AUTOCAR

1903 North Eastern Railway Electric Autocar Trust

Newsletter No.19 — Spring 2013

heritage lottery fund
LOTTERY FUNDED

MLA Museums Libraries & Archives

The North Eastern Railway 1903 Electric Autocar Trust

Registered Charity No: 1105829
Company Registration No: 05171008
www.electricautocar.co.uk

Chairman Stephen Middleton,
Rose Lea House, 23 Brunswick Drive, Harrogate,
North Yorkshire, HG1 2QW.
Tel - 01423 561 965
E-mail - middletonmarketing@btconnect.com

Secretary Dave Cullingworth,
29 Beckett Close, Nawton, York, YO62 7SB.
Tel: 01439 771 758
E-mail: david.cullingworth@btinternet.com

Treasurer Peter Lund,

E-mail - plund97005@aol.com

Press, Publicity & Editor Simon Gott,
Embsay Station, East Lane, Embsay, Skipton,
BD23 6QX.
Tel: 07564 249 029 (daytime only please)
E-mail: autocar.newsletter@gmail.com

Membership Stuart Hiscock,
2 Lairs Crescent, Snainton, N Yorkshire, YO13 9BQ.

Project Engineer Steve Hoather

Front Cover: **A shunting move at Embsay on the 5th April allowed us to get some good pictures of the autocar and autocoach together. (Simon Gott)**

April 2013

Welcome to the 19th issue of our newsletter. We have photos of two major events this time, firstly the power unit in its housing, taken on a visit to Loughborough and then the first views of the autocar and auto-coach together in daylight. Previous views have shown them together, but in the restoration shed, which has restricted angles and lighting.

Contents

New Members

A warm welcome to Mr & Mrs N Berry of Scarborough and Mr G Collett of Copmanthorpe.

Underframe appeal

Since newsletter number 18 was published, we have received donations from the following members:

J Clarke, H Peacock, J Harrington, T Hughes, D Carr, D Yates and R Chapman.

A grateful thank you to all. The underframe fund is steadily rising and has now reached £4560.70 please keep the cheques coming (either to Stephen or Stuart) - every little helps and brings our goal nearer.

Chairman's notes

Stephen Middleton

The recent bad weather has not stopped progress on our 'twinset'.

Alan Chandler has, with meticulous craftsmanship, laminated curved hardwood profiles, completing the 'face' at the non powered end of the autocar.

The autocoach took a coat of crimson undercoat on the odd fine day in February, which allowed us to fit the panel beads, transforming its appearance from a wreck to a fine carriage. Several volunteers are helping on a Thursday doing the vital but largely unsung 'boring' work, such as sanding window frames prior to glazing, preparing drop lights for glass, scraping paint from door frames and fitting glazing beads. We are ready to fit glass and roof canvass and expect to complete this by spring.

A committee meeting was held in Loughborough on 16th March, where we saw the generator set in its housing and looked at the underframe. Autocoach door repairs, a major challenge, is allocated to one very skilled Trustee, Marcus Woodcock and our secretary, David Cullingworth is researching the interior so we can make a productive start on this later in the year.

Michael Massey, who kindly produced two DVDs for us (copies are still available) is producing some educational display panels and they look great.

Thanks to our volunteers and the recent generous donors to the underframe appeal we are making great progress. Let's keep it up!

Opposite:

The autocoach, looking much better for a coat of paint. (Alan Chandler)

The engine housing assembly in our unit at Loughborough. (Simon Gott)

Engineering Progress Report

Stephen Hoather

The headline news this quarter is that the engine housing with the power unit installed was delivered from Adey's to our workshop in Loughborough on 14th March. There is still a lot of work to do before it can be run up, but now it is in our workshop Dave and Peter can make a start. The next steps with the housing are as follows:

- machine the aluminium doors, hinges and catches and fit the (removable) doors to the housing.
- determine the positions of the various electrical equipment boxes which need to fit within the housing, prepare drawings and make mounting brackets.
- wire up the boxes when installed (Noel Craigen will help with this).
- rig up a temporary fuel supply and exhaust outlet.
- design and install a fire detection and suppression system

Steve at the NRM, consulting chassis plans. (Bob Gwynne)

The alternator set can then be run off load, which will enable us to judge whether additional soundproofing will be needed. If we can find a suitable resistance load bank, we might also be able to run the engine on load, which would enable the control system to be checked – the more testing we can do in the workshop, less time should be needed for trial running.

Before the housing was delivered, Dave Moore spent a lot of time in his garage checking the electronic racks donated from HST power cars to us, and modifying the boards which drive the speedometers to give a full scale deflection at 40 mph instead of 125 mph. These will be driven by probes (yet to be fitted) in the motor gearcases which also detect any difference in the speeds of the two motors to operate the WSP (wheelslip prevention system) – just like the ABS system on a car, but over 35 years old!

The trailing bogie for the power car needs overhaul and significant repairs to corrosion of the frame. A number of quotes were obtained, and the contract has been let to Boston Lodge Works of the Ffestiniog Railway. Lifeguards will also be fitted at the outer end of the frame. Any rumours circulating that it's to be converted to 1' 11 ½" gauge can be firmly denied...

The news on the brakes front is not quite so encouraging. The material which we obtained last summer came from withdrawn DEMUs on Northern Ireland Railways, who were very kindly able to remove it for us for despatch to the mainland. For various reasons we did not obtain everything we needed then, but a final batch of these vehicles has now been released for disposal. Unfortunately they are stored in a remote siding where no staff or pit is available, so NIR have sold them to a local scrap merchant, who will cut each coach in half and take them to his yard. A number of restoration projects are interested in obtaining components from these vehicles, and initial discussions have taken place with the scrap merchant with a view to sending a joint working party over to Ulster to recover what is wanted.

The outcome is not yet known, but in the meantime I have been looking for alternatives over here, particularly for items which will be difficult to remove “on the flat”, and Wendy the C&W Supervisor at Embsay has already found two 10” brake cylinders for us. If we do not get the NIR material, I think all of it can be found on ex-BR vehicles, but it will be a lot of hassle since a mixture of coaches and locomotives will be needed. In the meantime, the occasional frustrations of this project have been illustrated by the saga of the 12” brake cylinder. We need one of these, and you may remember from previous reports that we spent a lot of time last year trying to find one as it was thought that Post Office vehicles were about the only vehicles fitted with this size. Having obtained one in good condition, we now also have a spare, and I recently spotted two more in the yard at Pickering, which we could probably have bought if needed!

Above: *The engine housing assembly, with the powerunit now inside.*

Opposite: *The chassis, handbrake and engine housing assembly. (all, SG)*

In the last report I mentioned a possible foul between the underframe trussbars and the brake rigging on the motor bogie on curves. Having had another look now that the underframe is on level track at Adey's, we think a small modification to the brake rigging should be possible, and we are working on the details with a view to doing it at Loughborough rather than waiting to see if we have a real problem in service.

An Engineer's Perspective — Traction design (continued)

Dave Moore — Volunteer Engineering Advisor to the Trust

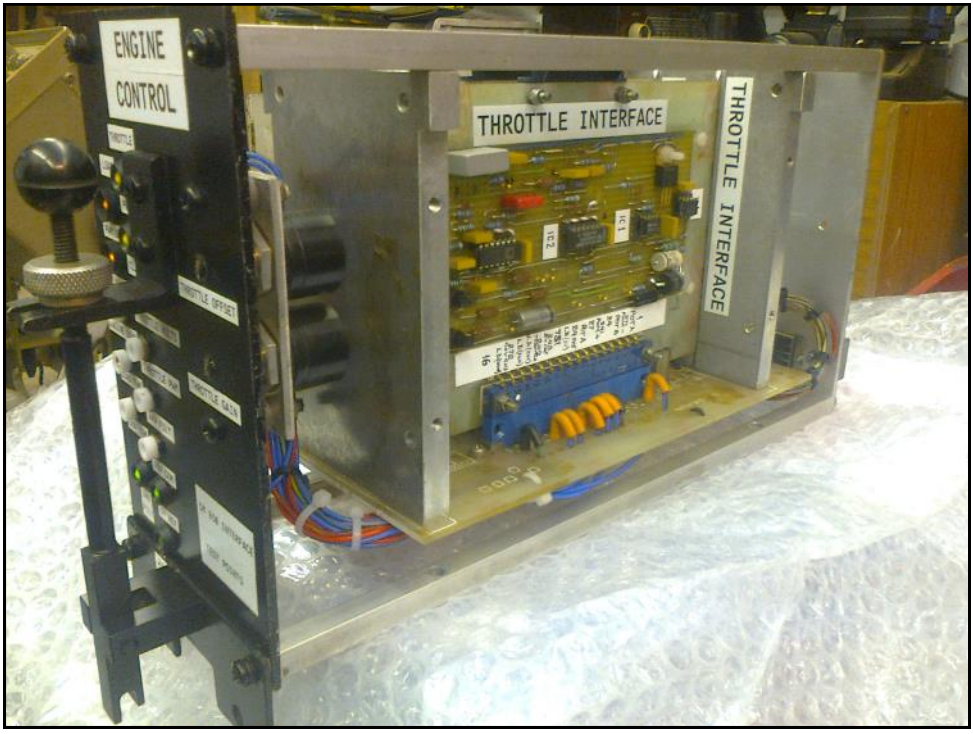
Control Electronics: Controlling the Autocar

Considering that we must have some degree of electronic controls on the Autocar in order to control the modern all electronic engine, we aim to make the most of this type of equipment for other functions as well. It would be a bad choice to have modern engine controls mixed in with crude speedo and wheelslip protection, so we will use middle of the road, essentially obsolete, old loco electronics as a building block to perform the difficult control functions. In this way we get the best of modern control performance, but don't make it so complicated that it becomes difficult to understand and maintain. This is a nice way of saying we stay one step back from computer controls, and stick with something we can mend if it breaks. Most people don't realise that the best modern diesel train of all time, namely the HST, still runs with all analogue electronics even in its repowered MTU engine versions. As long as the control functionality is not too complex, it is possible these days to design old style analogue electronics systems that are even more reliable and trustworthy than they were when they were the only option. And, the extra discipline of software is not required.

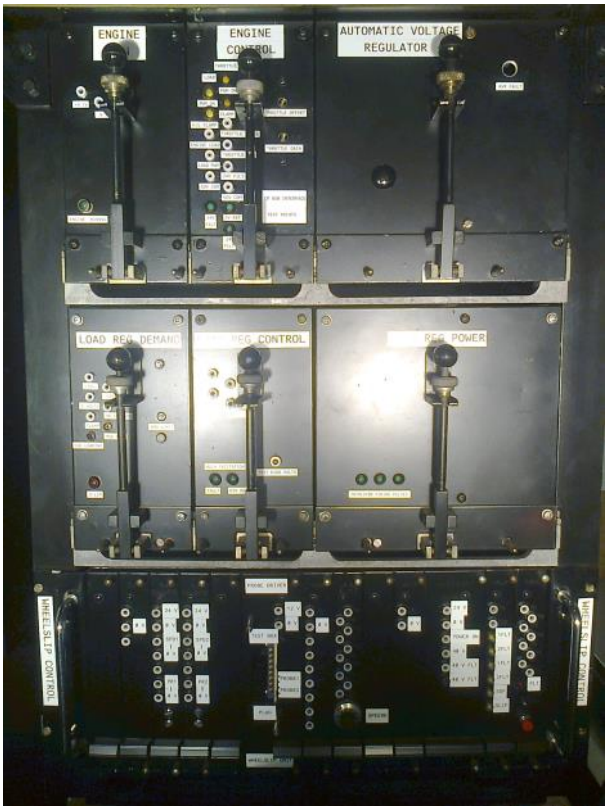
Left: *A wide-angle view of the power unit, looking towards the ECU.* (SG)

For the Autocar, redundant HST electronics forms the basis of the Electronic Control Unit (ECU). By comparison with car ECU's ours is huge, being quite dated, but it's good to work on and adapt for the exact requirements of the Autocar. The electronics are modularised and each unit slots into a 'rack' with rear connectors to connect it all together. This makes for easier fault finding and repairs.

Referring to the schematic diagram in the previous Newsletter, the Autocar needs an Automatic Voltage Regulator, a Load Regulator for traction, Speedos and Wheelslip Protection, and a battery charger. This is where electronics comes into its own, as all of these difficult to do the 'old fashioned way' functions lend themselves to electronics. Most of the traction manufacturers began using this technology - with varying degrees of success - in the late 1960s. Over time, equipment became more reliable, and by the late 1980s, computer control was also included in most new traction equipment.



Above: *New engine interfacing electronics, built into the original frame*. (DM)



The first thing an engine needs after startup is an auxiliary system to support it, and this comes from the three phase auxiliary alternator. The output from this machine is controlled by the AVR module, in our case this is a modern unit from Cummins Generator Technologies who built the alternators.

This was then built into the old module, rewired and adapted accordingly, and slots into the main ECU Rack. The electronic battery charger is actually mounted 'downstairs' in the Battery Box , which is a new fabrication designed to look like the old style wooden battery box but to have better structural qualities for modern times. This charger keeps the 96 volt vehicle battery (that has to support both Autocar and Autocoach lighting and control) continuously on charge.

Traction, and hence engine control, is controlled by the Load Regulator modules and their supporting units. The Engine Control module takes the driver's power handle position and makes it into a lorry like throttle signal for the engine to follow. It also takes the engine's load signal and uses it to control how much load is being applied to the engine via the Main Alternator. These are some of the special tasks unique to the diesel electric transmission that the North Eastern would have found difficulty with, and indeed some of these functions were done very crudely by their drivers as there was no automatic method of doing it in 1903.

The bottom deck of the main ECU rack is a sub rack in itself, and is where the speed related operations are worked out. This is a converted HST Wheelslide Unit, which now becomes a bespoke Wheelslip Protection Unit. It measures the speed of the motored axles from gearcase speed probes, checks for wheelslip at all times and sends the traction Load Regulator a warning signal if either or both axles is slipping, to prevent rail burn or overspeeding of the traction motors. It also derives a signal for all three cab speedos.

Full speed ahead!

(Dave Moore)

Letters

We have had a letter from Len Clarke (one of our working members) about some other of his charitable activities:

One of my reasons for joining the Autocar project (other than the fact of it being a relic of the North Eastern Railway) was the possibility of taking disabled visitors much more easily through it's double doors, than those of a Mark One coach. As a member of the ELR, in the late 1980s, I assisted in the conversion of a vandalized, fire damaged Mark One CK into a vehicle able to accommodate disabled visitors. This was paid for the hard way at jumble sales, raffles etc.

I did National Service in the RAF, and have been a long time member of the Royal British Legion. I make donations to the Welfare Fund of the Royal Corp of Defence Medicine at Queen Elizabeth the Second Hospital Birmingham, the unit deals with battle casualties, including those from Afghanistan and recently the young schoolgirl shot by the Taliban in Pakistan. Ultimately the aim is to restore casualties to an active life in the Forces or Civvy Street. One of the requirements while recuperating is to organise party visits to venues to integrate into the wider community, pubs, theatres, matches etc. I hope the Trust and the Autocar Unit will assist in this endeavour. Within Yorkshire there are a number of tourist railways that would welcome the Autopair and provide a day out for our heroes.

Also, recently I joined the Patriot Project, the loco to be the flagship of the RBL and the aim is to have completion for the anniversary of the end of WW1 – 'The war to end all wars'…

Donations and membership form for the RCDM welfare fund can be sent to:

Patient Support Services, RCDM Level 2, Queen Elizabeth Hospital, Mindelsohn Way, Edgbaston, Birmingham, B15 2WB.

Two views inside the autocoach, showing the driving end and the clerestory etched glazing. We suspect the swallows' nest is non-original!

The autocar and coach outside, catching some sun on their timbers. (SG)