RCEA
(SUSSEX)

An Association for Retired Professional Engineers

NEWSLETTER December 2010

Happy Christmas and Best Wishes for the New Year

PROGRAMME OF EVENTS 2010

30th Dec	**Thursday**	**Coffee - with Partners –Shoreham Airport Terminal Building**

PROGRAMME OF EVENTS 2011

11th Jan	**Tuesday**	**Talk: "As Time Goes By" by Richard Norton (Member).**
20th Jan	**Thursday**	**Coffee - at Spotted Cow, Angmering**
27th Jan	**Thursday**	**Coffee - with Partners at Beach Hotel, Worthing**
8th Feb	**Tuesday**	**Talk: " Magistrates in the Community" NOTE 2pm START**
17th Feb	**Thursday**	**Coffee - at Spotted Cow, Angmering**
24th Feb	**Thursday**	**Coffee - with Partners at Beach Hotel, Worthing**
8th Mar	**Tuesday**	**Talk: "Engineering Aspects of the Wey and Arun Canal Restoration" by Mr Eric Walker MBE, C Eng.**
17th Mar	**Thursday**	**Coffee - at Spotted Cow, Angmering**
24th Mar	**Thursday**	**Northbrook Lunch**

31st Mar	**Thursday**	**Coffee - with Partners at Beach Hotel, Worthing**
12th Apr	**Tuesday**	**Talk From Chemical Engineering to Horology by John Warner**
21st Apr	**Thursday**	**Coffee - at Spotted Cow, Angmering**
28th Apr	**Thursday**	**Coffee - with Partners**
11th May	**Wednesday**	**Visit : NATS London Area Control Centre, Swanwick**
19th May	**Thursday**	**Coffee - at Spotted Cow, Angmering**
25th May	**Wednesday**	**Outing: Skittles The Gribble Inn**
26th May	**Thursday**	**Coffee - with Partners**
16th Jun	**Thursday**	**Coffee - at Spotted Cow, Angmering**
22nd Jun	**Wednesday**	**Outing: Titsey Place House and Gardens, Oxted, Surrey.**
30th Jun	**Thursday**	**Coffee - with Partners**
20th Jul	**Wednesday**	**Outing: Croquet, Rother Valley Croquet Club, Duncton**
21st Jul	**Thursday**	**Coffee - at Spotted Cow, Angmering**
28th Jul	**Thursday**	**Coffee - with Partners**
17th Aug	**Wednesday**	**Outing: Olympic Site and Woolwich Arsenal, London**
18th Aug	**Thursday**	**Coffee - at Spotted Cow, Angmering**
25th Aug	**Thursday**	**Coffee - with Partners**

All Talks and Meetings will commence at 2.30 pm and be held in the Chichester Room, Field Place, Worthing, unless another venue or time is indicated.
Timings for visits and outings will be as printed in the detailed description of the activity.
Coffee mornings commence at 10.30 a.m., except at The Beach Hotel, Worthing, which is from 10.45 a.m

Coffee Morning 30th December 2010
As a trial venue we have arranged for the Coffee Morning with Partners meeting on the 30th December to be held in the Airport Terminal Building at Shoreham Airport. This may become the future venue for these coffee morning meetings subject to member's comments following this visit. The meeting will commence at 10.30 am and end at about midday as normal. Access to the building is easy from either the A27 (turning onto the airport perimeter road at the traffic lights by the Sussex Pad) or from the A259 Worthing to Shoreham Road (turn north at the roundabout for Shoreham Beach). There is ample parking outside the building at a cost of 50p for 2 hours. The venue is wheelchair accessible.

Beach Hotel Coffee Mornings 2011
Please note Coffee Mornings at the Beach Hotel will now continue into the New Year, January, February and March, only at present. The hotel is still due to close in 2011, April being the current planned date. So a new venue is still going to be required and we would welcome suggestions from Member on suitable venues. We need somewhere with good parking and easy access for wheelchairs.

Website for the RCEA

We would like to thank Charles Morgan (Member) for volunteering to keep the website up to date with current news about the RCEA.

For latest information and photographs, log into **www.rceasussex.org.uk**

Membership

Reminder - Subscriptions 2010/2011

These were due on 1st October; if you have not already done so, can you please send your cheque for £12 to the Hon. Ast. Treasurer,
J H Underwood, 168 Alinora Crescent, Goring by Sea, BN12 4HW

New Member

New members should check the information published below for accuracy. This is the data, which will be published in the next Member's Handbook.

2010 **BLACKBOROW M.A,** MIET HNC(Electrical) Bio Engineer(Aus)
The Priory Grange, Tottingworth Park, Broad Oak, Heathfield, TN21 8UN
Michael 01435869626
RAF (national service), Installation engineer with Uganda Electricity Board, Commissioning engineer with English Electric (Australia)
Interests: Inventions, hydroponics

2010 **EASTAUGH P.R**, BSc MIMechE CEng
33 Ruston Park, Rustington, Littlehampton, West Sussex, BN16 2AD
Perry 01903788858
eastaughs@live.co.uk
1966-1971 Rolls Royce, 1971-2001 MOD Pyestock, 2001-2008 Qinetiq
Interests: Walking, Travel, Theatre, Church

2010 **PRITCHARD J.R,** CEng, MIMechE
67A Decoy Drive, Eastbourne, BN22 9PP
Roger 01323504799
roger@burswood.me.uk
Designer for paper handling, chocolate enrobing and price labelling machinery, project manager for powder filling equipment.
Interests: DIY, Gardening, Light Music, Theatre, Tenpin Bowling, U3A, Photography

2010 **TEMPLETON D.M.F**, MIMechE, MIMarine E, JSME
24 Montreal Way, WORTHING, West Sussex, BN13 2RY
David 01903262725
david.m.templeton@ntlworld.com
Lieutenant RN to 1972, 1972 Project Engineer Dunlop Oil & Marine, 1975 Hewitt Hose. 1976 Vendor Inspector Brown Root, 1982 QA/QC Manager C Y Tong shipyard in Hong Kong, Business Consultant Oriental Pearl Airlines, 1986 Purchasing Engineer Sumitomo Heavy Industries in Japan
Interests: Car touring, Rock music, Computing

Existing members should also check that addresses, telephone numbers and e-mail addresses in the handbook are correct

Member's Handbook

All members should now have received the latest version of our Members Handbook (2010/2011). If you have not, please contact the Membership Secretary, Malcolm Hind.

Future programme of talks, visits and activities

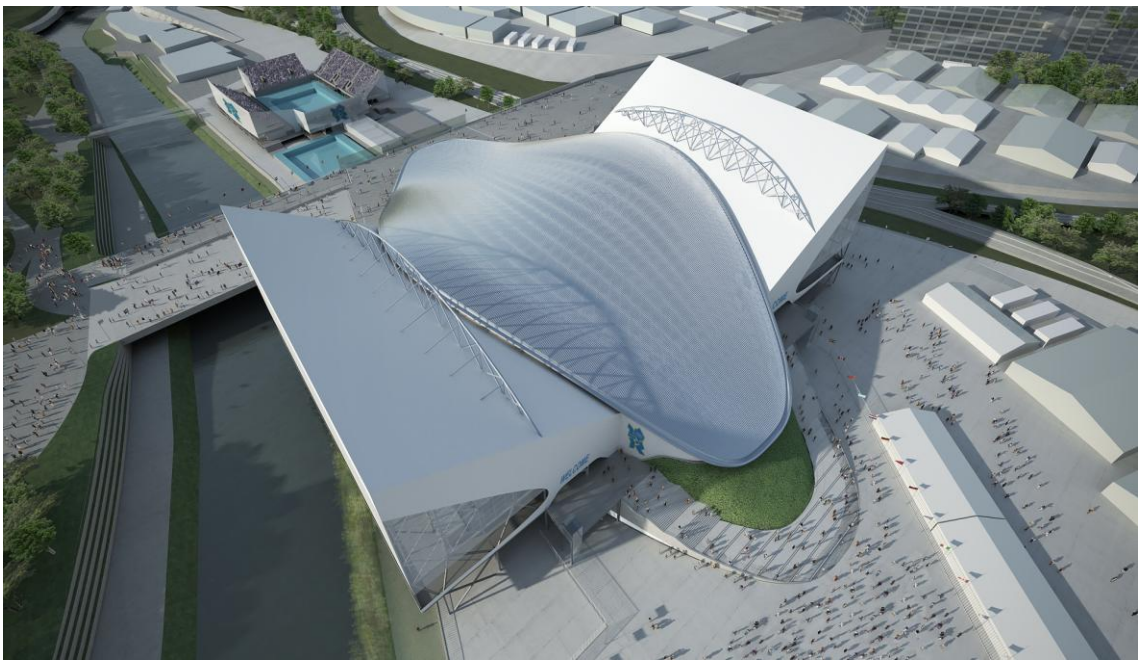
Your committee always tries to plan talks, visits and activities to appeal to as many members as possible. Recent attendance figures do suggest that we are getting it right most of the time, although obviously weather conditions do adversely affect attendance at 'outside' events.

We are aware that a small number of members attend very few of our events, and wonder if there is anything that we can do to encourage you to come along. If you do have any suggestions please let us know.

Looking to the future, the highlight of 2012 will undoubtedly be the Olympics here in the UK, and one suggestion for a visit that we are currently considering is to the main Olympic site at Stratford in London during 2011. By the middle of 2011 most of the major construction work will be complete and it will be possible to see the main stadium, Olympic Village, Velodrome and the futuristic Aquatic Centre (shown in the attached picture) from the visitor's viewing point above the site. There is no access onto the Olympic site itself, (at present), so there will be a fair amount of walking and there is no provision for wheelchairs.

In order to make this visit even more interesting, we would plan to visit Woolwich Arsenal and the moving experience of the 'Firepower' museum of the Royal Artillery in the morning and a guided visit to the Olympic site in the afternoon. A coach would pick up attendees early morning from the Worthing, Steyning, Horsham and Crawley areas en route to London. Costs, which include transport, morning refreshment, lunch and all admission costs are likely to be around £35 per head.

The final cost will be dependent upon numbers, and as we would have to put down a sizeable deposit. We would very much like an early indication as to how many members, partners and guests would be interested so that we can plan accordingly. The date that we have selected is Wednesday 17th August 2011, and if you are interested in coming on this visit, please complete the early registration reply slip at the end of the newsletter and return it by end of February 2011.



Southern Retired Chartered Engineers

As you know we have a reciprocal arrangement with the SRCE whereby we may attend their meetings if places are available. Their meetings tend to be more social than ours and usually include a lunch to which spouses are welcome. SRCE events planned for the first half of 2011 are as follows (if you are interested in one or more of these please make contact directly with the organizer named):-

Thurs 24 March:	Fort Nelson Armouries and D Day Map Room, Portsmouth. (Contact: Sandra Hill, 5 Oakdown Road, Stubbington, Hants PO14 2QR)
Weds 20 April:	Tangmere Aircraft Museum. (Contact: Bob Gillett, tel 01903 784 509)
Early May:	Visit to Salisbury Theatre. (Contact tba)
Tues 21 June:	Chatham Historic Dockyard. (Contact Gavin Barratt tel 01428 723 876 before 1 Feb 2011)
Mid July:	Bealieu Motor Museum. (Contact tba)
Thurs 11 August:	Theatre visit to The Mill at Sonning "Wife begins at Forty". (Contact C Price 01276 473379)

Brief Detail – Talks, Outings and other activities Jan – April 2011

Talk :
Worthing, Tuesday 11th January 14:30 Chichester Room, Field Place
As Time Goes By to be given by Richard Norton (Member)

Unfortunately, the Speakers for our planned talk on 11th January have had to postpone their visit until next year. However, at the Committee's request, Richard will give his talk on the History of Timekeeping in their place. He first gave the talk on 8th January 1998 so it is felt that there will be sufficient members who have joined since then to make the talk worthwhile.

The title he gives is "As Time Goes By" sub-titled "A Brief History of Timekeeping" or "5,500 years in an hour".

Starting with literally a stick stuck in the desert sand to the most modern Atomic Clocks much more accurate than the passage of the sun and stars via a description of the development of the Calendar, Richard skims over the evolution of timekeeping during the last 5,500 years.

Talk:
Worthing Tuesday 8th February 14:00 Chichester Room, Field Place
"Magistrates in the Community"
PLEASE NOTE UNUSUAL START TIME FOR THIS EVENT 2 pm NOT 2.30 pm

The criminal justice system in England has developed over the last 600 years and involves the police, the Crown Prosecution Service, the courts, prison and the probation service.

Virtually all criminal cases start off in a magistrates court, and over 95% of all cases are dealt with there by the magistrates, or occasionally by a legally-trained district judge sitting alone. Magistrates' courts also house family proceedings courts and the youth courts. Only the most serious offences are passed on by the magistrates' courts to the Crown Court to be heard, usually by a judge and jury.

Sadly the vast majority of the population has little or no knowledge about how the magistrates' courts work, despite these courts being open to the public at all times. Equally sadly, the media often portray a very distorted and narrow picture of the whole system.

Two local magistrates (or JPs) from the Western Bench (Worthing and Chichester) will show how the magistrates' court works by way of :-

- ***A presentation*** telling you (nearly) everything that you might want to know about the magistrates' court covering who is who in the court itself, the legal process and how a decision is reached

- ***A mock trial*** in which **you** will be asked to weigh up the evidence and decide guilty or innocent.

- ***Remand*** You will be asked to consider whether an accused should be remanded in custody or bailed into the community awaiting trial.

- ***Sentencing*** You will also be asked to decide upon a suitable sentence for an offender who has already pleaded guilty, but has had a report about him prepared by probation to help with sentencing.

This is your chance to be a magistrate for the day and see whether you too might have what it takes to become a good magistrate! Magistrates come from all sorts of backgrounds. You do not need to have a detailed knowledge of the law, just lots of common sense! Feeling tempted to have a go?

Talk :
Worthing. Tuesday 8th March 14:30 Chichester Room, Field Place
Engineering Aspects of the Wey and Arun Canal Restoration by Mr Eric Walker MBE, C Eng.
Eric Walker is the volunteer in charge of the engineering of the restoration. He will describe the engineering aspects of the restoration works of the canal including re-building locks and bridges and the provision of adequate water supply.

Although much has been achieved, there is still a great deal of work to do to meet the aims and ambition of the Wey and Arun Canal Restoration Trust to re-opened, what is known as "London's Lost Route to the Sea", 92 miles from London Bridge to Littlehampton.

Spring Lunch
Worthing Tuesday 24th March 12:00 for 12.30 Northbrook College
The cost this year will be £11.00 per head including a tip, for a three course meal which in the past has proved to be very good value. The occasion is not only an opportunity for new and existing members to meet socially but will also help to give "work experience" to chefs and waiters.

There will be a bar for pre-lunch drinks, the cost to be settled individually by Members and guests.

Because of College "lead times" required applications MUST be made by **10th Feb 2011**.

Should the numbers exceed the maximum seating allowed there will be a waiting list made, as in previous years. So please book early to avoid disappointment. The committee look forward to seeing you there.

Applications and cheques to be made out to RCEA and sent to Treasurer. Jim Underwood

Talk:
Worthing. Tuesday 12th April 14:00 Chichester Room, Field Place.
From Chemical Engineering to Horology by John Warner
John will cover his career in Chemical Engineering, time spend in Rhodesia, his National Service, time in Thwaites & Read and his passion for horology and great clocks.

Visit
Wednesday, 11th May NATS London Area Control Centre, Swanwick
A visit to the air traffic control centre at Swanwick (Fareham) is to be arranged for May 11th. Full details are unavailable at this time, however they will be published in the next Newsletter along with the visit timings. If you would like to register to go on this visit, can you please complete the reply slip at the end of the newsletter to allow the organiser to arrange the necessary security clearance details etc while finalising the visit detail with our host's.

REPORTS

Visit
Tuesday 14th September to Bluebell Railway Workshops, Sheffield Park
There are two workshops on the site; one the main Bluebell Railway workshop the other the reproduction LBSCR Atlantic loco construction workshop. Twenty-one members joined our visit and we split into two parties to avoid overcrowding.

In the main workshop, where the work is largely the maintenance of the Railway's fleet of steam locos, we saw all the components of the locos stripped down. To several members, this was revealing seeing for the first time, how a steam loco is constructed and works.

The Atlantic workshop was different in that a loco was being built, much of it from basic materials. Members recalled the talk, which David Jones (Member) gave about the project. The Group building the loco located what had been a spare boiler for a Great Northern Railway (GNR) Atlantic used as a steam accumulator and in useable condition. This we saw in the workshop. The Brighton Atlantic was basically the same as the GNR loco, LBSC having bought the design from the GNR.

The rest of the loco is being built to designs drawn by Gordon Bailey, who was our guide, a truly monumental task. He is also generally overseeing the work.

The construction is proceeding well. We were able to get a good impression of loco building "as it used to be". Your reporter's one regret is that initially, the loco is going to be painted in British Railways black, the condition on withdrawal of the original loco, "Beachy Head". He would have preferred to see it in Marsh brown, it's livery when new in LBSC days.

Altogether, members indicated that the visit was very worthwhile and instructive. For a number taking them back to the days of their youth. We have to thank David Jones for obtaining the necessary permission for us to go into the main workshop, which is not normally allowed.
R Norton

Talk:
Tuesday 21st September "Skyelab (1973-74) – Science and Medicine in Space" by Professor Mike Whittle.
NASA launched the Skylab space station in the spring of 1973. It was used by a total of nine astronauts (in three groups of three), who conducted an impressive array of experiments in several scientific areas.

MW started by explaining how he became involved in Skylab when he was at the time a research medical officer in the RAF. He was loaned to NASA to supervise (from the ground!) six of the Skylab medical experiments. He then outlined the Skylab mission profile: Mission 1 comprised of the launch of the Skylab followed by the first 3 astronauts a day later. This was followed by a 28-day mission 2, then an 84-day mission 3.

Things did not start well, during Mission 1 when Skylab reached the point of maximum dynamic load the Meteor/Heat Shield fell off the front of the spacecraft, taking with it one of the two giant solar panels and 'wrapping' a strip of metal round the second panel so although undamaged could not unfurl. The temperature in Skylab therefore rose to an unacceptable level and the launch of the first group of astronauts was delayed while a 'fix' was found.

The 'fix' comprised an 'aluminised Mylar parasole', which the first crew took up with them and attached to Skylab. The fix worked and the temperature dropped allowing the astronauts to enter Skylab. The next problem was lack of electrical power with only the four 'small' solar panels on the telescope working. Again a work around was found to allow limited experiments to take place until a better fix could be found. This resulted in rigid electrical power management along with spacecraft positioning to ensure that the 'parasol' always faced the sun. Fourteen days into the flight an astronaut

went ‘outside’ and freed the jammed solar panel. A larger meteor/heat screen was also flown up on Mission 2 and installed on the front of Skylab.

MW then gave an overview of the problems of human beings in zero-gravity (or micro-gravity as it is now known) including ‘space sickness’. It is a sobering thought that currently nine months is about the maximum time we can spend in space before we run into bone density problems. He detailed the medical and dietary experiments including those that he had responsibility for running. One of the main experiments (mineral balance) meant that the nine astronauts lived on a strictly controlled diet (which they had to choose in advance) with complete intake monitoring and total urine and faecal collection. This happened for the duration of the flight and for three weeks before and two weeks after the flight. There was also a set of Body Mass experiments

MW also outlined some of the ‘other’ experiments, which ranged from Solar Measurements using the telescope, manufacturing in micro-gravity (they produced a large, pure silicone crystal), to watching a spider spin a web (wobbly to start with but got better over time !)

Not only was the talk fascinating in that MW reckons that it is only in the last few years that we have actually advanced from the days of Skylab, the talk it was peppered with anecdotes about astronauts, space medicine (and of course engineering fixes!) which made it a most enjoyable afternoon.

Thumbnails of the slides and an excellent report which contains a lot of detail of the experiments can be found on MW’s website www.crowaptok.com/mike/index.htm under the ‘Talk about the Skylab Space Station’ in the article from the RAF Quarterly, Summer 1977.
R Keir

Talk:
Tuesday 5th October: “The Search for Weapons of Mass Destruction.”
The talk was given by Roger Thomas, who is a career diplomat with the Foreign Office and has held various posts within Europe and more particularly in the Middle East where he was Consul in Turkey and finally Ambassador in Azerbaijan.

He was a leader of the original UNSCOM inspection team, which was tasked with searching for Sadam Hussein's weapons of mass destruction after the first gulf war when Iraq was beaten back from the invasion of Kuwait. The talk gave a fascinating insight into the extent of the biological weapons programme in which Iraq had been active, a forbidding aspect of which is that the inspectors discovered sufficient supplies of Anthrax alone to kill the global world population four times! By diligent and technical searching the team wrinkled out the disguised manufacturing plants and believe that by the end of the process they had destroyed both them and the stockpiles. Roger also described their work in tracking down all the Russian supplied Scud missiles and also described how the Iraqis were deriving the technology to rebuild longer range missiles, regrettably using parts sourced in the UK via dubious intermediaries. He did pour some scorn on the later claim that Iraqi could deliver a rocket based weapon with 45 minutes as claimed by Tony Blair since it took some hours to fit the gyro guidance systems to the rockets before use.

He also said that Dr David Kelly had been a key member of their team, and was an extremely diligent and dogged scientific investigator who would have been put under enormous personal strain by the unwanted pressure placed on him at the time of the inquiry into the war in addition to the problems of the health of his wife and might indeed have thought enough is enough.

As an illustration of how careful diplomats should be, he began the talk with the comment that the US Ambassador to Iraq had made a passing remark to Saddam that the US would not wish to interfere with squabbles between Arab brethren. Hence the invasion of Kuwait, the Gulf War, destruction of Iraq, and who knows what’s to come.
T Tomkins

Visit
Wednesday 20th October to Victoria Signal Box (at Clapham Junction)
The original eight places on this visit were filled within days of the publication of the August Newsletter, a sign of the popularity of all things to do with railways. However, we were fortunate that our host David had taken note of our comments about the popularity of such events and had enlisted the help of his friend Richard and the number of places available was increased.

At 18:30 fourteen members met at the ticket office of Clapham Junction railway station and shortly afterwards walked the few hundred yards to the secure compound which housed the signal box. The signal box was, I believe, built in the mid 1980's and the technology employed is predominately of that vintage (lots of relays) with some stand-alone computers performing later enhancements.

The operational floor houses two large mimic diagrams showing routes from Victoria Station. One of the diagrams covered the routes to the south of London and the other to Kent and South East London. The diagrams show all points, signals, stations and a level crossing. The position of trains is shown together with their identity, which indicates their type and the route. Each mimic board is divided into a number of sections with a signalman being responsible for controlling the trains within each section. The train drivers are able to contact their controller by radio and the controllers can similarly contact each of the train drivers.

We were shown how the points could be set manually, the safeguards that prevent this happening when not appropriate; how level crossing gates are controlled and the general operation of the signal box.

Overall, this was a very enjoyable and informative visit.
G Mathias

Cooch Memorial Lecture
Tuesday 9th November A bolt from the blue – lightning protection by the Rev Christopher Miles MA, MSc, C Eng, MIET
Rev Christopher Miles opened his talk with a look at the history of experiments in static electricity and lightning strikes. In the mid-18th century Benjamin Franklin of Philadelphia and others successfully carried out experiments to show that static electricity and lightning have the same nature. This led to the design and installation of lightning protection of buildings. Modern lightning protection is applied to electrical and electronic equipment as well as buildings and people.

CM reviewed the different kinds of lightning strikes that occur such as Cloud-to-ground Lightning, Cloud-to-Cloud/Inter-Cloud Lightning, Intra-Cloud Lightning and Ball Lightning. He also discussed the electric charge mechanisms that lead to such a strike. Although commonly associated with close thunderstorms, lightning strikes can occur on a day that seems devoid of clouds. This occurrence is known as "A Bolt from the Blue" as lightning can strike up to 10 miles from a cloud. Hence the title of the talk!

CM concentrated on Cloud-to-Ground Lightning, as this is one of the most severe, and unsafe types of lightning known to man. It is not so common, but one, which is the best, understood. The majority of such types come from the bottom of the cloud, which is negatively charged and travels to the ground that is positively charged. There are some cloud-to-ground lightnings, which also pass down positive charges to the ground. These are rare cases, and come from higher regions of a thundercloud.

As well as direct strikes the high voltages that build up during a strike may cause 'side-flashing' whereby the lightning seeks other metallic paths e.g. bell-frames and mains wiring. Side-flashing may, in passing over combustible material, cause fire or severe damage to electrical installations.

CM gave an overview of the development of lightning protection standards culminating in the issue of BS EN 62305-2:2006 'Protection against lightning'. The need for protection is determined by risk assessments, with the three aspects of lightning protection being:

a. Protection of the structure of the building.
b. Protection of people in the building and in the vicinity of the building.

c. Protection of electrical, especially electronic, equipment in the building or connected to the building's supplies.

Electronic equipment can be damaged by direct strikes, or more commonly by voltage transients (surges) appearing in power or telephone lines as a result of a strike at a distance. The risk of damage to electronic equipment through transient voltages (surges) on mains supplies and telephone lines or induced voltages in system cabling is much higher than the risk of a strike to the building – of the order of 1 in 10 to 1 in 50 per year, albeit the consequences are far less, rarely extending beyond damage to the equipment itself. Damage due to transients can be minimised by installing surge protection devices, e.g. between each phase of the mains supply and earth where the supply enters the building, and at the equipment itself.

A lightning protection system (LPS) is designed according to one of four levels of protection such as is necessary to reduce the risks to a tolerable level. LPSs comprise:

Air Termination System: Those parts of an LPS, which are intended to act as capture points for a lightning strike. They will generally be placed on the high points of the building e.g. spires, pinnacles, flag poles and roof ridges and on high corners of a building including, tower corners. They may take the form of a separate rod or tape connected to a down conductor, a section of the down conductor brought up above the surrounding stonework or a weathervane. On a large roof area, requiring an air termination network, the mesh size differs for different levels of protection. Air terminations should preferably be in bare metal – copper or aluminium.

Down Conductors: Down conductors are designed to take the current from the air terminations to ground level where they will be connected to earth points. Older LPS commonly had a single down conductor on a church tower or spire. There have been a number of instances of lightning damage to churches with such installations, including a church in Rochester Diocese in 1989 and a church in Oxford Diocese in 2004. It is strongly recommended that a church tower or spire should have at least two down conductors. Down conductors may be in either copper or aluminium in either tape (flat strip) or round section and aesthetically will generally be better with a suitably coloured PVC coating. Bare aluminium must not be used where it is in contact with limestone or lime mortar because of corrosion.

Earth Points: The lower end of the down conductors must be well connected to earth via an earth point for each conductor. The overall earth network resistance should be no more than 10 ohms. The earth resistance of an individual earth point should be no more than about 10 ohms times the number of down conductors. Regardless of resistance, a minimum earthling rod length of 2.4 m should be used to minimise seasonal and long-term variation of resistance. Exceptionally, in rocky conditions, the 10-ohm limit may be discounted and a ring earth electrode around the base of the church, connected to all down conductors and to the mains earth installed.

Bonding – General: Bonding is the term used for connection of the LPS to any sizeable metallic structure that is considered to be in range of side-flashing (as a rough guide one metre at ground level plus one metre per 10m of height). Bonding should generally include metal bell-frames, clock faces and mechanisms and the mains electrical installation, which will itself be connected to other services. The value of such bonding is that during a lightning strike it reduces the voltage difference between the LPS and services or other metalwork and hence reduces the risk of flashover to the services or metalwork.

It was interesting to note that even with lightning protection in place there is no guarantee that a building will be immune from lightning strikes, as CM showed with photographs of various churches that had been struck by lightning – despite having some form of protection! Also in 2005 a Church in Rochester Diocese having an air termination on the tower was struck at the east end of the chancel resulting in serious fire damage.

A lively question and answer session ended the fascinating talk
R Keir

Visit:
Wednesday 24th November to Portsmouth Naval Base, BAE Systems Surface Ships Ltd.
Twenty-three members attended the visit to BAE Systems Surface Ships a wing of BAE Systems. The visit took the format of a presentation by Mr Mike Pollard Engineering Manager (Production) assisted by Mr Dave Williams. This covered the global activities of BAE Systems, the work of the Surface Ships division and a tour of their manufacturing facilities. Dave also demonstrated their 3D Computer Model, which is linked to the CAD System. This allows them to ensure that ships, carrier sections and large assemblies can be handled and moved without interference – a most impressive model (and all from off-the-peg software!). Details of areas covered as follows:

BAE Systems is a global defence, security and aerospace company with approximately 107,000 employees worldwide. The Company delivers a full range of products and services for air, land and naval forces, as well as advanced electronics, security, information technology solutions and customer support services.

BAE Systems is a leading member of the Aircraft Carrier Alliance (ACA), a unique partnering relationship between industry and the UK Ministry of Defence, where all members work together to deliver the Queen Elizabeth Class aircraft carriers.

BAE Systems Surface Ships is a leader in the design, build, integration and support of naval vessels, delivering high-end engineering capability across the entire lifecycle of a ship. They employ over 7,000 people, with facilities in Glasgow, Portsmouth and Filton, near Bristol and deliver the whole spectrum of military vessels, ranging from aircraft carriers and surface combatants to rigid inflatable boats and fast interceptor craft.

***Queen Elizabeth Class Aircraft Carriers*:** The QE Class will be the biggest and most powerful surface warships ever constructed for the Royal Navy. The QE Class has a displacement of 65,000 tonnes, a length of 280m, a maximum beam of 70m and a range of 10,000 miles at a top speed of 25 knots.

Sections of the carrier will be built at several UK Shipbuilders (A&P Tyne in Tyneside, Cammell Laird on Merseyside and at Babcock's sites in Appledore and Rosyth) . When completed these will be transported by Barge to Rosyth Dockyard where they will be integrated into a complete carrier.

BAE is responsible for building three sections (known as 'Blocks') of the giant hull with Lower Blocks 3 and 4 under construction at the Company's Govan shipyard on the Clyde and Lower Block 2 in the Portsmouth facility.

Since first steel was cut for the carrier in July 2009, over 100 units of Lower Block 3 have been completed, equating to over 20 per cent of the section. Full-scale production on Lower Block 4 began in January 2010 and over 30 units of this complex section of the carrier now under construction. Weighing in at 9000 and 11,500 tonnes respectively, each individual section will be bigger than a whole Type 45 destroyer.

Meanwhile, construction of Lower Block 2 at Portsmouth, the future home of the Queen Elizabeth Class ships, is progressing steadily. Lower Block 2 is one of the large structures that will form the stern section of the carrier hull housing machinery spaces, stores, switchboards and some of the ship's accommodation. Lower Block 2 will weigh around 6,000 tonnes and will stand over 18 metres tall, 70 metres long and 40 metres wide.

***Construction Facilities Tour*:** The construction facilities comprise two huge 'sheds' with sheet steel entering the door of one shed and sections of carrier and complete ships coming out of the other! In between there are all sorts of interesting moves of sections between the buildings. All worked out using the 3D Computer Model. We were split into two groups and 'walked round' the path that steel takes from delivery to launch. Most of the construction we viewed was associated with the carrier build, which is designed to use the maximum amount of flat plate to make construction easier and to save money.

Sheet steel is delivered and very large plasma or laser cutting tools cut the steel plate steel to shape.

The carrier is designed to use the maximum amount of flat plate to make construction easier and to save money. The laser cutter was capable of cutting 20mm thick steel plate, thinner aluminium (risk of melting if too thick), and MDF! (The latter was for an order to make moulds for a millionaire's yacht!) There was also a massive linear welding machine although a lot of welding is completed by hand. The standard of hand welding was most impressive. Welds are crack detected on a sampling basis. There were all sorts of carrier sub-sections being assembled. It was interesting to note that much of the work is conducted with the sections upside down. This makes the manual welding process a lot easier.

The larger assembly building was most impressive. It contained an almost complete corvette (see below) and two carrier assemblies (Block 2) under construction, one being almost full height. The amount of scaffolding had to be seen to be believed! Once completed, the Blocks are made watertight and then they are moved out and placed on a barge in a dry dock. The dock is then flooded and the Blocks "float off" the barge. These are then floated to Rosyth where they are built into the carrier.

Corvettes: BAE are well into a programme of designing and building three corvettes for the Royal Navy of Oman. One vessel has been delivered; one vessel had been launched and was alongside in the final fitting out phase. The last vessel was in the assembly building where Block 02 of the carrier was being constructed. Once completed the vessel will be will be wheeled out on a trailer, then loaded on to a barge, prior to being floated off to a dry dock for final fitting out. It was amazing to see a complete ship sitting alongside massive carrier sections with room to spare; it shows how massive the buildings are.

(A bit about the Corvettes!! - The corvette is a highly capable vessel delivering anti-air and anti-surface capabilities, providing Economic Exclusion Zone protection and deterrent operations. Displacement: 2,660 tonnes, length: 99m, maximum beam 14.6m, top speed 25 knots, range: 4,500 miles, endurance 21 days.

Featuring a novel hull design and electric propulsion system it gives superb manoeuvrability, with an impressive three-ship length stopping distance. Its stealth design shrinks radar signatures and a slow speed drive mode means it can loiter undetected.

The ship's flight deck is designed to support up to a 12 tonne helicopter, which covers most small to medium sized aircraft. With comprehensive hangar facilities, key maintenance can be carried out onboard.)

Future Surface Combatant: BAE are in the preliminary stages of the Future Surface Combatant design programme, which aims to develop a new generation of affordable, agile warships that can adapt easily to the fast changing demands of modern defence.

BAE will develop the detailed specification for the Type 26 combat ship. The Type 26 for the UK Royal Navy is the first class of ships to be designed under the programme and will replace the Type 22 and Type 23 Frigates. The Type 26 will have enhanced submarine defence and be able to adapt to multiple roles. The Type 26 will have a displacement of 6,000 tonnes, length 144m, maximum beam 21.5m, top speed 28 knots and a range 7,000 miles. The first is due to enter service around the start of the next decade.
R Keir
(Information courtesy of BAE website)

Talk:
Tuesday 14th December, theRNLI New Lifeboat
Richard Moss a Senior Project Engineer with the RNLI based in Poole entertained forty-five members and guests to an excellent lecture. Richard has an honours degree in mechanical engineering and an MSc in Marine Engineering so was well qualified to talk us through some of the interesting aspects of lifeboat engineering.

His talk began with a brief outline of the services provided by the RNLI and how these had developed and changed over the years, especially over the last 30 – 40 years or so.

He then went on to describe the many types of lifeboat currently in service with the service and the current development of faster craft to allow quicker rescue attempts. Many of the engineering problems associated with the development and manufacture of large craft capable of operating at speeds of up to 25

knots were described, not least those of making the craft comfortable for crew to operate at these speeds in rough seas. This led onto a description of some of the difficulties associated with launching such large craft from exposed beaches and the even more significant problem of recovering them afterwards.

At the end there were many questions from the audience. This was a talk in the words of the speaker, which could have gone on much longer than the time we had available.

Christmas Lunch

Wednesday 15th December, lunch held at The Windsor Hotel, Worthing.

Forty-four members and their guests attended the Christmas lunch this year at the Windsor Hotel in Worthing.

As, in the last two or three years this is has become one of the most popular events in our calendar, even though on this occasion it was at a new venue. This event has become an occasion when our members and guests can meet to chat and enjoy a pleasant lunch in a more informal way than it used to be when the association held Annual Dinners.

Everyone present enjoyed the meal, the President's wife was presented with a bouquet of flowers and our President gave a short address. A lucky dip (raffle) was held at the end of the address and five of our guests received a small present to take home.

The general consensus afterwards seemed to be that the Windsor Hotel had been a good venue for the event; parking was easier than expected, the reception lounge and dining rooms were ideal for the number of guests and the service was good.

REMINDER:

RCEA members are covered by a Members' Club Protection Policy whilst engaged in Association activities This cover does not extend to non – members and guests.
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REPLY SLIP 1

To: Treasurer, J H Underwood, 168 Alinora Crescent, Goring by Sea, BN12 4HW

Can you please reserve me …….. places to attend the Spring Lunch at Northbrook College on **Tuesday 24th March 12:00 for 12.30**

Full name:……(Block capitals)
Address………
……
……
Telephone Number…….Name of guest/s ……..
E mail address……

I enclose a cheque made payable to RCEA for **£……..…(£11.00) per person**
(Separate cheque please)

There will be a bar for pre-lunch drinks, the cost to be settled individually by Members and guests.

Because of college "lead times" required applications MUST be made by 10th Feb 2011.

Should the numbers exceed the maximum seating allowed there will be a waiting list made, as in previous years.
……

REPLY SLIP 2

To Randall Kier, 16, Shirley Close, Rustington, West Sussex. BN16 2EG
Telephone 01903 785952 or email randallkeir@btinternet.com

I would like to register to attend the proposed RCEA Visit to LACC Swanwick, Hants, on Wednesday 11th May 2011 **Times and detail to be confirmed**

Name……Telephone……..
Address……e-mail…….……
……..
……..
Car Registration Number……..(Limited parking)

Prepared to take passengers **YES / NO**

Suggested passengers if on list of successful applicants …….

Have you a Photo ID **YES / NO**

Latest date for applications by post, or e-mail **11th April 2011**

Limited places on this visit, please reply early

INTENTIONALLY

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REPLY SLIP 3

To: Malcolm Hind, 7 The Castle, Horsham RH12 5PX
Telephone 01403 251719 e-mail malcolmhind@msn.com

I would like to register an interest to participate in the proposed RCEA Outing to the Olympic Site and Woolwich Arsenal on Wednesday 17th August 2011**.**

Subject to sufficient interest, times and detail to be confirmed in next newsletter

Name……Telephone……..
Address……e-mail……..……
……..
……..
Number of places required……at an approximate cost of £35

Suggestion for a suitable pick-up point for you……

Latest date for applications **by post, e-mail, or telephone** **28th February 2011**