

British Tunnelling Society

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NEWSLETTER July 2003

INTRODUCTION

This Newsletter has the largest number of pages to date with news about

- The future of the Newsletter and that it is now placed immediately it is written on the website
- A reminder of the tunnelling course on 30th June to 4th July
- The AGM, the elections and the award of the James Clark Memorial Medal
- The successful Harding Prize Competition
- The Annual Dinner and the Second Annual Tunnelling Industry Awards, and
- A report on the International Tunnelling Association meeting in Amsterdam

NEWSLETTER

The Newsletter has been sent out to members for the last nine years initially once or twice a year and quarterly for the last four years. The Newsletter has also been placed on the website after it has been issued to members as an insert in Tunnels & Tunnelling International.

One of the problems with this method of circulation is that the writing and printing of the Newsletter takes place five or six weeks before you receive it. The Committee decided earlier in the year that the Newsletter would be placed on the website immediately it is written and thus up-to-date information can be given in the Newsletter.

The Committee at their May meeting decided, partly to improve the distribution and partly on cost grounds, that the Newsletter should be placed on the website and not sent to members with T&TI. This issue and the October issue will be sent out as normally. However, from January 2004 it will only be placed on the website.

The number of issues will be reviewed in the next few months and how members can be alerted by e-mail. The October issue will give more information on this and the dates that the Newsletter will be placed on the website.

TUNNEL DESIGN AND CONSTRUCTION COURSE

May we remind you that the Society is holding one combined course this year from 30th June to 4th July 2003 entitled 'Tunnel Design and Construction'. Whilst for those receiving the Newsletter with T&TI this reminder will be too late, but for those who read it on the website, there is still time to book. As we go to press there has been a good response with 37 registered on one or both modules. However, there is room for more. So please register immediately.

The course will provide a foundation in the many aspects of tunnelling from client requirements, through planning and ground investigation, design, the letting of contracts and practical aspects of the construction process. Experienced engineers from the industry will give the benefit of their experience to delegates through lectures and course study materials.

The course will also incorporate a number of Health and Safety presentations based upon the Society's Health and Safety course, which will not be run as a separate course this year.

Delegates will be offered the opportunity to attend for the whole five days, or alternatively to attend Module 1 – Design, from Monday to Wednesday, or Module 2 – Construction, from Wednesday to Friday. All delegates will be present for the core Health and Safety topics on Wednesday.

There will be ample opportunity to question lecturers on their subjects, which include

- Survey, site investigation and geotechnical aspects of tunnel design
- Temporary works design and construction
- Linings and ground support including NATM
- Mechanised tunnelling, tunnel plant and equipment
- Settlement associated with tunnelling, and the effect of compensation grouting
- The use of compressed air, ground treatment and grouting
- Contractual and commercial matters including risk
- Safety relating to design and construction
- Legislation

Application forms can be obtained from Hannah Wilson at the Institution of Civil Engineers, One Great George Street, London SW1P 3AA, tel 44 (0)2076652313, fax 44 (0)2072331743 www.ice.org.uk or www.thomastelford.com

Please support the course.

CHANNEL TUNNEL RAIL LINK

Section 1 of the CTRL is planned to be opened in September. The 74km length of new route will take the link from the Channel Tunnel, through the Ashford cut and cover tunnels and station, through the North Downs Tunnel to Southfleet Junction in north Kent and then on existing lines to Waterloo. The opening of Section 1 will save 20 minutes on the Eurostar journey time through Kent.

At 1st June 15km of the 40km of bored tunnel for Section 2 of the Channel Tunnel Rail Link had been completed.

The progress on the seven drives on 1st June was as follows:

Contract 220	first drive	4,663m
	second drive	3,174m
Contract 240	first drive	424m
	second drive	975m
Contract 250	first drive	1,755m
	second drive	1,095m
Contract 320	first drive	Completed
	Second drive	420m

GOSSIP

Any interesting pieces to rodneycraig@compuserve.com please.

COMMITTEE

Anthony Deane, Mott MacDonald, and Eddie Woods, Ove Arup, retired from the Committee, after three years, at the AGM on 22 May 2003. Kevin McManus, who was elected at the AGM in 2002, resigned from the Committee as he is pursuing a different career path. It was therefore agreed to elect four new members at the AGM and Bill Redhead, KBR, Chris Smith, CRS Consultants, Alun Thomas, Mott MacDonald, and Paul Watson, Ove Arup, were elected. The first meeting of the new Committee was on 19th June, after the Newsletter went to press, and details of the new Chairmen of the Sub-Committees will be given in the next Newsletter.

JAMES CLARK MEMORIAL MEDAL

The James Clark Memorial Medal was presented to Jim Buchanan at the AGM. Jim started his career with W & C French Ltd in 1947 on a hand excavated tunnel at Maple Cross. He later worked on tunnelling projects for A & M Carmichael and Costains before joining Sir Robert McAlpine in 1953 whom he worked for until he retired in 1987, but continued to work part time for a number of years. At McAlpine Jim worked initially on site on Dungeness A Power Station cooling water tunnels and was later Site Agent for the Dungeness B Power Station cooling water tunnels. On both projects high pressure compressed air was used. Jim returned to the office and worked mainly on tenders and latterly he was QA Manager.



Jim Buchanan receiving the James Clark Memorial Medal from Anthony Umney, Chairman

Jim had three spells on the BTS Committee and was Vice Chairman from 1977 to 1978. He was the FCEC representative on the CIRIA Working Group for Report 44 on Compressed Air Working from 1970. He worked on all three editions of the report and on the drafting of the fourth edition which was eventually shelved when the HSE announced its intention to revise the 1958 Regulations.

From 1986 Jim was the BTS representative on the Medical Research Council Decompression Sickness Panel Compressed Air Working Group. When this Panel was disbanded the BTS sponsored the Compressed Air Working Group and Jim continued to sit on the Working Group.

Jim has been a member of the BS 6164 Committee since it was formed in 1975 and has been a member of the UK delegation to CEN/TC151 since its first meeting in 1989.

FUTURE MEETINGS

All meetings start at the Institution at 17.30 unless stated. Flysheets on the details of the meetings are circulated in advance in T&TI and details are also posted on the website a month or so in advance of the meeting.

The last meeting in the present session is in June.

The next session begins in September when the meeting will be **held at the ExCel Exhibition Centre in Docklands as part of the Underground Construction 2003 Conference. The meeting will start at 4.30pm on Wednesday 24th September** and will be followed

by free refreshments in the Exhibition area. Do come and spend some time around the exhibition beforehand.

19th June 2003	Box Jacking under M1
24th September	Channel Tunnel Rail Link at the ExCel Exhibition Centre.
16th October	TBA
20th November	TBA

HARDING PRIZE COMPETITION - 2003

This year the Harding Prize Competition received 8 excellent entries, the equal highest number to date. The three finalists presented their papers on 24th April 2003.

The papers submitted were:

Mike Devriendt, Ove Arup – Ground movements and building damage assessment for the King's Cross Underground Station Redevelopment Project

Rania Gideon, Charles Haswell & Partners – Box-jacking the Gedora Canal under Histadrut Road, Haifa, Israel

Esve Jacobsz, Ove Arup – The effects of tunnelling on piled foundations

Phillip Lea, Halcrow – Arrowhead Tunnel Project USA – Precast segmental linings joint tests

Hilar Matous, Mott MacDonald – The evaluation of support measures for a large diameter NATM tunnel in weak rock

Sarah Munk, Ove Arup – The reconstruction of the Wastewater Transfer Tunnel, Hull

Martyn Noak, Halcrow – The analysis of the Central Line running tunnels for the undercrossing by the Channel Tunnel Rail Link

David Smith, Parsons Brinckerhoff – Design development of the New York East Side Access Project

The three finalists were Mike Devriendt, Esve Jacobsz and Phillip Lea who presented their papers for 20 minutes each and answered questions for 10 minutes. All three presentations were of a very high

standard. The judging is based upon the paper and its content and the presentation on the night.

Phillip Lea, the youngest entrant at 24, won the Harding Prize and received a copy of Sir Harold Harding's book 'Tunnelling History and My Own Involvement'. He was later invited to the Annual Dinner and received a cheque for £500 and a Certificate.



Phillip Lea receiving Sir Harold Harding's book from Anthony Umney, Chairman

The two other finalist receive a cheque of £100 and the other entrants a cheque for £50. Each of the entrants will be given free membership of the Society for one year. It is hoped that all eight papers will be published in T&TI over the coming months.

ANNUAL DINNER

On 9th May 2003, a total of 482 members, partners and guests gathered for the annual dinner, which was again held at the Brewery, in the City of London. The number represented an increase of 40 on last year. After the dinner, there were short addresses from the Chairman, Anthony Umney, and broadcaster David Jacobs MBE DL, who also presented the Second Annual Tunnelling Awards during a brief ceremony.

The evening was rounded off by a combination of socialising, networking, and dancing to the music of Brass Farthing. Most comments received by the organiser, John Scholey, were favourable although several have asked for a quieter band next year. John suggests perhaps a break from tradition by opting for a gentler very danceable folk song or dance band next year. Any comments, please, direct to John or john.scholey@haliburton.com

TUNNELLING INDUSTRY AWARDS

A report on the Second Annual Tunnelling Industry Awards is in the June 2003 issue of T&TI. The six winners were:

A Major Project - sponsored by Skanska Construction - CTRL Contract 320 Thames Tunnel, Hochtief - Murphy JV



The Major Project Award being presented by David Jacobs to Peter Bermingham and Maurice Gallacher, Hochtief-Murphy JV, with Anthony Umney, Chairman and Tristan Thomas, T&TI

B Minor Project - sponsored by Bekaert Ltd - Acre Road Relief Sewer, Glasgow - Bysak Ltd

C Achievement Through Innovation - sponsored by Aperio Ltd - MI Box Jack Junction 15A Enhancement - Edmund Nuttall Ltd

D Excellence in Tunnel Design - sponsored by Continental Conveyor Ltd - CERN LHC Project Package 01 - Scott Wilson

E Machinery/Materials Award - sponsored by MBT Ltd - In Tunnel Conveying - Continental Conveyor Ltd

F Safety Award - sponsored by Bysak Ltd - TBM 1200 Remote Controlled Tunnelling Machine - Herrenknecht

UNDERGROUND CONSTRUCTION 2003

The final circular for Underground Construction 2003 to be held at the ExCel Conference Centre in London Docklands on 24th and 25th September 2003 has already been circulated. The Conference and Exhibition is organised by Brintex on behalf of the IMMM and the BTS and is supported by the PJA, the Engineering Group of the Geological Society, BGA, BDA and UKSTT and the Ground Forum.

This is **your conference** and should be supported by all clients, consultants, contractors and manufacturers in the industry. If you book by 15th July there is a 10% reduction in the delegate fees. We look forward to seeing you there.

TUNNEL LOBBY GROUP

There was a very successful APGUS (Associate Parliamentary Group for Underground Space) visit to the CTRL site at Dagenham hosted by David Court, Vice Chairman of the BTS. Two Peers and two Parliamentary Assistants visited the site. The small size of the group ensured that access to the working face was possible. In the event the group managed to see the end of the excavation cycle and the start of the ring build. Walt Bell, of Union Railways North, gave an overview of the project and David Court and his team filled in the detail. The visit was greatly appreciated by the Parliamentarians who found it fascinating and exciting.

The next APGUS event will be a visit in early July to London Electricity's underground substation in Leicester Square. This will be for a small group of Parliamentarians and an invited group of non-parliamentarians.

Looking forward to the Autumn term we hope to arrange a couple of events where more people can participate: possibly something with Crossrail in September and then the AGM with a topical presentation at the end of October.

Further information from Helen Natrass h.natrass@sir-robert-mcalpine.com

HEALTH AND SAFETY

The BTS Compressed Air Working Group met recently and had an interesting presentation on

initial experience with oxygen decompression by Dr Andy Colvin and Tony Ridley. The meeting was hosted by Hochtief-Murphy JV at CTRL Contract 320 and Group members were taken underground to see the airlocks and oxygen system at first hand. Thanks are due to Bob Brown of J. Murphy for organising the visit. BTS members are reminded they are welcome to consult the Group on any matter concerning work in compressed air.

The HSE is shortly to publish a research report on the 'Comparison of Oxygen Decompression Tables for use in Compressed Air'. This describes a range of physiological model studies in which the performance of decompression tables from Germany, France, Holland, Switzerland, USA and Brazil were compared with the oxygenated Blackpool Tables. The main conclusion from the work was that none of the tables were significantly better or worse than the oxygenated Blackpool Tables but that further research should be undertaken towards reducing decompression bubbles in the bloodstream. The report will be available on the HSE Website www.hse.gov.uk and from HSE Books Reference Report 126.

WORKING GROUP ON REGISTRATION

In the light of increased expectations of clients, insurers and engineering institutions for tunnelling companies and individuals to be able to demonstrate competence, the BTS has formed a Working Group to report on the issues. A Working Group of David Court, Peter South, David Hobson and Eddie Woods was convened by Peter Jewell. The Group has met twice and has received a presentation by the ICE on the Registers, which they currently maintain for a number of professional specialisms. The Group intends to present a draft report on its findings and recommendations to the main BTS Committee in June, and it is hoped that a policy on how BTS should go forward on these matters can be finalised during the Autumn. For the BTS to do nothing on these issues is indeed one option; but the Working Group has already formed the view that in the 21st Century business climate, to do nothing is unrealistic.

INTERNATIONAL TUNNELLING ASSOCIATION

The 29th annual meeting of the International Tunnelling Association was held in Amsterdam,

The Netherlands, from 12th to 17th April 2003, in conjunction with the World Tunnel Congress 2003 organised by the Dutch Tunnelling Society (VOR) on (Re)Claiming the Underground Space. Andre Assis, President of the ITA, and Henk Oud, Chairman of the Organising Committee, welcomed the delegates to the Conference.

Forty-one of the fifty-two Member Nations attended the General Assembly of the ITA on 13th and on 16th April. During the year there has been a substantial increase in the number of Corporate Affiliate Members whose numbers have increased by 21 to 113. The number of Individual Affiliate Members has, however, reduced by 18 to 163. If you wish to know more about the ITA and become an Affiliate Member of the Association please contact Martin Knights martin.knights@halliburton.com

Tribune is the current ITA Newsletter which is published quarterly. From 2004 Tribune will have only one issue which will be published for the Annual meeting. An 'ITA e-news' will be sent out bimonthly by e-mail to all those members registered and will be placed on the website. It is hoped that this e-news will have a much larger readership, being sent not only to Member Nations, Affiliates, those on the Working Groups, but to anyone who registers for the e-news on the website.

At the same time the ITA website will be upgraded during 2003. The present site has 1000 pages and is time consuming and costly to update. The site currently has 5000 visits a month from more than 90 countries. A Content Management System will be installed which will provide an up to date system with an hierarchical ordered structure and a more intuitive navigation system. The new site will be progressively implemented and will be fully operational before the next meeting in Singapore in May 2004.

To mark the 30th anniversary of the Association in Singapore, a CD is being prepared with all the Working Party reports issued during the life of the Association.

At the second session of the General Assembly Henk Oud, The Netherlands, was elected as Vice President for a period of one year, and Martin Knights, United Kingdom, was appointed as a Member of the Executive for a period of three years. We congratulate Martin on his appointment

The next meetings of the ITA will be held in Singapore, 22 to 27 May 2004, Istanbul, Turkey, 7

to 12 May 2005, and in South Korea, 29 April to 4 May 2006

Working Groups

All the Working Groups met during the Conference. Working Group 11 – Immersed and Floating Tunnels was particularly active as the two parts of the Conference Open Session on the morning of 15th April were organised by the Working Group on 'Immersed Tunnels - The Next Generation'

The BTS does not have representatives on all the Working Group. The work of the Working Groups is now carried out more during the year by correspondence or by e-mail. Generally only a third to a half of the members attend the Annual meetings. If you would have an interest in one of the Working Groups and would like to be a member of a Working Group please contact Martin Knights.

WG 2 – Research

The report on the 'Guidelines for tunnelling risk management' has been completed. The report on 'Settlements induced by tunnelling' will be finalised during the summer. The Working Group is now concentrating on a study of 'Site Investigation Strategy for Tunnelling Projects'.

Barry New, GCG, represented the BTS at the Working Group meetings

WG 3 – Contractual Practices in Underground Construction

The Working Group had a number of presentations on legal, social, environmental and financial challenges facing the industry and discussed how to deal with these issues in different countries. The Working Group discussed the requirement for independent and neutral experts to be appointed to Dispute Boards for tunnel projects and will develop procedures for drawing up lists of experts. The 25 propositions on the principles of apportionment of risks approved in the early 1990's will be updated.

WG 5 – Health & Safety in Works

The 'Safety in Tunnelling' CD-rom project was reviewed and will be completed in the Summer. The revision of the 'Tunnelling Safety Guidelines' published in the early 1990's will be completed and

agreed at the meeting in Singapore in 2004. Further responses have been received in support of a database on health and safety legislation. The Working Group agreed a Statement calling for the provision of fixed fire fighting systems on all tunnelling plant and equipment.

Donald Lamont, HSE, as Animateur of the Working Group, and John Anderson, consultant, represented the BTS at the Working Group meeting.

WG 6 – Maintenance and Repair of Tunnels

The Working Group met with the Animateur of the PIARC Working Group on Fire, Life and Safety. The Working Group reviewed their current work on 'Guidelines for Structural Fire Resistance for Road Tunnels'.

WG 11 – Immersed & Floating Tunnels

The Working Group carried out the final planning for the Conference Open Session. A number of members had participated in the first US Workshop on Immersed Floating Tunnels in Seattle and had provided support to the Discovery Channel for its TV broadcast on 'Immersed and Floating Tunnels'. The Working Group has decided to update, extend and edit for internet use, its previous State of the Art Reports. In addition a report on 'Differential Settlement' will be prepared.

Chris Marshall, Symonds Group, as Vice Animateur of the Working Group, represented the BTS at the Working Group meetings.

WG 12 – Shotcrete Use

Contributions to the 'State of the Art Report' had been received from 21 countries and the final draft of the report will be ready in the late Summer. The report on 'A list of Fire-protective Sprayable Mortars' will also be finalised in the late Summer. The report for the third task 'Shotcrete Support Mechanism' will be included in the State of the Art Report. The Working Group's new tasks will include the collection of information on existing schemes for the training and certification of shotcrete nozzlemen, a report on reinforced shotcrete ribs/arches and an overview report on synthetic structural fibres for shotcrete. The reference list of projects with permanent shotcrete linings will be continued and new references were requested.

WG14 – Mechanisation of Excavation

The database on 'Classifications and Definition of TBMs' with recommended keywords was finalised and will be established on the ITA website with a protocol for data search and acquisition. Recommendations on the collection and interpretation of tunnelling data will be prepared as a first step to automated tunnelling. A model study with hard rock, EPB and slurry TBMs will be made and a final draft report prepared for the Singapore meeting in 2004. Draft recommendations will be prepared on geological investigations, TBM design, tunnelling plan, preventive measures and other measures on site for discussion in Singapore.

Anthony Umney, Faber Maunsell, represented the BTS at the meeting of the Working Group.

WG 15 – Underground Works and the Environment

A summary of the first report of the Working Group was published in the October 2002 issue of Tribune. The meetings heard presentations on environmental considerations and problems for tunnelling projects in Member Nations' countries. The Chairman of the EU GeoTechNet Environmental Working Group gave a presentation of their work associated with the EU Water Framework Directive. The Working Group's next report on 'Environmental and Sustainable Reasons for Going Underground' will be published next year.

Rodney Craig, consultant, as Animateur of the Working Group, represented the BTS at the meetings of the Working Group.

WG 16 – Quality

The Working Group has completed its final editing on its General Report on Quality. Future topics should be developed in the field of monitoring the performance or the design process with particular reference to geotechnical and technical information.

WG 17 – Long Tunnels at Great Depth

The draft of the Working Group's report on 'Long Tunnels' was approved and should be published later in the year. The report focuses on long road and railway tunnels under extreme conditions for risk assessment and risk management during the feasibility, construction and operation phases of the project. A general methodology is defined. The major guidelines are related to the planning and design of the tunnels, including ground conditions and ground investigations, and safety and environmental requirements for the construction and operation.

WG 18 – Training

The Working Group had presentations from three Member Nations on training activities and literature. The data will be made available on the website in due course. A list of universities with tunnelling courses will be drawn up and placed on the website. The future work of the Group will include a list of University Professors, the preparation of basic training and learning material to be placed on the website, and the preparation of a standard format for the working groups to prepare training material on their activities.

WG 19 – Conventional Tunnelling

Four national reports on conventional tunnelling were presented and discussed at the meeting. A table of guidelines for the most important topics for reports from other Member Nations was drawn up. The final report will include an important section on contractual practices.

WG 20 – Urban Problems - Underground Solutions

The first official meeting of this new working group was held in Amsterdam to consider this topic of great significance – how best to provide the infrastructure to support rapidly growing populations in Urban Areas. Underground space will play an increasingly important role in solving this question. A questionnaire was sent out during

the year to all Member Nations asking for the identification of urban problems that had to be solved, or could have been solved, by the use of underground space or facilities. The response to date gives good information on many projects from several countries.

Martin Knights, KBR, and Gordon Torp Petersen, Crossrail, represented the BTS at the meetings.

AUA GUIDELINES FOR BACKFILLING AND CONTACT GROUTING OF TUNNELS AND SHAFTS

The BTS has recently received a review copy of the AUA Guidelines for Backfilling and Contact Grouting of Tunnels and Shafts, which was edited by Raymond W. Henn and which is published jointly by ASCE (www.pubs.asce.org) and Thomas Telford. Peter Jewell reviewed the Guidelines on behalf of the BTS.

In summary, his review concluded that 'the book covers many aspects of grouting fairly comprehensively, with descriptions of different grouting materials and properties; grouting plant and equipment; and quality control and record keeping.

In addition it reviews how grouting materials and methods are adapted to deal with different types of ground and different linings systems and methods of tunnel construction (e.g grouting behind EPBMs using automated grout injection systems). The book does not appear to cover consolidation or compaction grouting.

The principle intention is to provide guidelines to clarify terms and methods, improve contract documentation and reduce costs and claims. It goes a long way to achieving these aims. This book will be of most use to graduates and those unfamiliar with tunnelling, but would also be a useful reference for those with more experience.

A full copy of the review may be obtained from Peter Jewell, peter.jewell@halliburton.com

CONFERENCES

Don't forget to look at the back pages of Tunnels & Tunnelling International and World Tunnelling for the conferences coming up over the next two years. Also the International Tunnelling Association website www.ita-aites.org

Underground Construction 2003, 24 & 25 September 2003, ExCel, London, Docklands, organized by Brintex on behalf of the Institute of Materials, Minerals & Mining and the British Tunnelling Society, www.tunnelling-show.com

EFFEE 2nd World Conference on Explosives and Blasting, Prague Czech Republic , 10 to 12 September 2003; www.explosives.cz

ITA-AITES 2004, World Tunnel Congress and 30th ITA General Assembly, Singapore 22 to 27 May 2004.