

RTSA NSW CHAPTER NEWSLETTER

JANUARY 2011 EDITION

NEXT MEETING



OPPORTUNITIES FOR ENHANCING THE FUTURE TRANSPORT OF THE CITY

Garry Glazebrook, Transport Policy Manager, City of Sydney



Sydney is Australia's global city. Like other Australian capital cities and competing global cities such as Singapore, Shanghai and Hong Kong, Sydney faces challenges in accommodating growth whilst enhancing sustainability.

This talk presents an analysis of the transport challenge facing both Sydney City and the wider Sydney region, and presents some opportunities for enhancing and integrating the city's rail networks to help address this challenge.

TECHNICAL PRESENTATION

VENUE:

Temporary Venue

Pymble Room,
Ground Floor, South
Tower,
477 Pitt St
(between Central Station
and Hay St)

DATE:

Wednesday 2nd February
2011

TIME: Noon (12.00)

*LIGHT REFRESHMENTS
WILL BE PROVIDED*

The Railway Technical Society of Australasia (RTSA) - NSW Chapter

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WORDS FROM THE CHAIR – KATHARINA GERSTMANN

Greetings to you all. Your Committee is really moving into top gear with the organisation of our event calendar for 2011 including the High Speed Study Tour, in May this year.

Is there anyone or anything you would like to hear from in 2011? Please email Coen Stoltz at Coen.Stoltz@ttgtt.com.au with suggested topics or speakers to ensure that the 2011 event calendar caters for your needs.

If you wish to register your interest in sponsoring / partnering with the RTSA NSW Chapter in 2011 (e.g our Annual Dinner) please contact Katharina Gerstmann on 0400 133 234 or nsw-chair@rtsa.com.au.

Our key objectives remain the same this year with areas such as events, membership services, newsletters, study tours, and many more being enhanced to provide that extra value that all our members deserve to further develop their careers.

Your constant feedback continues to ensure that we at RTSA are on top of our game and provide

the services that you require. Hence, I encourage you to continue to offer any suggestions that may lead to improved service.

Nominations for the Annual Individual and Young Railway Engineer Awards close on 25 February 2011. Please try to promote these among your contacts. Even better, see if you can come up with a submission or nomination yourself. The Individual Award is for outstanding achievement in the railway industry while the Young Railway Engineer Award is to reward young professional engineers, technologists or associates in Australia or New Zealand for reaching a demonstrated level of achievement and involvement in any field of railway engineering. Nominate online, or download a nomination form at www.rtsa.com.au.

I hope you will come along to our events, get involved in your profession and RTSA.

Katharina Gerstmann
Chair – NSW Chapter

TEMPORARY MEETING VENUE CHANGE

Our usual Central Station meeting room has been 'closed' for renovation, so we will be unable to meet there for a few months. Instead we have been able to get a room in 477 Pitt St for the

duration – the **Pymble Room on the ground floor of the South Tower at 477 Pitt** to be exact. The building is between Central Station and Hay St on the western side of the street.

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POINT OF VIEW – MAX MICHELL

Inter-modal freight traffic on the East Coast should be on the cusp of a great revival. Several years of significant investment in infrastructure between Melbourne and Brisbane is coming to a conclusion, with the stand out exception of the Southern Sydney Freight Line (SSFL), which may see a small portion complete later this year with the rest a couple of years away. Passing lanes, longer crossing loops, duplication, concrete sleepers, bridge renewals, 20th century signaling (replacing 19th century stuff) and a minor deviation are together supposed to reduce run times for freight and gain rail an increased market share of the competitive inter-capital freight. The revival in rail fortunes is predicated on faster and more reliable transit times and to a limited degree these faster times have already appeared – on the Brisbane corridor best schedule times from Sydney have dropped by around 2 hours from the previous 19 hours to 17 hours.

In practice present inter-capital freight services on the east coast corridor are little better than one train a day with intervals between successive trains of up to 36 hours departing from Brisbane and 47 hours departing from Melbourne – a time interval that would allow a very ordinary truck to do a round trip to Sydney (with ease) or even Brisbane while the railway slumbers. I have a strange feeling that the average rail customer (nowadays a freight broker rather than a real customer) would not be impressed by a wait of such magnitude in order to gain a few hours in transit. Even during the week, when departures are more regular, there are intervals between successive departures of between 15 and 24 hours which once again is not much of an offset for a transit time gain of small proportions. It needs to be remembered that there are two operators running the east coast corridor so in reality the intervals between single company trains will be longer. To all appearances while the infrastructure manager is busy improving the corridor (albeit much of that improvement in reality being accrued maintenance inherited from the previous owners) along the lines of the advice provided

by the operators, the latter are not somehow pulling their weight. In the Hunter Valley there is a formalised process that feeds back capacity improvements to the infrastructure into the access fees – in a fairly transparent way the coal producers pay for the capacity they require. In the inter-capital game there is far less traffic and far more infrastructure, along with aggressive competition, which makes direct transfer of such a process impossible. However it does seem that the inter-capital operators are all talk and not much responsibility. How many times have we heard the head sharang of a major operator stand up at a conference and flag infrastructure as the problem?

Step back a bit and look at the problem. Rail cannot match road times capital to capital and is further disadvantaged by having to rely on pick up and delivery (PUD) at each end. Reliability is poor which is also particularly related to the terminals along with PUD at each end so traffic volumes are low – in fact so low that adjacent capital city rail traffic is almost non existent and even the longer haul Melbourne – Brisbane corridor is barely able to capture 1/5th of the competitive tonnage. As a result of low tonnages there are few trains, made worse by the big train policy, so that the interval between trains becomes ever longer. Surely a classic case of spiraling to oblivion.

Rail needs to inject a circuit breaker into the business if it is to remain as a carrier. One such, the premium Inland Route concept, had an airing in the January 2011 Railway Digest magazine, but that will take years and cost substantial capital. An immediate circuit breaker needs to be relatively simple, capable of relatively quick implementation and be effective in getting immediate results.

Back in the early years of National Rail two train concepts were developed to manage the inter-state business of that organisation – the pendulum train for steel and general freight and the yo-yo train for inter-

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capital intermodal. The pendulum concept was implemented and can still be recognized in today's timetable, but the yo-yo was immediately overtaken with an obsession for longer but less frequent trains.

What is a yo-yo train you will ask? In simple terms the yo-yo train is a series of services that yo-yo back and forth between Brisbane and Adelaide, running three or four times a day. Each train would depart at reasonable intervals (6-8 hours depending on the traffic pattern) and convey traffic for the capital cities it would pass through or terminate at. A train leaving Brisbane for instance would have loading for Sydney, Melbourne and Adelaide – at Sydney it would drop the Sydney portion but pick up loading for Melbourne and Adelaide and so on. Perth and Darwin loading would also be handled via connections at Adelaide or Melbourne.

Obviously arrival and departure times at some locations along the yo-yo run would be less attractive while other would be at peak times which would allow rail to engage in a form of peak and off peak pricing to maximize and balance the loading on trains. The burden on the terminals would be spread out and therefore more readily managed with improved reliability, while rolling stock and loco utilisation would be improved. It would also open up a range of dispatch and receipt times that are quite out of range of the existing service pattern.

A 'for instance' timetable, based on a 12 hour transit Melbourne to Sydney and 16 hour transit Sydney to Brisbane (both longer than the ARTC target times) might look like the following

TRAIN 1: Mel dep 16:00 (early dispatch), Syd arr 04:00 (morning delivery), dep 05:30 (pre curfew, late night dispatch), Bne arr 22:00 (early morning delivery)

TRAIN 2: Mel dep 21:00 (afternoon dispatch), Syd arr 09:00 (afternoon delivery), dep 12:00 (first thing morning dispatch), Bne arr 04:00 (morning delivery)

TRAIN 3: Mel dep 05:00 (late evening dispatch), Syd arr 17:00 (early next morning delivery), dep 19:00 (follow

curfew, afternoon dispatch), Bne arr 11:00 (afternoon delivery).

Return workings would be similar but due to the vagaries of the dreaded Sydney curfews the times ex Brisbane might be 14:00, 19:00 and 03:00, giving a similar range of early /late opportunities. The existing pattern of second morning delivery would be retained under such a timetable, but with more opportunity for individual clients (the real ones, not necessarily the brokers) to tailor their dispatches to their needs.

Implementation of such a concept would not be without its difficulties. With two operators there would be problems of 'ownership' of the service – unless there was to be a 'code share' type arrangement between the operators there is little prospect of either taking such a radical step. Initially it would involve running some unused capacity until the market tuned in to the new opportunities, and at the same time might require more resources than now until the traffic built up. It also would require a shift away from the 'long is beautiful' policy into something more sensitive to (real) customers wants and needs. It almost certainly would involve a bit of biff with the custodians of the curfew, and would require more precision in train running than is now evident (to avoid being delayed 4 hours or so by a curfew if a train is late arriving in the Sydney area). Some reconfiguration of terminal operations would be required with hopefully an improved interface process between rail and the PUD function being an outcome.

Such a service pattern would be primarily about the Melbourne – Brisbane long haul corridor, but with a range of opportunities for the paltry existing but substantial potential short haul traffic to and from Sydney. We can but hope that one (or both) the major operators restrict the blood supply to their 'coal brain' and let a bit more flow to their 'intermodal brain' or alternatively that a new operator with deep pockets but a far more sensitive business snout gallops over the horizon. I am not hopeful on either count, but given the near terminal state of the existing business anything with half a chance is worth a try. The question is who if anyone is sufficiently bright to take on this business as an entrepreneur rather than an undertaker.

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LETTERS TO THE EDITOR



Silence! <sigh>

COMING EVENTS

HIGH SPEED STUDY TOUR

Excitement is building for the High Speed Rail Tour of Taiwan, South Korea and Japan!

We had initial expressions of Interest of 58 people of which 19 were Young RSTA members (under 35 years of age) for 15 placements.

Due to the overwhelming support we have lifted the tour size to 20, with the aim to still maintain the professional and technical content of the tour.

Briefly the itinerary is

Sunday 8 May - Tuesday 11 May: Taiwan high Speed rail operations and facilities and possibly construction briefing of the airport express line

Wednesday 11 May - Friday 13 May: Inspect South Korea High Speed rail, rail research facilities and rail infrastructure

Friday 3 May: Travel of ferry to Japan,

Friday 13 May - Sunday 22 May: JR West Hataka Shinkansen facilities; Kawasaki Heavy Industries; new HSR museum at Nagoya; Sendai/Ishikiri Shinkansen facility; JR East and JR Central operations control centres: Infrastructure visits: talks with JR East; and travelling on Kyushu Shinkansen, Tokaido Shinkansen, Touhoku Shinkansen E5 Series (Hayabusa); Sanyo Shinkansen N700 Series.

Sunday 22 May: Returning to Australia.

Each of the delegates will write a report on an aspect of the high speed rail technology, whether it be

infrastructure, operations, maintenance or rolling stock and discuss how these may apply to a possible east coast Australian high speed rail system. Each of these delegates reports' will be compiled into an overall study report, which we believe will both develop the applied technology for rail engineers in Australia, as well as inform the wider public on emerging high speed rail technology.

At this stage all young RTSA members, as well as a number of general members have been requested to re-confirm their intention as pre-qualification. Although we have had very strong confirmation from the general membership (indeed more than enough!) we are hoping more young RTSA members would re-confirm.

I would ask young RTSA members who initially expressed an interest to attend the tour, to think seriously about coming on the tour. I know it may be expensive, but it really is a commitment to your ongoing development in the rail industry. If you believe you can afford it, please consider coming along! I am sure you will find it both rewarding and exciting!

Any young engineer wanting to speak with a young engineer who attended the earlier Metro Study tour and who is also attending the high speed rail tour can contact Pascal Sueess who is on our HSR committee (PSueess@pb.com.au).

A reminder that registration deposits are due by 1 Feb 2011 for those pre-qualified.

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HUNTER VALLEY STUDY TOUR

This long awaited event is now being planned for September or October 2011 and is likely to combine a seminar and an inspection tour. Given the intensity of traffic on the core Hunter Valley network, primarily to do with coal, there is a lot to see and a lot more to try and comprehend to get an

understanding of this network. The probable timing would involve a Friday seminar (timed so Sydney members can attend without having to get going too early) and a Saturday inspection tour, although this will need to be confirmed closer to the date.

Stay tuned for more details as the year progresses.

DECEMBER MEETING – REPORTER: MALCOLM CLUETT

Overhaul of steam locomotive 3801

Over the last few years, the RTSA generally has a heritage topic for our final meeting of the year. On this occasion we had a double act, with Chris Hosking and Craig Mackie reporting on the extensive overhaul of NSW steam locomotive 3801. A presentation with numerous photographs and diagrams was displayed at the meeting.

The C38 class locomotives were designed in the 1930s, and the first five were built by the Clyde Engineering company. A subsequent 25 were built by the NSWGR. These 4-6-2 type locomotives operated mainline passenger services until replaced by diesel traction. The last regular operation was in 1970. Four of the locomotives survive, though one is currently dismantled.

Loco 3801, like the other five of the Clyde batch, has a distinctive streamlined shape. It has been something of a celebrity, if a locomotive can have this status, by travelling widely outside of NSW on excursion trains. It spent a decade idle before receiving an overhaul in 1987. After this, it was used extensively by the company 3801 Ltd, mostly on day trips out of Sydney, until again being stopped for mechanical attention in December

2007. This overhaul is the subject of the current presentation.

Chris Hosking, Senior Consultant, Traction and Rolling Stock, Halcrow Ltd

The meeting commenced with an organisational chart, showing the relationship between the owner, volunteers, consultants and RailCorp which is funding the overhaul.

Chris has 13 years experience in railways including the Ffestiniog steam railway in Wales.

Chris was the boiler project manager, and also adviser to the restoration project in general.

It was known there was some degree of stress cracking in the inner & outer firebox, and also in the front tubeplate. A new inner firebox was fitted in the locomotive's previous 1987 overhaul. There was some debate as to whether the original boiler barrel would be retained (with new or repaired inner firebox and front tubeplate). However, a decision to obtain a new welded boiler was made in early 2008. Consulting engineers Halcrow Ltd were appointed to manage the procurement of this boiler by open tender in July 2008.

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The tender evaluation was completed in December 2008

The winning tender was from the DB Meiningen workshop, which is located in the former East Germany. Here, it escaped the modernisation process, and skills and tooling from the steam era were still available. The workshop is now part of the German Federal Railway system.

Meiningen has completed 21 new boiler designs since 1986, and has constructed many new boilers. The requirement for new designs relates to new forms of boiler construction, rather than the traditional riveted construction. It is also capable of building complete new steam locomotives. Another current project at Meiningen is the repairing the exhibits from the Nuremburg national railway museum, which were damaged in a fire a few years ago.

Loco 3801 has a so-called Belpaire firebox, with flat sides and top linked by staybolts. This form of construction was quite common in Europe, but was almost unknown in Germany. German locomotives, and also German export locomotives, use the so-called round-top firebox. So the project is something new for Meiningen, with the added challenge that the boiler is among the largest locomotive boilers built in Europe.

Chris Hosking displayed some drawings of the new boiler in his presentation. The decision was taken to use a fully-welded construction. The advances in welding technology, which permitted the fabrication of welded boilers came very late in the steam era, and were not used in Australia. In outline it is the same as the previous riveted boiler, but has significant detail improvements.

For example the foundation ring (which links the inner and outer fireboxes) is now gutter-shaped (in cross section) and milled in one set-up on a CNC machine. The original had a plain, rectangular cross section. It is an impressive 2000 x 2500mm in size. The joints between the plates in the barrel are now flush, with better stress flow characteristics, than the previous design. In appearance it is very smooth, while the older boiler exhibits a multitude of lap joints and rivets. Chris displayed a few comparisons of traditional and modern construction. The new boiler is certainly a lot smoother looking than the original, and is painted in silver heat-resisting paint.

The welded boiler had to go through the usual design and review stages for RailCorp procurement projects.

NSW WorkCover Registration has been obtained for the boiler, which is designed to AS1228 and manufactured to AD2000 (German Standard). This is similar to the Australian and British Standards.

Manufacturing commenced in March 2010 and was complete by August 2010.

Boiler fittings from the old boiler were freighted over to Germany for the steam test. This included the superheater header, water columns, safety valves, etc.

After the fittings were applied, the boiler passed its hydraulic test. For the steam test, it is not permitted to light up a cold boiler in the EU with fire. A supply of auxiliary steam is required to warm up the boiler first. It was heated for ten hours at atmospheric pressure, and then slowly brought up to operating pressure.

German locomotives have numerous steam take-off points for purposes like this. Pictures were

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shown of the new C38 boiler under steam (supplied by a hose from a German locomotive), and the safety valves in the test rig.

Craig Mackie, Project Manager, 3801 Overhaul.

The future home for locomotive 3801 will be the museum and depot complex at Thirlmere NSW. Coinciding with the overhaul of 3801, there was a major construction and development project of the museum site. It was not possible to do major restoration work on the loco while the site was so busy. Many of the other exhibits from the museum have been relocated elsewhere until the redevelopment is complete in early 2011.

RailCorp allowed the 3801 project team to have access to the 1925-built workshop at Chullora. Formerly a NSW boiler workshop, it is now used just as a warehouse. This building still has rail access (which is now something of a rarity in Sydney) though it lacks a pit and overhead cranes like the former locomotive workshops.

The 3801 project occupies five bays of the building, with a fenced enclosure. The work team is a mix of full-time staff, apprentices and volunteers, all led by Craig Mackie.

Most of the approx twenty volunteers are retired. There are no female volunteers as yet. Work has settled down to a 3 workday week. A valued volunteer is a former brake engineer from Westinghouse, who was involved with locomotive performance testing in the 1950s. Currently 80 years old, he has overhauled the air compressor.

The scope of works and the budget are hard to determine until the locomotive is fully dismantled. The following were seen as the major tasks:

- Cylinder and valve liner replacement
- Roller Bearing inspection

- New axlebox wear liners
- Corrosion repairs to tender tank
- Overhaul of engine and tender bogies
- New set of coil and leaf springs on engine and tender
- Overhaul of compressor and Westinghouse Brake system

It was known is that the cylinder and valve liners had worn past the condemning limit. These liners are normally manufactured of cast iron, and are an interference fit in the cast steel cylinder bore.

The bearings on all axleboxes are SKF double-row spherical roller type. These have been inspected and passed for further service, despite being the originals. They were checked by technicians from SKF. The axles are also original.

These axle bearings were smuggled to Australia from Sweden via Russia, Iran and India. This was due to the difficulties in obtaining shipping during World War 2. There was a contingency design to have the C38s built with plain axlebox bearings. The first batch of C38 locomotives were used intensively during the remainder of the war.

Axlebox wear liners – these were traditionally replaceable pressings of manganese steel alloy. This material is no longer available, but a grade of Bisalloy with similar properties will be used instead. These components have a difficult life on a steam locomotive, as they have to cope with the thrust from the pistons and the unbalanced reciprocating masses, as well as the vertical movement of the axlebox in the frames.

The engine frame is being re-machined in the pedestal gap area before the new wear liners are installed.

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The tender tank is not very old (dating from its previous restoration in the 1980s) but it did have some rust. It was sent up to the Hunter Valley Training Company by road for repairs, and is now back at Chullora.

Overhaul of the 'A6ET' braking equipment was also done by a Contractor.

When the coil springs were removed from tender bogies – the free heights were not uniform. Cracks and grooving were evident in the large locomotive leaf springs. A decision was made to buy a complete new set of springs. The rectangular bars of spring stock were obtained from the USA in the original inch sizes. (Similar metric-sized bar would not give the same spring rates, which is very sensitive on the bar thickness dimension.)

The cost of the new set of springs for the engine & tender was \$70K.

A piano wire was strung along the datum points and used to align the cylinder bore centre line with the main frame.

There was also a test fit of axleboxes to the frame. This included setting the centre distances to correspond with the centres on the coupling rods. This work was done to a high level of accuracy, using modern surveying techniques.

The new cylinder liners were not inserted using a cryogenic nitrogen bath to cool them. It was thought that handling a cryogenically-cooled cylinder liner would be hazardous, with the risk that it would heat up before it was fully home. Instead they were screwed in slowly at room temperature. (They are an interference fit in the bore.)

The air compressor was tested by running it on shop air (which is an unusual thought). Later it will be tested properly using steam.

On the original boiler, there were 150 brackets attached to the boiler using studs.

With the new welded boiler, there will need to be doubling plates welded onto the boiler. The original brackets re-used when possible attached to studs screwed into the new doubling plates. There will be no need for a penetration into the steam space, and the difficulty of obtaining a steam-tight joint of each stud.

In recent days, there was a test fit of the footplate (on the sides of the boiler). This is mounted from the boiler on substantial brackets. (There is less vibration when the footplate, cab and pipe fittings are mounted on the boiler, rather than the frame.)

Surprises –

There was a steam passage behind one of the valve liners, in an area which should be steam-tight. The erosion associated with this meant that the cylinder bore had to be machined out to a smooth diameter, pad welded and then machined back to the finished diameter.

A crack was found in the casting underneath the smokebox. This might have been there from the beginning (due to a defect in the casting process). It was ground out and replaced. This work was done in a tiny compartment with poor access. It could only be accessed when the front bogie was removed. There were 22 of days work grinding and remedial welding here.

Q Why not build a new locomotive, instead of repairing a worn out one ?

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A The skills and techniques for steam locomotive production are almost gone now. Most of the work associated with 3801 is unusual and unfamiliar. Contractors would need to stop normal production to produce steam locomotive parts.

For example, 3801's frame is a very large one-piece casting, incorporating the cylinders and the main air reservoir. Australian contractors never attempted to construct these items in the past. The C38 frames were cast in the USA.

Q When will there be an inspection of 3801 at the Chullora site ?

A Stay tuned. (NB The RTSA is planning an inspection next year, so watch the RTSA newsletters.)

Q What will be the ongoing cycle of overhauls ?

A In the old days, overhauls were about 4 – 5 years apart when the locomotive was used intensively.

The recent 25 year gap is too long however. Many of the fittings and threaded joints had seized. Suggest 5 – 7 years is the best.

Incidentally, there are some experienced guys around who worked on steam locomotives in the past, who are helping in the present overhaul. These guys might not be around for the next one. Indeed, the speaker might choose not to be around for the next one too, and may be enjoying a well-earned retirement.

Q Steam test – what precautions apply ?

A After the hydraulic test is completed.

The boiler is filled 75% full of warm water. Steam is then injected into the boiler at atmospheric

pressure for ten hours. After this, the boiler is sealed and the pressure is slowly brought up.

A German steam locomotive was used to provide the steam for the steam test. This operated at 215psi. German locomotives had offtakes for steam.

There was also a rig for testing the safety valves of 3801. (Boiler fittings were air-freighted over.)

Q What will the operating pressure be when 3801 re-enters service ?

A The normal pressure of 245 psi (1.69 MPa) (Loco had operated at reduced pressure since the last overhaul, due to difficulties with the replacement inner firebox.)

Q What grade of steel was used for the boiler ?

A Steel complying with the European standard, and stress relieved.

Q New method of mounting brackets on doubling plates, will they affect the stresses in the boiler shell ?

A No – they are small enough so as not to affect the stress situation in the boiler.

On the other hand, there is no need to drill and tap the boiler shell. It is just the doubling plates that are drilled and tapped. So for boiler inspections, there are less potential problem areas (ie, lack of steam tightness at studs)

Q What colour will the loco be running in ?

A It will have two coats of enamel paint. Colour not determined yet.

Q Will the loco have the original light globes ?

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A. A supply of 32V light globes is available. This will give the traditional appearance, rather than the sealed-beam headlight carried in the past 20 years or so.

Vote of thanks was given by Les McNaughton, who was involved in the 1980s restoration.

This earlier restoration could not include a full dismantling, as there was pressure from SRA management to get the job done by a deadline. Les told a few anecdotes, and was happy to see the

work of his team in the 1980s being continued at the current time.

Footnote :

Details can be followed on www.3801.com.au. There are many photographs on this site, which illustrate the scale of the work.

The Meiningen Works also has a website (in German) which proudly displays pictures of 3801's new boiler. There is also information on the Wikipedia.

AND WHAT'S MORE

After having dug to a depth of 10 feet last year, British scientists found traces of copper wire dating back 200 years and came to the conclusion that their ancestors already had a telephone network more than 150 years ago.

Not to be outdone by the Brit's, in the weeks that followed, an American archaeologist dug to a depth of 20 feet, and shortly after, a story published in the New York Times: "American archaeologists, finding traces of 250-year-old copper wire, have concluded that their ancestors already had an advanced high-

tech communications network 50 years earlier than the British".

One week later, the state's Dept of Minerals and Energy in Western Australia, reported the following: "After digging as deep as 30 feet in Western Australia's Pilbara region, Jack Lucknow, a self-taught archaeologist, reported that he found absolutely stuff all. Jack has therefore concluded that 250 years ago, Australia had already gone wireless."

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FUTURE MEETINGS AND EVENTS (6 MONTH HORIZON)

Date and time	Activity	Location
Wednesday 2 February 2011 11.30 for 12.00	Light Rail in the City of Sydney Gary Glazebrook	Meeting Room Ground Floor 477 Pitt St Sydney
Wednesday 2 March 2011 11.30 for 12.00	London Crossrail Dr Mark Raiss, Head of Metros URS/Scott Wilson	Meeting Room Ground Floor 477 Pitt St Sydney
Wednesday 6 April 2011 11.30 for 12.00	Adelaide Rail Revival Stephen Townsend, DTEI (SA)	Meeting Room Central Station Concourse Sydney
Wednesday 4 May 2011 11.30 for 12.00		
Sun 8 May to Sun 22 May 2011	High Speed Rail Study Tour	Taiwan, Korea and Japan
Wednesday 1 June 2011 11.30 for 12.00		
Wednesday 6 July 2011 11.30 for 12.00		

Members with ideas for meeting topics should contact the Secretary, John Watsford, in the first instance – contact details on the back page of this Newsletter

Engineers Australia members are reminded that attendance at RTSA technical meetings contributes towards CPD requirements. Each RTSA technical meeting generally has a value of 1 CPD point.

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