EXPANSION LINK

BASINGSTOKE and DISTRICT MODEL ENGINEERING SOCIETY

Volume 7 - Issue 4 – December 2013

Editor Austin Lewis

'Southern in front' - Eastleigh 2013

Editorial

Well, this is my fourth edition (who said it wouldn't last!) and the end of a good year although we have lost several of our older members as well as gaining several new members. By the time you receive this edition the AGM will have taken place and so the minutes of the meeting will be published separately.

Club Shirts

Seventeen new sweat shirts and polo shirts have been supplied to members and now that the club logo has been set up with Cotton Graphics, shirts can be supplied in any number as required.

The BDMES Library – *for those long winter evenings*

by Ken Jones

When our illustrious editor – Austin, asked me to write something for the Link about the library I thought he must be in real trouble trying to find material for the mag if he has to go to such extremes as this! But, here goes and I will try to make it interesting.

I have been the BDMES librarian for several years; indeed I have a letter of thanks from the committee dated September 2005 for 'sorting out' the mess of magazines that existed up to that time. I took on the job because I have always enjoyed reading these publications and I thought that (as librarian) I would have a chance to read up on some of the valuable tips and advice that exists among these pages. Well, that was my first mistake because I find that I have to resist any thought of looking through any of the mags as I know that any tidying or sorting would take forever if I allowed such dallying.

It is incorporated in the club constitution that we should maintain a full set of Model Engineers as a reference library. In 2005 we had so many magazines and books stored about the club house that space had become a problem and it was difficult to identify what we had. In order to cope with this I created a system for recording issues and volumes so that duplicates and omissions could be identified. There was already an embryonic system which had issues stored in yearly batches so I chose to continue in this way but lately however I have started to store them by volume and issue as this makes more sense at yearly transitions. I also record the year as a secondary reference because members often remember articles by saying-- "I think it was about 1972 or something".

At first I found it easiest to make a spread sheet for each year and marking it up as issues were found and filed, this made it possible to identify duplicates and triplicates as they turned up and these I took home and filed as a backup system. I had the idea that I could use these sheets to record when members borrowed and returned the file copy so that some kind of system could be established as is normal library procedure but members use the mags comparatively rarely so that has not worked, any way it was also quite expensive in paper. Now I have a simplified spread sheet giving just the volume, issue, file copy, spares (if there are any) and date of entry.

The club file- copies are (as I am sure you all know) stored in the club room and are available to all for reference. We have a few early issues starting from 1935 (see additional note) but from around 1940 to 2000 we have an almost complete series. Most are individual issues but some are in bound volumes, in general I prefer the unbound sets as they are easier to exchange and control. The method of storage leaves a little to be desired, those cardboard file boxes are getting rather tired so (when I can get them) I like to exchange them for the plastic files, are there any members who can donate a few?

Some of you will know that I run a stall at the Steam Rally where I offer spare mags for sale, there is some interest and I can generally raise about £40.00 from this. We are offered further copies from time to time and I will always accept these. Sometimes we are lucky and we can fill in a gap or two but spares will be sold when possible, so please keep them coming in. I currently hold many spares some of which are not yet sorted and they do take up a considerable amount of space in my garage. I have found it necessary to discard those which are old (pre about 1970) and any multiple issues in order to regain some of that space. If any member has their own collection and are missing any issues, please check with me as I may be able to fill in some gaps with donated copies.
I have a system which involves sorting a newly acquired batch of mags, into years, then into volumes, then into issue order, separating out duplicates and finally applying a label recording volume, (complete or otherwise), identifying any missing issues and filing them in boxes. I would like to do this as new mags are donated just to keep up to date with the stock but in practice I generally only manage it just before the April Steam rally.

The library is available for ALL club members for their reference and use. Any member wishing to refer to an issue should first check (with me) to verify that we do have that issue (or series) and then I will book it/them out. If a member requires some research for a particular subject I can sometimes do this through the internet, let me know if I can be of any help. There is a very comprehensive ME index and I have described the method of searching in an earlier issue of the Link. When returning issues I would prefer that the returned mag is given to me as this gives me a chance to check the file and ensure that that year is complete and correctly filed.

The library also contains a few issues of Engineering in Miniature and Model Engineers Workshop (MEW) which are filed in a similar way. I will collect and maintain these for the club as they are donated so please let me have your spare copies. At rally's I find that second hand copies of Engineering in Miniature are more popular than Model Engineer. MEW is also popular among those 'in the know' so to speak and appear on the net for quite high prices, I have considered trying to sell issues from our stock on the web – ebay for example but a casual glance at the current exchange rate suggests to me that it is not worth the trouble, there are only a few bidders and the only outfit making money is the postal service. I may have another look.

Other railway and engineering magazines are about and we often get given them, my policy with these is to leave them out for a couple of weeks but in order to avoid being snowed under I do bin them after a time. If any member wishes to add any of these to his personal collection please let me know.

Another aspect of the library which I would like to draw to your attention is the collection of engineering drawings which we hold. Thanks to the late (and greatly missed) Fred Pheby we have construction drawings for 13 engines of various gauges. In general theses are in sets, mostly complete and readable and indispensable to anyone who chooses to (or is in the process of) constructing of one of these projects. I have prepared a list which has been published in the Link and there is a more comprehensive list held in the clubroom. By the way, this list seems to have got out to an international audience as we had an enquiry about one of the items from a member of another club in Warwickshire who was very interested in one particular set. After some discussion we decided to sell our set to this gentleman who, I understand, was very pleased to take ownership of them and made a significant donation to club funds.

Additional note:-
This is really a cry for help as it will be obvious from just a casual glance at the current magazine storage space that we are pretty well full! Those of you who have had the patience to read the forgoing will realise that there is a limit to the number of mag's we can accommodate and as I am now collecting those issues published for 2013 we need to make some adjustments. I have noticed that it is only rarely that anybody shows interest in anything prior to 1960 so, what I am proposing is that we dump (or sell) all issues prior to that date, this is almost heresy I know but we must be practical! We would need to revise the constitution to read something like -- "A 50 year back log of ME will be maintained at the club" What is the club opinion?
Please let me know your thoughts, thanks – editor.

Ken Jones (Librarian)

Fred Pheby

by Ian Roberts

You are probably thinking that it's a long time since dear old Fred crossed the Styx and it is. I wanted to add a couple of reminiscences of my own to the excellent obituary that John Croker wrote.

I got to chatting with Fred when our working paths crossed more than a quarter of a century ago now. We were both 'working' for London Transport Underground; he for most of his career and me for a few months before extreme boredom set in. We were both employed by the permanent way department which looked after the tracks in the small hours of the morning. Fred sat in the depot and I sat in the offices which summed things up apart from short periods deep under parts of London staring at rails and deciding that tomorrow might be a better time to make a start!

I was very impressed when Fred told me that he served his apprenticeship at the Swindon Works of the Great Western Railway; a lofty status indeed. He joined the GWR at the beginning of the last war and finished at the end. As he was young and fit he was called to the colours at the end of his apprenticeship to become part of Britain's fighting force. After training he embarked for the Far East to bring the Japanese to heel. The Emperor obviously got wind of this and, with perfect timing, surrendered before Fred disembarked in Singapore. He spent a short time ashore before re-embarking and sailing back to Blighty.

For obvious reasons and for many years Fred used to look after our track at Basingstoke. I helped at various times but noticed that Fred's management training always seemed to put him as supervisor and me doing the work! Ah me oh my.

Vale and farewell.....

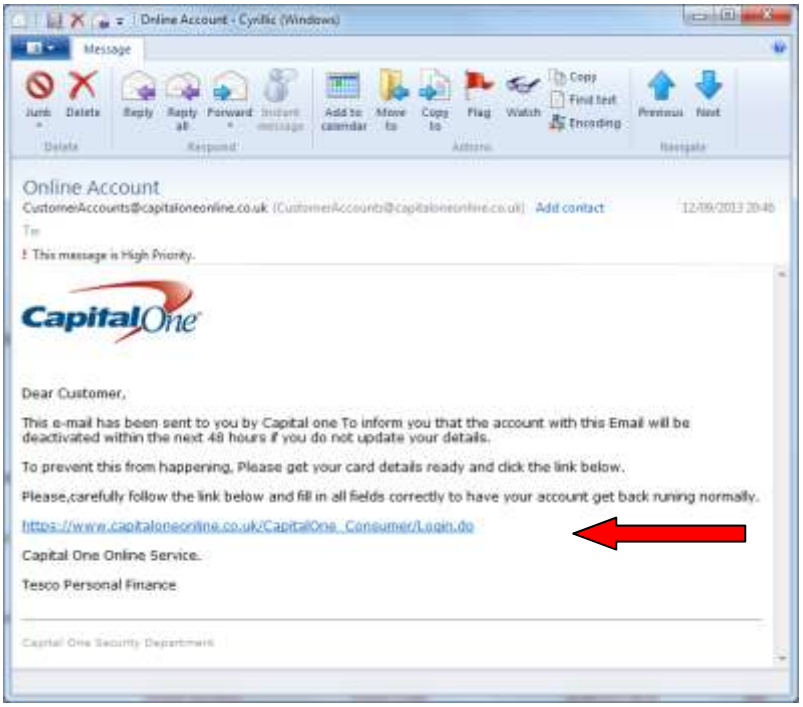
Spotting the Rogue Email

by Graham Blissett

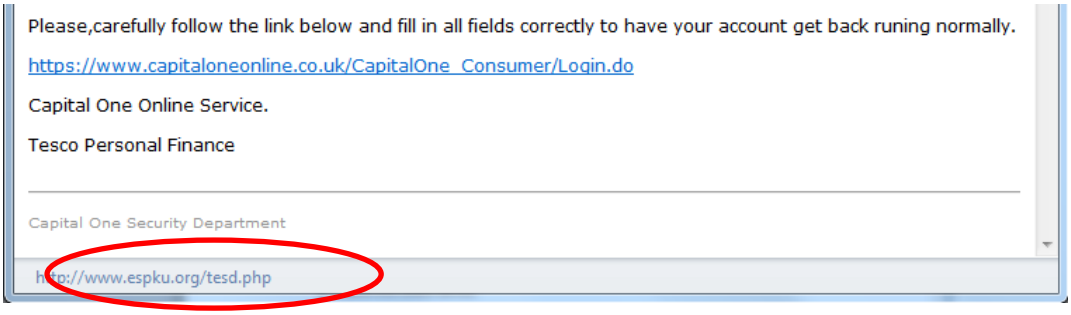
After a recent issue where a club member inadvertently opened a scam Email, here are a few things to lookout for. If the Email is asking for money, saying you are about to inherit a fortune, requires an upfront fee to process your winning ticket or it sounds too good to be true then it is highly likely to be a scam, so delete it. If the Email is asking for you to validate a bank account or some other online account then it is possibly a scam, especially if you don’t have an account with the implied sender or

you are not expecting an Email from them. As an aside banks never send emails asking you to provide account details, passwords or pin numbers.

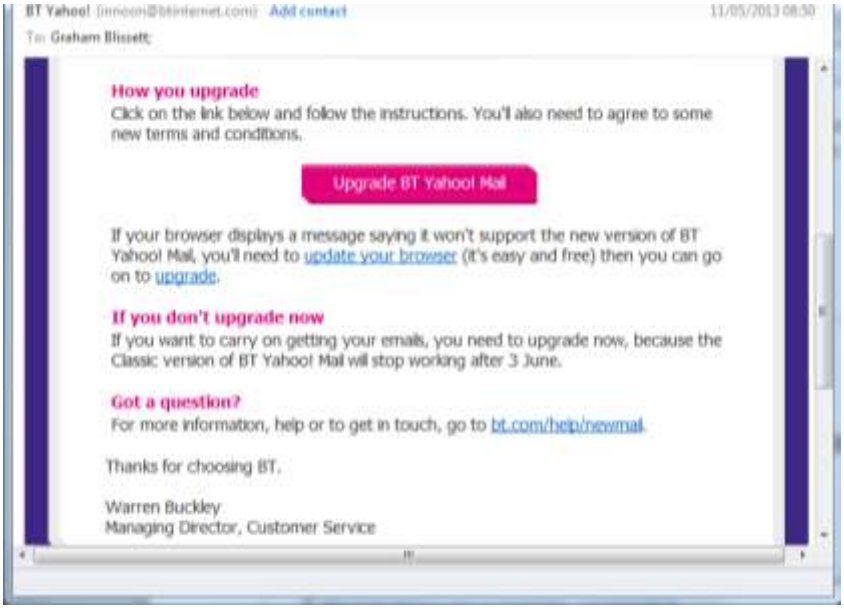
If you are unsure about an Email then here is one way of digging a little deeper. Below is an Email I recently received from the bank CapitalOne. First off, as I don't have a CapitalOne bank account I know this Email is a fake. However, if I did have an account with them I could quite easily click on the hyperlink, which I have identified by the red arrow, and followed the instructions.



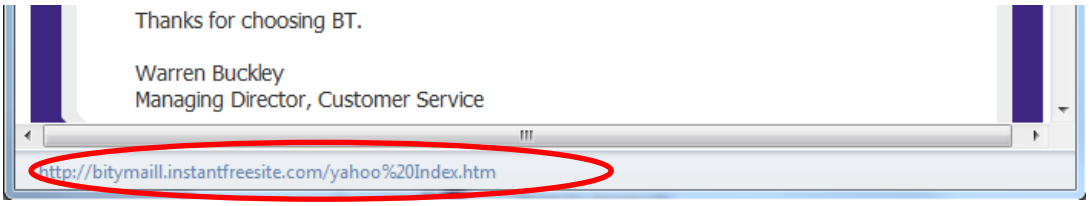
However, by placing the cursor over the hyperlink, without clicking on it, the actual web address assigned to the hyperlink is displayed on the status bar at the bottom of the Email. I have highlighted this below with a red oval for clarity.



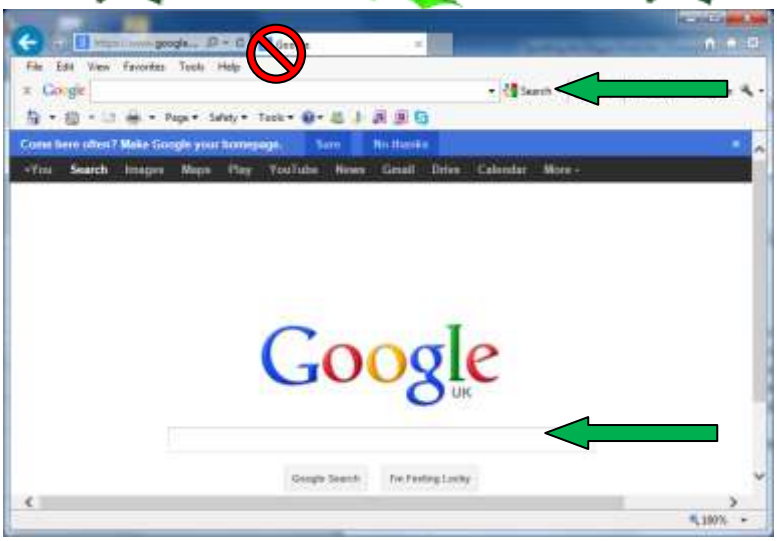
The status bar shows the actual web address bares no relation to the hyperlink indicated in the original Email and is most likely a website set up by the scammer. Unfortunately, the scammers are learning by their mistakes and getting more sophisticated. The hyperlinks in the below email are all for valid BT Yahoo websites, albeit provided by a third party.



However, moving the cursor over the big pink Upgrade BT Yahoo! Mail button reveals a completely different web address to that for the valid hyperlinks, which even looks dodgy. Sometimes the revealed web address or even return Email address may just have one extra character inserted, which at first glance looks like what you would expect to see, so some vigilance is required.



If after all this you are still not sure about the Email, try typing the revealed web address shown on the status bar into the query boxes on a search engine, as indicated by the green arrows. Don't type the web address into the area marked by the red stop sign as you will go to the scammer's website.



You may be surprised how many likeminded people are querying the validity of the hyperlink. I have done this several times. In one instance the revealed web address was a fake and in another the revealed web address was for a valid third party website being hosted on behalf of BT. A BT representative, through the forum, also accepted BT's mistake in providing a confusing web address.

Although the above is not fool proof, I do hope these ideas help weed out the scammers.

Graham Blissett

The Dreaming Spires of Academe 2013

At 11:30 AM on the 27th of July Ian Roberts, John Hutson, Eric Widdowson, Dave Andrews and GWR pannier tank 3763 found themselves at the City of Oxford track, Cutteslowe Park under a burning sun. The boiler documentation for the writer's pannier was examined and (rather grudgingly I thought) found to be in order. It was going to be leg breaking work as the steaming bays are only about a foot above ground level which meant that the preparation had to be undertaken from a kneeling position. Was this a subconscious plan by the track builders so that one venerated at the high altar of steam so to speak? Probably not and we shouldn't allow ourselves to waste time drifting into such quasi-religious thoughts.

Anyway, it didn't take long to get the pannier up to working pressure; my blower, sized for the King, made short work of the much smaller boiler. There were further delays as the track marshal wanted to see the safety valves lift and tick another box on another sheet of paper (they also had a fire

marshal - thank heavens for HSE; a whole non-productive industry has grown from nowhere to smother our initiative!). The track is very curvaceous with only one straight and took a bit of getting used to. There are many bushes and hedges which hide the overall view. Normally, I understand, this rally is heavily subscribed but today I had the rails to myself. 3763 steamed well but the injectors were somewhat temperamental apart from two excellent laps where I could sit back with the engine in balance and enjoy the view (leaving Paddington with 16 on to Plymouth etc. etc.). I continued to circulate for a couple of hours and then stopped for a bite of lunch; the stomach rules the day - mine does anyway! Bob Lovatt with his Railmotor/diesel shunter combo and a well made (Les Warnett) 5", 9F, Evening Star from the Cardiff Society arrived in the early PM to provide the afternoon's entertainment. The 9F is the only BR standard I like; it wasn't an LMS rehash like the rest of them. The builder had done a magnificent job including the massive boiler and the paintwork. The initial running of the 9F was tentative but a change of coal brought it to life in every sense. I was amazed that a wide firebox doesn't burn whatever is shoved in it unlike the narrow Great Western type which resents anything other than dry steam coal (but why burn anything else?). Bob did several laps with each of his engines.

That summed up the running for visiting steam. A couple of Oxford club electrics driven by the youngsters and a visiting (Harlington) outline class 47 diesel (it could well have been something else) circulated later on. Geoff Staite and Helen Verral of Western Steam had their portable shop in the middle of the raised track loops which was handy for all those odds and ends you wonder why you purchased when you get home.

Under a darkening sky and whilst the fish and chips were being collected, we were serenaded in the late afternoon by an Oxford member on his keyboard. The tunes were purported to be 'all the old favourites' but they didn't say whose they were! A thick overcast had hidden the sun by now and half way through forking down large chunks of cod the rain began to fall. We ran for a nearby tent which rapidly resembled a refugee centre as the rain became torrential leaving a lone Oxford member driving his Pansy round the track - extreme dedication.

Readers might think my opinion of the event as somewhat jaded. It wasn't at all; the opposite in fact, an enjoyable day in good company and the cod and chips was almost too big to eat.

I'd finally like to thank John Hutson and Mick Lowe for doing the 1.1/2 times boiler pressure test on the previous Monday and the steam test on the Tuesday plus filling in the extensive paperwork the Southern Fed. now require. The attached pictures were taken by Eric Widdowson.

Post script: I checked the Oxford website (16.10.13) to see the pictures of the event and the Basingstoke contingent seems to have made a negative impression; it's as if we never went.....

by Ian Roberts

THE CORROSION OF METAL – Part 2

Including MODEL LOCO BOILER CORROSION

by Richard Holt

Continued from September 2013

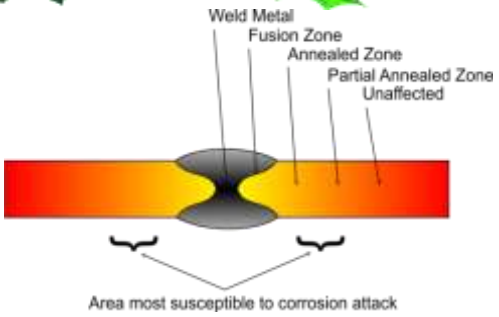
WELDED METALS

In general welding metals should not cause additional corrosion risk. There is however a possible exception when high chrome or stainless steels are welded.

Figure 13 shows the reverse side of a metal sculpture which was located in the open air.

Heat Affected Zone Corrosion
Figure 13

It can be seen that around the welds are areas of corrosion. These occur in the heat affected zone close to where the weld was made. Figure 14 shows how the metal is affected when a weld is made.

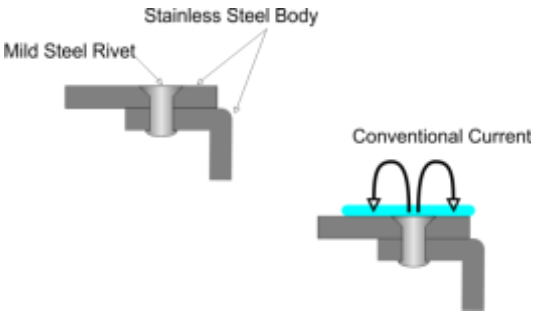


Heat Affected Zone (HAZ)
Figure 14

The weld metal fills the gap in the base structure. At the junction of the weld material and the base metal will be a fusion zone where the two metals have melted together. The heating of the base metal will generate an area which changes from fully annealed to partially annealed through to unaffected. It is in the anneal and partially annealed zone that the risk of corrosion arises.

GALVANIC CORROSION

In the design of complex structures it is sometimes necessary to choose different metals to obtain the best outcome.



Mixing metals
Figure 15

Some combinations of metals can be of positive benefit when it is intended that one

of the metals can corrode to protect the other. But care has to be exercised so as not to create unintended consequences.

In the design of ships it is normal practice to construct the propeller from a different material to the vessel hull. This is both for cost expediency as well as overall strength.

Bronze propeller and a steel ship's hull
Figure 16

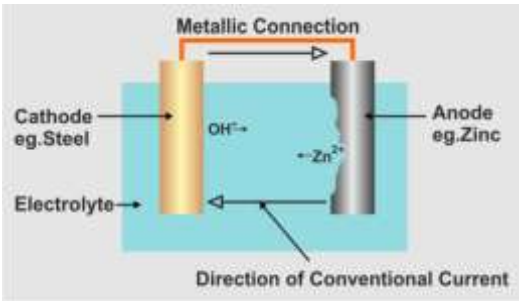
The steel hull will become anodic to the bronze propeller, and as we have seen from the diagram of the corrosion cell (Figure 2 – September Expansion Link) the hull will corrode.

In the case of a propeller there are added complications. As the propeller shaft starts to rotate in its bearings, an oil film may be formed between the shaft and the bearing. This will electrically insulating the hull at this point. However, as most propeller shafts are driven through a gearbox the insulation at the bearings means that the corrosion currents will now find their way through the meshing gears. This can cause a rapid destruction of the gear teeth.

The question is how we can predict which metal will become the anode and which cathode? The answer is that we can examining a table which lists the metals in order of their electro negativity. This list is often referred to as the galvanic series. For metals in seawater the list is as follows:

Galvanic Series in Seawater
Zinc
Aluminium
Cast Iron
Carbon Steel
Stainless Steel (304 active)
Brass
Copper
Bronze
Titanium
Silver
Hastelloy
Monel
Stainless Steel (316 passive)
Platinum

The most active metal in this list is zinc and the most passive, or noble is platinum. The more active a metal is, in the list, the more it will become an anode when joined to a different metal. We can infer from the list that if we join a piece of zinc to a piece of carbon steel in the presence of an electrolyte the zinc will act as the anode and corrode whilst the steel will be the cathode where the reduction of oxygen will occur, as in fig.17.



Galvanic Corrosion
Figure 17

In the above example, if we do not mind if the zinc is corroded, because the design is such that its loss will not affect the structural integrity then we can use this property to our advantage. One example of this is to place zinc anodes on the hull of a ship, and allow them to be consumed, so preventing corrosion of the ship's hull. This process is referred to as Sacrificial Anode Cathodic Protection (CP). The grey lozenge shaped objects in Figure 18 are the zinc anodes welded to the aft of a fishing vessel.

Zinc anodes providing Cathodic Protection for the ship's hull Figure 18

Other examples where CP is used to provide positive benefit are:

- Dipping steel sheet in molten zinc either before or after fabrication (galvanising);
- Electrolytically pre-coat the sheet steel with zinc (Zintec – a trade name of British Steel plc)
- zinc powder coat the fabricated steel object and heat treat (Sherardizing).

Providing atmospheric conditions are controlled to reduce humidity, then the zinc will corrode to a dull grey, whilst the underlying steel retains its shape and its strength.

DEZINCIFICATION OF BRASS

Brass is an alloy, or mixture, of copper and zinc. Since brass is a malleable metal that is easy to cast and has many desirable properties, it is often used in plumbing. When a brass alloy is made up of more than 15 per cent zinc, there is an increased risk of selective corrosion. Zinc is a highly reactive metal with a weak atomic bond. As the percentage of copper in the alloy increases, the risk for dezincification decreases.

Dezincification of brass is a form of selective corrosion that happens when zinc is leached out of the alloy leaving a weakened porous copper fitting. This commonly happens in chlorinated water or in water that has high levels of oxygen and carbon dioxide. Selective corrosion can be a problem when it weakens a fitting, leaving it vulnerable to failure and eventual leaks.

Two distinct forms of the dezincification of brass are generally recognised. The first is referred to as 'Plug'. This is characterised as being localised and usually penetrates deep

into the metal. The second form is 'Uniform', and as the name suggest occurs over a broad area from which the zinc is leached out.

PLUG TYPE DEZINCIFICATION

The result will be penetration through side-walls leading to water seepage or loss of mechanical strength in threaded sections, to the point of complete failure.

This type of dezincification will normally occur in neutral or alkaline water that are high in salt and usually warmer than room temperature which causes the zinc to leach.

UNIFORM LAYER DEZINCIFICATION

Uniform dezincification happens over a broader area than the plug type, thinning the wall uniformly.

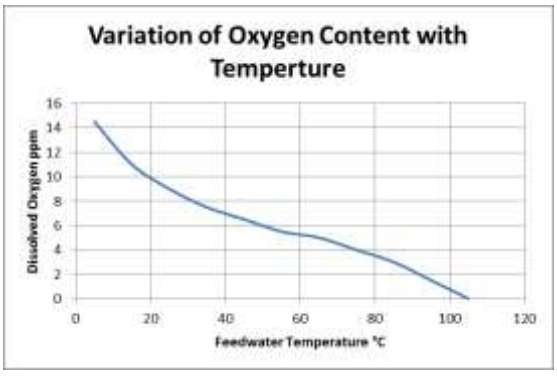
Slow water flow or stagnant water, especially when the water is high in oxygen and carbon dioxide, may make a fitting more susceptible to uniform corrosion. Slightly acid water that is low in salt and about room temperature may also facilitate leaching of zinc.

BOILER CORROSION

Corrosion of steel boilers can result from a number of possible causes.

- Dissolved oxygen
- Chloride ions
- Scale
- Dissimilar metals
- Overfeed of Chelants or Phosphates

DISSOLVED OXYGEN



Oxygen Content vs Temperature

Figure 19

It is well understood that as temperature increases the amount of dissolved oxygen in water decreases, see Figure 19. This means that as the boiler is running at temperature and pressure the rate of corrosion from dissolved oxygen will be at a minimum. However, the corrosion risk is present whilst the water is heating and cooling and from any condensation inside the boiler once at room temperature.

CHLORIDE IONS

The presence of chloride ions, say from salt, will make the water more acidic. This will accelerate any corrosion process that is occurring. Feedwater derived from water softeners will tend to have high salt content as the regeneration process of the water softener uses common salt.

SCALE

Heating hard water will generate insoluble magnesium and calcium salts. These will deposit as scale inside the boiler. It must be remembered that unlike say a kettle where the boiled water is poured out and replenished, in a boiler the water is turned to steam, leaving the salts behind. As more water is added to the boiler to be turned to steam the concentration of those salts will increase. Thus the production of the scale will be more prevalent. The areas of scale present two problems. Whist the boiler is full then they create areas of different oxygen concentration, which promote the corrosion processes. Secondly, once the boiler is drained down, the scale can trap water within, so causing corrosion beneath the scale, even when the boiler 'looks' dry.

Clearly the build-up of scale in any of the tubes will lead to reduced water flow rates and therefore a reduction in boiler efficiency.

DISSIMILAR METALS

Clearly great care is required where dissimilar metals are used in the construction of a boiler, as these can lead to galvanic corrosion. A review of the galvanic series will show which of the metals will suffer from corrosion. It may be that a galvanic anode is used in the boiler to prevent corrosion processes.

CHELANTS and INHIBITERS

According to ASTM-A-380, chelants are chemicals that form soluble, complex molecules with certain metal ions, inactivating the ions so that they cannot normally react with other elements or ions to produce precipitates or scale. If the quantities used are not to the manufacturers instruction they can accelerate the corrosion process rather than controlling it.

BOILER FEEDWATER

Where an electrolyte is deliberately introduced into a situation where galvanic corrosion is likely to take place there are clearly choices that can be made. It might be acceptable to ignore the possibilities of corrosion or add a 'corrosion allowance' to extend the time to failure. As has been demonstrated, this can lead to problems as there is no guarantee that the rate of corrosion will be even throughout, and localised pitting corrosion can lead to premature failure. A second approach might be to design a sacrificial Cathodic Protection system. If the water temperature is likely to be above 60°C then zinc in not a good choice, either aluminium or magnesium anodes would work. Please be aware that if aluminium activated anodes are used then there must never be any possibility that the water containing the aluminium ions will be consumed by humans as it will lead to serious health issues. A third choice would be to introduce inhibiters into the water which will reduce internal corrosion. These will balance the pH of the water and at temperatures below 80°C control the oxygen required in the corrosion process.

CONCLUSION

Careful consideration of environmental conditions and control of the design process can both contribute to the prevention of corrosion. However like death and taxes corrosion is always with us.

Just remember 'Worse things happen at sea'.

Richard Holt

Photos from Autumn 2013

Great Cockcrow Railway

Members' Running

Halloween 2013

Other photos have been uploaded on to the Club's web site – many thanks to Mike Bowman our web manager. If you have any photos for the club web site please either send them to me the editor or to Mike at: yawkshireman@googlemail.com . Thanks

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Email Addresses
If you have received a copy of the newsletter by post, it is because we don't have your Email address. Each newsletter costs about £1 to print and post, where as Email is effectively free. Currently, we do not have an Email address for nearly half the membership. If you do have an Email address, which we can use, could you please Email me with your details.

Jon Evans
Treasurer

Who's Who.

Chairman	Vacant
Vice Chairman	**Tom Burgess**
Secretary	**Brian Hogg**
Treasurer	**Jon Evans**

Committee Members.

Graham Blissett	Member
Barry Spender	Member
Dave Andrews	Member
Darren Davis	Member
Steve Newell	Member

Project Leaders.

Catering manager	**Eric Widdowson**
Electrical Work	Vacant
Library	**Ken Jones**
Painting/Decorating	**David Andrews**
Publicity	**Eric Widdowson**
Publicity assistant	*Vacant*
Signalling	**Graham Blissett**
Station Building and contents	*Vacant*
Track, site and ground maintenance	**Dave Blaza & John Neal**
Traction Engine Track	*Vacant*
Webmaster	**Mike Bowman**
Newsletter	**Austin Lewis**