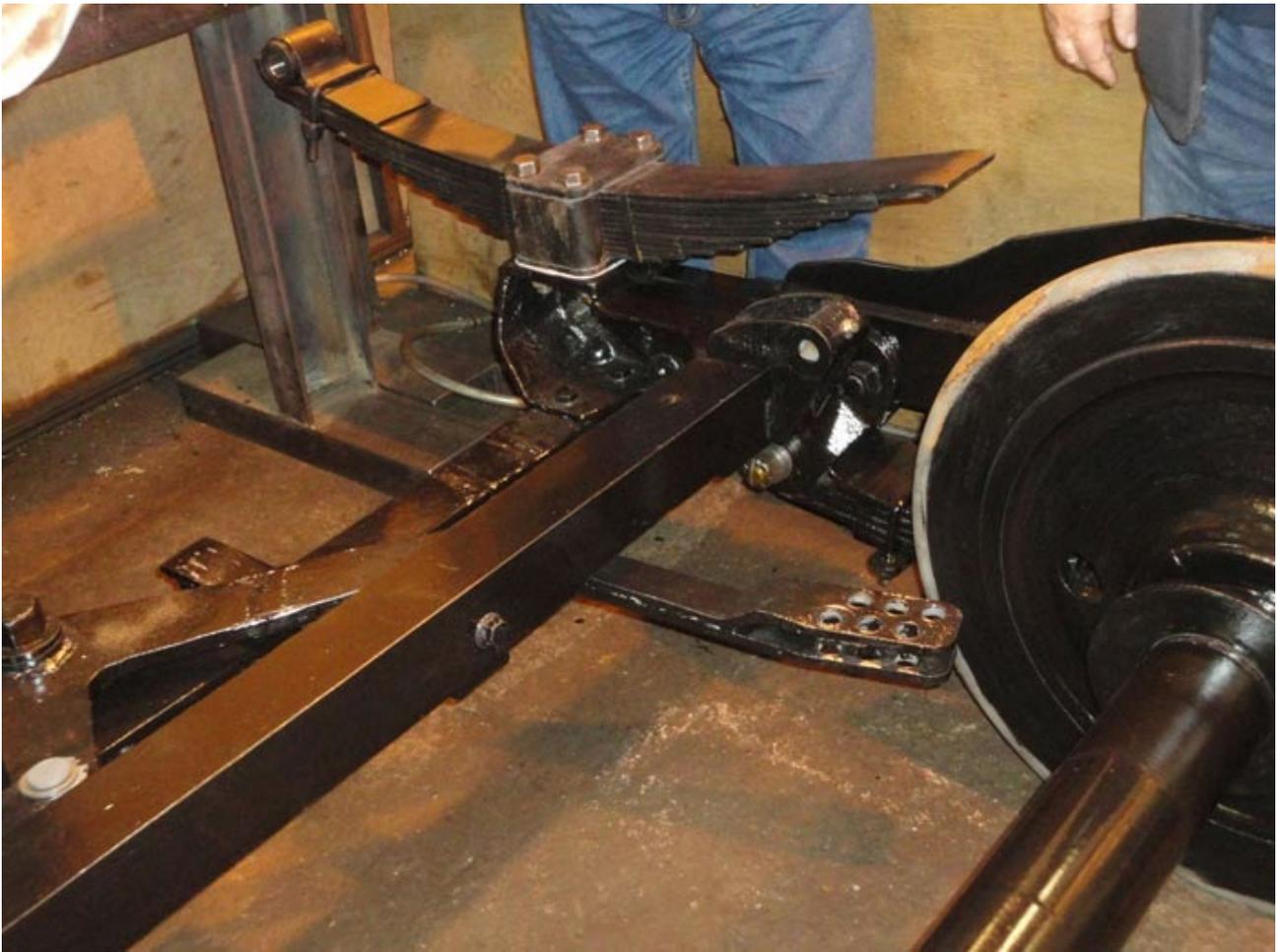
Bowers Electrical have now completed the work to Liverpool 245's EMB truck and work is concentrated on constructing a virtually complete new underframe. The parts were delivered to Bowers works in Heanor, Derbyshire in October 2011, for work which was originally anticipated to take just a few months.

The truck has been made true (one side frame was bent) and every original bolt used in its construction has been replaced with new. Work on the underframe is estimated to take some weeks to complete, and when this work is done, the truck and the underframe will be returned to BIRkenhead - probably during December.























LIVERPOOL 245 PROGRESS REPORT.
Photographs by Mike Mercer.

23rd January 2013.

The lifting frame had now been dismantled and 245 has been installed on its new underframe and truck.











January to March 2013

The refurbished truck and new under frame were returned to Taylor Street in early January and wheeled under the body which was duly lowered onto the under frame and then securely bolted in place. Because all the bolt holes along B side of the new under frame did not match the original holes in the pillars, new ones had to be drilled through the thick steel, slowing progress. Weeks later, the truck was unbolted from the under frame and after the car was raised on jacks, the truck was pushed over the pit for work to begin on fitting the brakes and motors.

New ash packing was fitted to the bearers of the new platform at A end and new planks which had already been coated in preservative, undercoat and gloss paint, were fitted in position. New planks and some originals were also fitted inside the saloon to form a new floor. The original corner seat units, which also housed the sand boxes were fitted back in place.

On the outside of the car, four large new steel panels have been fitted along B side of the car, below the lower saloon windows. The original steel straps which fit the length of each pillar have also been put back, set in mastic to prevent water ingress, and held with steel screws and bolts. Rain deflectors have been put back above the windows of the upper deck and lower deck on this side of the car. New aluminium beadings covering panel joints, have been set in mastic, and held with either stainless steel or brass raised head slotted screws.

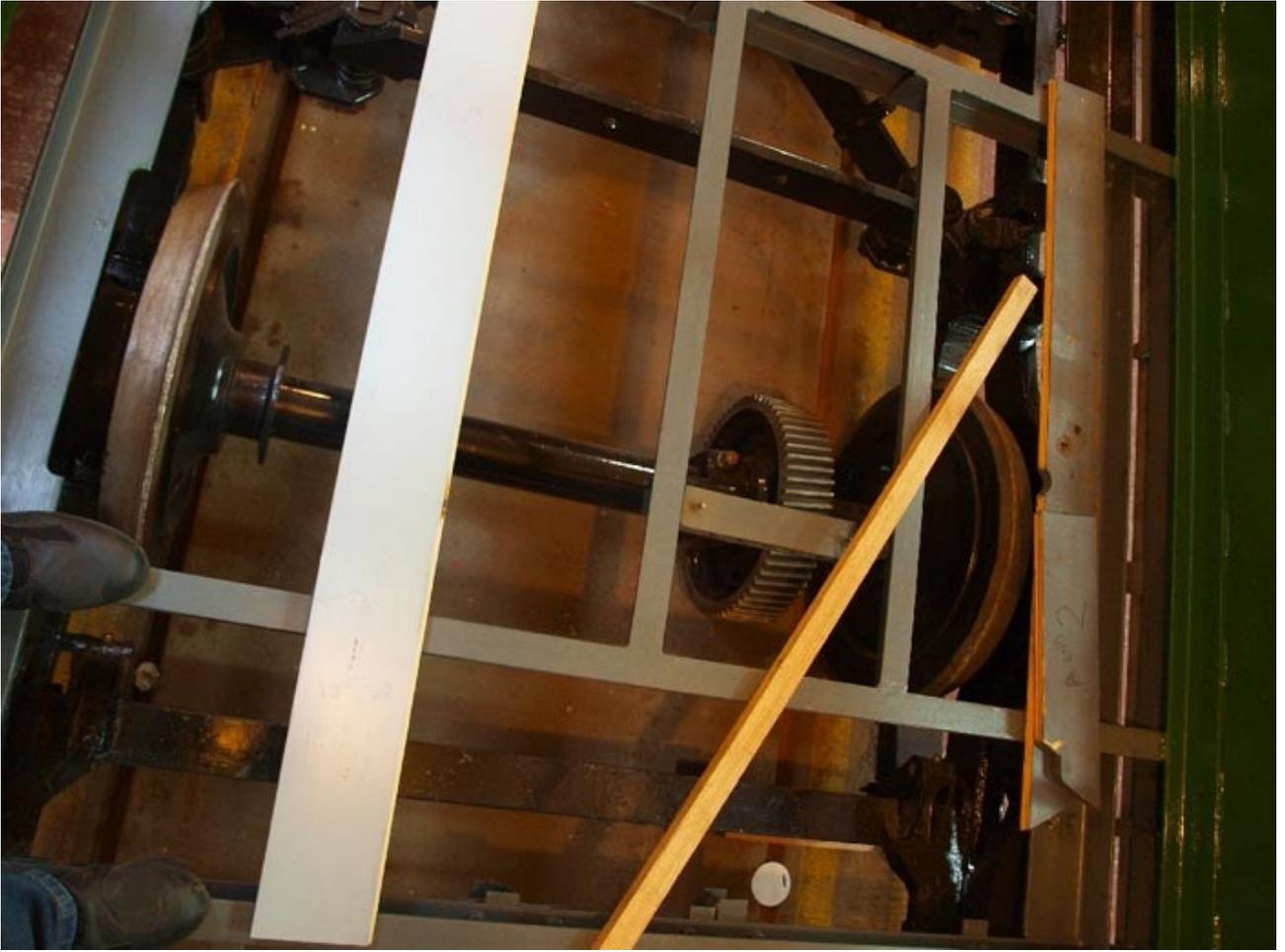
In mid March the first of the rebuilt wind-down windows was returned to Taylor Street, after extensive refurbishment which included the complete stripping down and fitting of new racks and pinions to replace the originals which were badly worn. The original chromed brass 1930s windows are of a complex but poor design as the 6 kg weight of the drop window hangs on just two tiny toothed pinions. Any movement of the pillars (which was common to these cars) often resulted in the mechanisms failing or jamming. LCPT replaced many of the old tram windows with sliding ventilators, but we hope the rebuilt windows will be more robust than they were originally.

Painting of the car's upper saloon ceiling has been completed in cream gloss colour matched to the original. Green gloss is also being applied inside the car, while the upper deck end waist panels are finished in a silver colour. All the car's eight signal bell pushes, two in the upper saloon ceiling, two in the lower saloon and two on each platform, have been wired in and tested okay.

The undersides of all the lower saloon floor planks are being painted in undercoat and a light grey gloss colour.

Photos: John Hewitt.



























245 restoration April to June 2013

Using T&G floorboards, a complete new floor has been fitted to the lower saloon and platforms. The only original parts now remaining are the four trap doors and two long floor planks. Panelling around the lower deck is now complete. All the large side panels are of steel, the smaller panels behind the staircases and the ends are in aluminium. Three original panels survive at A end and two at B end.

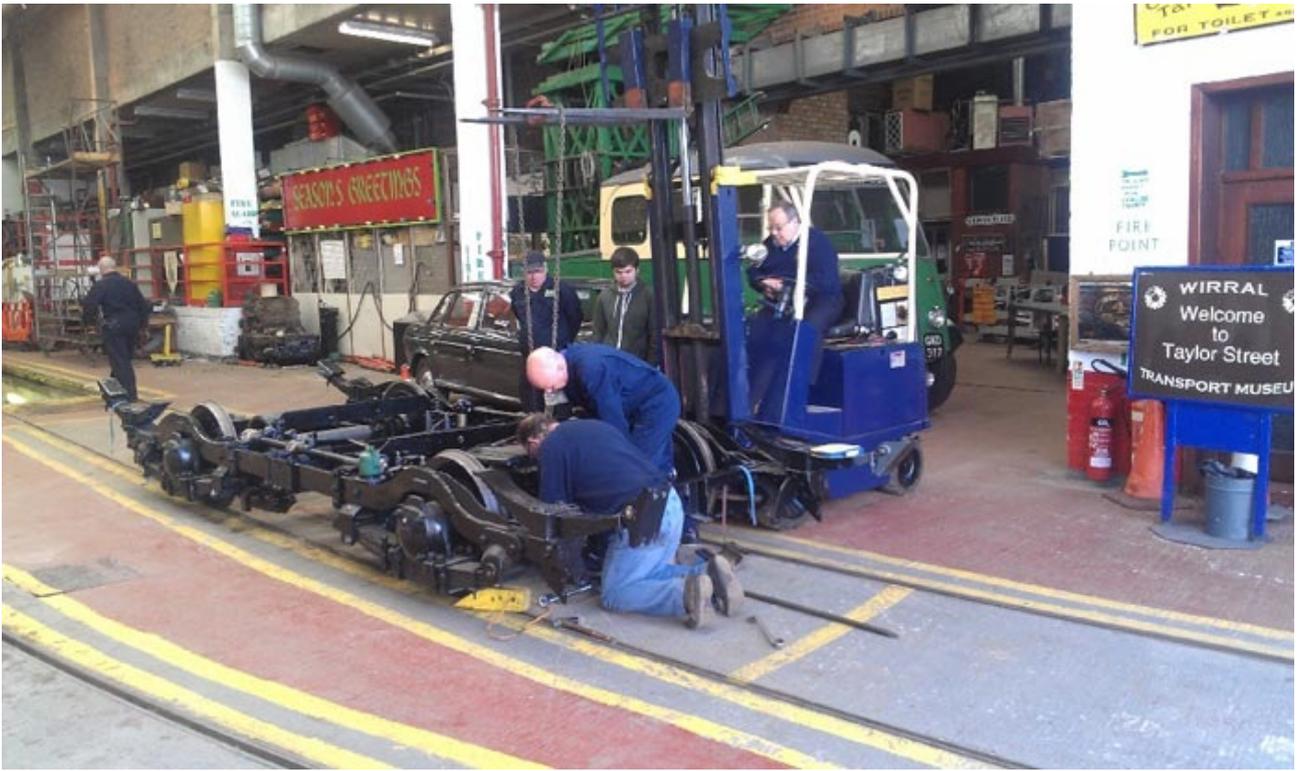
New aluminium beadings have been fitted to the car and sealed in place to stop rainwater ingress, a major problem with these cars pre 1957. A number of lower saloon seats have been reassembled, and new chrome plated brass screws have replaced the rusted steel ones along the chromed tops of the leather seat backs, much improving the appearance.

The two controllers have been overhauled and bolted in position ready for wiring up and the warning gongs and their associated fittings have been put back in place on the platforms. The four longitudinal corner lower saloon seats are back in place along with the sand hoppers and mechanisms which fit beneath each seat. A second refurbished roll down window has been fitted in the lower saloon and another on the upper deck.

A large hole has been cut into the decking at B end to bring air to the resistance box and a scoop to increase air flow has been fitted. It has a mesh at each end to prevent leaves or other litter from entering. The ornate chromed covers have been fitted over the ventilation openings in the upper deck ceiling, and all the interior cream gloss is completed. Much of the green interior paintwork has also been done.

A massive amount of work has been carried out on the truck and the two motors have been refitted in place. The two air tanks have been thoroughly overhauled and certified prior to re-fitting to the car. At B end, the cast aluminium rain deflector has been put back over the windscreen opening and much work was carried out to the ash framework - original pillars had literally rotted away and there was much splicing in of new timber.



















Progress from June 2013-March 2014

The metal sand reservoirs are now securely fitted under the four corner lower saloon seats, and the jiggers and sand pipe mechanisms are connected by rods to the pedal on each platform. A new cork floor was fitted over the new floorboards of the lower saloon, and new and original hardwood lagging has been put in place before painting in dark grey lino paint. Only the four trap doors are original timber, cork and lagging. Much of the wooden trunking for the main cables running through the saloon is original and in excellent condition. Two lamps have been wired in on both platform ceilings. Two new aluminium panels have been fitted to the car side at B staircase. The entire inside of the car has been painted in green gloss, and the original re-chromed match strikers/stubbers have been put back in the upper saloon.

The original resistances have been installed back under the staircase at B end cupboard. Suitable extra ventilation (large holes) were cut through the new floorboards and on June 6 an original metal contraption for deflecting cold air into the resistance box was fitted into this opening. The four chrome plated upper deck circular ceiling ventilators have been fitted to the upper deck ceiling to vent onto the roof.

On July 11, the trolley base was hoisted onto the roof and later bolted in place. The re-silvered wooden framed mirrors were fitted on the two stairwells. New hardwood lagging was fitted on the two platform floors, and the cast brass plates to take the driver's portable seat, were also bolted into position.

The towing blocks and spring bumpers were temporarily fitted at both ends of the car, but this job took much longer than expected as the holes in the new underframe had all been drilled in the wrong positions! The spring bumpers were later removed while the front panels were painted in gloss.

All the windows on the tram were then put back. The triplex D windows on both decks proved difficult as their radius was sharper than the new curved ash sills which had replaced all the rotted wood, and much adjustment had to be made. All the windows are sealed into U-shaped rubber channel along each edge, which are then set in further sealant to prevent any future water ingress.

The original refurbished compressor was put back into the cupboard under a end staircase with the help of a forklift and all four armature coils have been re-insulated. Miles of new cabling has gone into the car and the controllers at both ends are wired up with their newly re-chromed tops back in place.

Fine replica interior transfers of black coloured legal lettering and fleet numbers have been fitted in the appropriate positions. The cupboard doors have been put back at both staircases, and painted in gloss.

At the end of October, after many months of work on the truck, it was reunited with the underframe and car body. Unfortunately, all the leafsprings had not been cleaned of rust and the truck and body were separated so the leafsprings could be taken apart, cleaned of rust, greased and reassembled. The truck and underframe were finally bolted together on Sunday November 17.

Aluminium seat pedestals were fitted in the lower saloon (these had previously been stripped of old paint, and coated in acid etch primer, undercoat and green gloss) and all the transverse seats were put back in the places they had been taken from - each pedestal, seat frame, cushion and seat back had been carefully numbered on dismantling). Later, all 20 transverse seats were put back in the upper saloon. The refurbished brown rexine roll-up blinds were fitted to the lower bulkheads.

At this point the holed and battered gear box casings were finally repaired and ready to go back onto the truck. They should have been fitted before the truck went back under the car of course, and fitting them in position via the trapdoors of the lower saloon floor proved extremely tedious and time consuming.

By the end of the year, the last of the eight Rawlins patented wind-down window frames had been fitted. These had been taken away off site and painstakingly rebuilt with new racks and pinions, new rubber seals and in some cases, new toughened glass. Tram 245 is the last Liverpool tram with this feature. Both 869 and 293 are fitted with sliding ventilator windows.

Two caravan batteries have been housed in the space alongside the sandbox under the seat at A end (step side).

Next major task was the fitting of an inverter to reduce the current from 600V dc to 24V dc for the lamp circuits.

The folding platform doors took much time to fit into place, getting the sliding door gear correctly in line with the runners on the bottom of the doors, not to mention the six sets of hinges on each set of doors, was a black art requiring (literally) the thickness of a piece of card to act as packing to make the whole thing work (we found evidence of old Woodbine cigarette packs had been used for this in the past!) In February 2014, the life trays and associated fittings were fitted and tested. The handbrake column at B end was fitted and the chains and rods fitted in place under the car, for both handbrakes.

Final wiring up of the car is now underway and the professionally painted exterior has a mirror-like finish. White legal lettering and fleet numbers have been put in place along with the warning lamps, headlamps and spring fenders.

Testing of the tram is expected to commence shortly.









