



Patrons - Lord Faulkner of Worcester - Judy, Lady McAlpine - Dame Margaret Weston, DBE - Brian Greenwood

## "BESTT - Something to Crow About"

### Herbert Crow Award



Presented to Gordon Newton (right), Chairman of BESTT at the Mansion House, London on 13th March 2019 by the Worshipful Company of Carmen. (from left, The Lord Mayor's Representative, Alderman Ian Luder CBE, Master, Mr Stephen Britt)

### THE HERBERT CROW MEMORIAL AWARD

Founded by the Worshipful Company of Carmen in 2000, the Carmen's Herbert Crow Memorial Award honours achievement in transport scholarship, management systems, training, research, authorship and publication, or any other knowledge-enhancing transport activity. It comprises the Herbert Crow Memorial Cup, displayed by the Company, and a silver gilt medal and framed citation, to be retained.

### THE BOILER & ENGINEERING SKILLS TRAINING TRUST

The Boiler & Engineering Skills Training Trust received the award for addressing the decline of skilled engineers in heritage steam, by training a new generation. A voluntary, charitable organisation, it has created a syllabus-based scheme to teach heritage steam engineering boiler and mechanical repair. Training is undertaken in workshops throughout the UK and, since 2014, sixteen trainees have successfully completed the one year course, funded by the National Lottery Heritage Fund, twelve finding employment within the sector. Another sixteen are in similar training. The Trust's scheme ensures maintenance and continuity of working steam power.

In receiving this accolade, BESTT has followed in the illustrious footsteps of a number of high profile and world-renowned historical attractions, including York National Railway Museum, London Transport Museum and the RAF Museum Hendon.

Gordon Newton, chairman of BESTT, said: "We are thrilled to have received the Herbert Crow Memorial Award. It's a massive achievement for us and a testimony to the hard work we have put into creating world-class mechanical training programmes. Our success would not have been possible without the continuous hard work of employees, training workshops, trustees and volunteers. We have received further National Lottery Heritage funding which has enabled us to produce a new Mechanical Overhaul Scheme for 2019/20"

### HLF Funded Mechanical Overhaul Course



(First year trainees with G. Newton & J. Reddyhoff at Severn Valley Railway Museum)

### RECRUITING NOW FOR NEW TRAINEES TO START SEPTEMBER 2019

The second year of BESTT's one year training programme funded by National Lottery on mechanical repair of steam engines begins in September. We are recruiting now with priority for under represented groups. Training opportunities across England and Wales.

Interested? [See Page 2](#)

To apply [http://www.bestt.org.uk/mechanical\\_overhaul.html](http://www.bestt.org.uk/mechanical_overhaul.html) or contact [enquiries@bestt.org.uk](mailto:enquiries@bestt.org.uk)

**Deadline for applications is 31st July**

# COURSE DETAILS - Engineering Training on mechanical overhaul of steam engines

[www.bestt.org.uk](http://www.bestt.org.uk)

## What the HLF BESTT mechanical overhaul scheme offers. Where and what is the work?

We offer one year paid work training placements with entry in Summer 2019 - 8 placements. Basic training of 3 - 4 months then specialist work. Pay is £11,000 at age 18 and £15,000 (age 22 or over) plus £3,000 bonus on completion. There are good job prospects.

**Training** is on the job with a trainer and BESTT organized teaching. You work through a syllabus, photograph your work and write it up to show you understand "why".

**Where** Our training placements are at heritage engineering workshops around the country. You are likely to need to live away from home Mon - Friday but you will get help to find accommodation.

**Work** - you will learn how to repair the moving parts of a locomotive or steam engine - wheels, cranks, pistons, steam pipework, brakes, lubrication. It can be hot, noisy, heavy but when finished is usually very satisfying! You will be working alongside very experienced people and in a team.

## Who we are looking for and how do we select

Anyone over 18 can apply but we give priority to underrepresented groups including those with a disadvantage eg lack of job opportunity or educationally disadvantaged backgrounds (schools with few people going on to training or higher education), women and black and ethnic minorities. If you fit one of these groups please tell us or tell us about any other disadvantage in looking for this type of work.

You don't need to have previous engineering or heritage **experience** but we are looking for people who can work with their hands and have a real interest in how things work. At the interview we will ask you about your experience, for example in using tools or making something. We ask you to bring photographs or a model and be able to talk about what you made. It could be repairing or improving something at home or making a model, and if possible it should involve moving parts.

**Use the internet to learn more about how steam engines work.** We look for applicants to say what would interest them about this type of engineering work and their future plans;

We also need to know that you can follow instruction, work both in a team and on your own and have the English and Maths to write up the work you do and the necessary calculations.

## To know more about the scheme

Before an interview we will contact you to make sure you understand what's involved and can ask us any questions you may have. We may also be able to arrange a Taster Day and/or a Work Trial at a heritage railway or workshop.

**To apply** [http://www.bestt.org.uk/mechanical\\_overhaul.html](http://www.bestt.org.uk/mechanical_overhaul.html) or **contact** [enquiries@bestt.org.uk](mailto:enquiries@bestt.org.uk)

**Deadline for applications is 31st July 2019.**

1. **Email BESTT** [enquiries@bestt.org.uk](mailto:enquiries@bestt.org.uk) **with your CV or contact details** ( we need a contact address, email, phone number and age also we need to know about your education and any work experience);
2. Tell us what practical experience you have eg things you have made or a project you plan to complete using moving parts. Tell us also which parts of the country you are willing to go to for training.

## Short Courses

### Riveting

BESTT is continuing to offer Riveter Certification Courses which gives the opportunity to learn the skills of hot metal riveting.

The course can be tailored from novice to expert over 2 to 4 days and gives hands on training with distance learning, a practical assessment by an independent assessor completing with a short exam. The skills acquired can be used for the fabrication of heritage pressure vessels and structures.

### Boiler Washout & Examination

BESTT is pleased to continue offering washout & examination courses in 2019.

- Examination and details of washout plugs and fusible Plugs
- Details and techniques in replacing washout plugs and mud hole doors as part of boxing up' the boiler.
- Examination, testing parts and components on the boiler, identifying faults, corrosion etc.
- Overview of water treatment principles.

**For further information and course dates please contact** [enquiries@bestt.org.uk](mailto:enquiries@bestt.org.uk).





### 3 days with BESTT trainees at the Keighley & Worth Valley Railway Masterclass

The first Mechanical overhaul masterclass was held at Keighley and Worthy Valley railway in April 2019. Trainees across the country travelled from West Somerset, North Yorkshire Moors and North Norfolk Railway. We also invited the first-year apprentices from Severn Valley railway to join the group. The trainees gathered at the main workshop at Haworth and they were inducted onto the site by John Reddyhoff, the lead trainer for the 3 days.

The team assembled around the wheelsets for locomotive 90733 to discuss the agenda covering the learning outcomes from the BESTT modules (LM1 and LM2) "Wheels, axles and axle boxes".



The trainees were asked to look at the various types of locomotives and identify at least three different methods of wheel tyre fixing. John spent time explaining the reasons behind the differences.



The trainees were set the task of A) checking tyre wear, B) different tyre profiles using a tyre gauge and finally C) back to back measurement across the tyres.

Trainees were found checking some old wheel sets in the yard showing very aggressive wear. All

trainees went on to carry out all three aspects of this exercise. The team gathered around the wheelsets for locomotive 90733 to discuss and review their findings and methods of inspection.

John Reddyhoff presented the different defects that could be found on wheels and axles, along with inspection methods and the critical defects that need special attention.

The trainees were asked to examine three different locomotives and establish the difficulties of carrying out the inspections to the wheels and axles and provide a report on their findings. All the trainees gave



realistic diagnostics on the methods of inspection and how difficult it was to carry out many of the inspection methods and measurements required for wheels and axles while mounted within the frames on a fully assembled locomotive.

On the morning of the second day we had the pleasure of Richard Gibbon and Tony Simons presenting a more in-depth introduction to axlebox design, lubrication and inspection. The trainees were split into groups to carry out measuring axle



journals, axle boxes and checking the boss faces and frame squareness.

Following this exercise the teams discussed their findings and reported some strange results. The first strange finding was that the axle sets were showing very unusual methods of mounting the wheels to the axle journals. The wheels seem to have been pinned onto the journals, a method not seen before by Richard, Tony and John. Secondly some unusual marks were found on the axle boxes and frame.

It was decided later to change the exercise to investigate further the findings found earlier. The trainees checked the back to back and journal measurements of the four axle sets.

Trainees checked and measured the axle boxes and frame very closely.

During the discussions it was found the measurements across the axle set journals were very different between the four axles and that all the axles had been modified during their lifetime, but nobody could tell when. It was found that the middle two axle sets had been machined not as wide as the end two rear and forward axles, again no reason why. Then it was also found the frame was not fully square and needed further investigation by KWVR.

The conclusions were that this was not a normal locomotive as it was built in the UK, shipped and used in the Netherlands and then moved to Northern Sweden before being brought back to the UK. There seem to be no record of the changes and why they were carried out, but further investigation was required.



On the final day John showed the trainees the method of load testing an axle and wheel using axle load testing equipment.

Before leaving, the group discussed the findings of the three days and were set goals to report their findings in their portfolios for later discussions.

**Further masterclasses planned will include :**  
Motion, Cylinders and Slides & Pistons.

Our thanks go to KWVR for the use of their workshops and facilities.

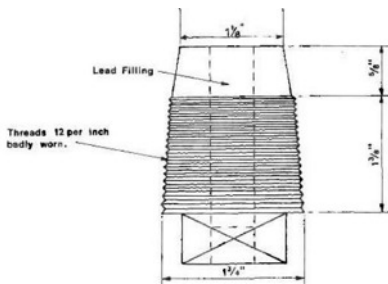
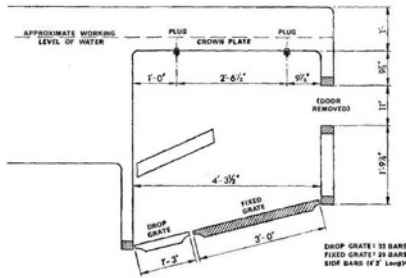
*(Article written by Martin Wadeson, BESTT Training Manager)*

## Training makes all the difference

(Extract from a DoE report published in 1976)

### Footplate crew injured when fusible plug blew out of the firebox crown

There were four people on the footplate of a locomotive when the front fusible plug blew out of the firebox crown whilst it was hauling a passenger train. The boiler pressure was 170psi and the



hole in the crown sheet was 1 3/8 ins diameter.

The firebox was of steel welded construction and the crown sheet was nominally 3/8in thick although it had wasted to 5/16ins thick around the front fusible plug hole. The thread pitch was 12tpi so, at best, there were only four threads engaged in the plate. The plug was recovered from the grate and had clearly been a poor fit in the crown sheet and had been loose.

The rear fusible plug remained in place but the threads were in poor condition and it had been cross-threaded when fitted. The two plugs had been

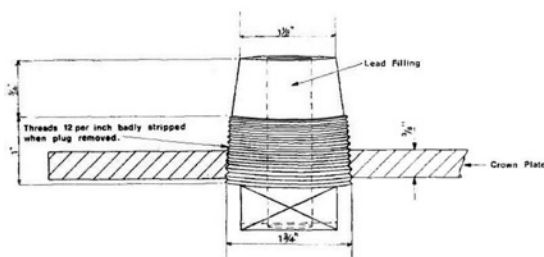
removed prior to the incident at the request of the Engineering Surveyor from the boiler insurance company so that the condition of the plugs and the crown sheet could be checked. This work was done as part of a re-tube. The front plug had to be drilled out so a new plug was manufactured using the old plug as a guide. The holes in the crown sheet were re-tapped to clean up the threads. The taps used were BR Western Region, 12tpi with a 1 in 8 taper. This is the same as the standard BR washout plug.

Both fusible plugs were also 12tpi but the front plug was a 1 in 12 taper (the same as an LMS washout plug) and the rear plug was a 1 in 20 taper.

The result was that both plugs were a poor fit in the plate and the rear plug was also cross-threaded.

The boiler was hydraulically tested after the re-tube in the presence of the Engineering Surveyor and then steam tested. Both tests were satisfactory with no leakage observed. The steam test was carried out ten months before the failure occurred.

The work on the fusible plugs had been carried out by a volunteer with no qualification or competence in boiler work.



As a result of this incident, there was a requirement for all heritage railways to have systems in place for the examination and repair of

steam locomotive boilers, to have a responsible person who would make sure that such systems were followed and to ensure that examinations and repairs were only carried out by competent staff. In addition, there was a requirement for a proper schedule for boiler and mechanical examinations based on BR practice.

**This is now supported by the HRA Steam Locomotive Boiler series of Guidance Notes.**

## David Morgan's Column

We are pleased David Morgan, our BESTT Trustee and director will be submitting a regular column in our newsletter. David has taken a leading role in heritage steam with worldwide experience.



*David's achievements include; Chairman of the North Norfolk Railway 1973-2010, Heritage Railway Association - retired in 2014 also having chaired West Somerset Railway and Great Central Railway at various dates.*

*Founded FEDECRAIL in 1994 and WATTRAIN (World Alliance of Tourist Trams & Trains) in 2009 now President Emeritus.*

*Founding Director of SS Sheildhall now vice-President. Chairman of Maritime Heritage Trust. President of European Maritime Heritage since 2017. Deputy President of the Transport Trust, having being Chairman for many years and vice-Chairman of the Industrial & Engineering Heritage Committee of Europa Nostra.*

(Editor)

### Why Trains need Training



(Lord Faulkner of Worcester-BESTT Patron)

During a debate in the House of Lords on 5th June, initiated by Lord Faulkner of Worcester, President of the Heritage Railway Association (HRA), the Under-Secretary of State, Department for DCMS, Lord Ashton of Hyde said "We should ensure that the next generation is endowed with the skills and passion to protect this legacy [railway heritage] for future generations." I think that that comment sums it up nicely.

Our problem is that the generation, like myself, which grew up in an age when steam was still in active service throughout the country is now retiring. Fortunately, the larger heritage railways have developed not only their own sheds and workshops but also their own engineering teams, many of whom are full time paid staff. Furthermore several railways have engaged apprentices and/or trainees. Lord Ashton welcomed the introduction of "a level 3 apprenticeship for heritage engineering technicians, which includes an option to acquire technical skills for the restoration and repair of locomotive steam engines".

So far, so good, but my principal concerns relate to those railways which do not have the resources or facilities to pass traditional skills to the next generation. That concern extends to operators of steam vessels, stationary engines and traction engines and this is where I believe that BESTT has an important role to play. Not only is it served by a team of experienced and talented engineers, but it has developed a series of modular training schemes which are flexible enough to be tailored to a variety of financial abilities or engineering needs, whether for paid staff or volunteers.

I would urge all those who have ambitions to see their operations continue into the future if they have training challenges, to look at BESTT's website or contact us to see how we can help.

[www.bestt.org.uk](http://www.bestt.org.uk)

(Article written by David Morgan)



## Become a member of BESTT....

- Membership gives the opportunity to be involved with BESTT.
- Keep up to date with newsletters and web site.
- Receive first hand information regarding opportunities for both trainees and mature students.
- Receive information regarding technical training modules.
- Have the opportunity to get behind the scenes and look at what we do.
- Offer your own skills and expertise.
- Know that your subscription / donation is keeping BESTT alive and enable the scheme to continue into the future.
- Notice and invitation to the AGM.

Thank you for your support - keeping steam alive...

### Supporting Organisations



# Bestt

Boiler & Engineering Skills Training Trust



Registered Office:  
York Civic Trust, Fairfax House  
Castlegate, York YO1 9RN

Registered Company Number 05677191  
Registered Charity Number 1153592



# The Boiler and Engineering Skills Training Trust



# Bestt

Boiler & Engineering Skills Training Trust



## Membership and Donation Form

The Boiler and Engineering Skills Training Trust is a charity entirely devoted to the training of new heritage boilersmiths and mechanical engineering in order to maintain the working steam fleet of railway locomotives, steam vessels and road vehicles for future generations to enjoy. We have raised substantial Heritage Lottery Funding for our training schemes but we can only continue if we have a base of donations from those who support us. To learn more about BESTT visit: [www.bestt.org.uk](http://www.bestt.org.uk)

☐ **Corporate Membership** - Heritage railways, Museums, Preservation Groups, Clubs & Societies and professional organisations **£75 per year**

☐ **Associated Membership** - Limited individual. One **£12 per year**

☐ **Donations** - Donations are a great help and can be made on a single or yearly basis. You will receive an acknowledgement and details of our Gift Aid scheme. Newsletters will be forwarded on to you. £

NAME

ORGANISATION   
CORPORATE MEMBERS

ADDRESS

TEL. NO.  DATE

EMAIL ADDRESS

**GDPR** - Please add me to the mailing list ☐ Please remove me from the mailing list ☐

(To view our Privacy Policy - Please visit our website - [www.bestt.org.uk](http://www.bestt.org.uk))

To join BESTT and support our work, please provide the information and send by post, with your subscription to:

BESTT, 14 Greenfield Lane, Idle, Bradford, West Yorkshire BD10 8PT.

You can also email: [enquiries@bestt.org.uk](mailto:enquiries@bestt.org.uk).

Cheque's made payable to - **"Boiler & Engineering Skills Training Trust"**

Data security - Your data will not be used without permission

June 2019