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Developments in industry, education and IT behind a new approach to teaching project management
Nick Spencer Chapman, Oxford Brookes University

It never rains but it pours
Tom Wrzesien, Taylor Wessing

28 days later
David Carrick FInstCES, Knowles

Blast analysis with a laser scanner
Jane Ball, Maptek

Engineering insurance
Mark Thomsen, James Hallam Professional Risks

When is a variation not a variation?
Simon Longley MInstCES, SL Consulting

Glasgow, city of art
Doug Pitchard, Digital Design Studio, Glasgow School of Art

The past, present and future
T Bramald, J Mills MInstCES, D Parker FInstCES and S Edwards, Newcastle University

For what we are about to receive, may we be truly concerned...
The CDM Regulations 2007
Robin E Jones FInstCES, SURCO Ltd

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CES May 2007 will feature transport infrastructure, bridges and tunnels.
Editorial copy date: 12 April 2007.
Please note that this date applies to news, calendar items and to readers’ letters. Articles, reviews and other lengthier contributions inevitably require a longer lead in time.

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**A question of sport**

On a lighter note, there was a short mention in the last CES that China is about to expand its rail network from 75,000km to 100,000km over the next 13 years. According to our stalwart Barry Hiscox in his Letter from America in February’s CES, the Peoples Republic of China is the world’s number one user of rail transport (Britain ranks a pathetic number 12). However, it was not always so, as revealed by this little gem about my civil engineering hero, John Dixon.

> “In 1875, in connection with Mr Richard Rapier, [Dixon] got the concession for, and made, the first railway in China, from Shanghai to Woosung. It was very successful and popular among the natives for a time, but, owing to the prejudices of the ruling Mandarins, was bought by the Chinese government and taken up in October 1877; not, however, before thousands of the people had had practical experience of its utility.”

So, there you are, even back, then they had problems with Mandarins!

The Institution has been keeping me very busy over the past few months. Of particular note were two ‘fast-track’ Fellows’ meetings in Sale and London when some of our leading figures of industry had the opportunity of learning more about their institution and entering into a debate on our plans and how they can make a positive contribution. Both meetings were informative and enjoyable for me and, I hope, for our new members. On 6 March, I was a guest with Chris Delight on the Scottish region’s AGM. It was a good turnout and they all listened politely to what I had to say before laying into me on a few pertinent issues. I also learned from the meeting of yet another example of a major survey contract where, it seemed, the client was unaware of the proper surveying procedures or the need to employ properly qualified practitioners. The AGM took place in an Indian restaurant where the food, and company, were excellent. These are the real occasions where we can reach out
to the membership. If you are not a regular attendee at regional events then do try to make the effort because you won’t be disappointed.

On 14 March, we were guests at the TSA après AGM presentations and listened to some really interesting talks from Jon Mills, of Newcastle University, discussing Geomatics.org.uk and Roger Jeans from the OS education team explaining how they provide web resources to schools. Kathryn Thomson gave a delightful talk on the Royal Geographic Society promoting their chartered geographer qualification and Adrian Fox, from British Antarctic Survey, spoke on GIS and mapping products. I was a little surprised when Jon Mills suggested the idea that there should only be one professional institution for surveyors and it raised a few groans from the audience. I think it would be a challenge for ICES to absorb the members from ‘the other place’ in one go but I guess we could try.

Returning to Andy Allinson’s article on invasive species, one invasive species that is proliferating as a consequence of climate change, is a gaudy mammal that has taken control of the lanes around my home in Somerset. This large omnivore comes in the brightest colours – red, blue and yellow — with various stripes and other adornments, and a fearsome pointed head crest and dark glassy eye coverings. It is always found in packs that spread across the road way and defy anyone passing. These creatures, with their prominent baboon-like rear parts and lack of fur, present a shocking spectacle on any warm day when a stroll along the country lanes seems such a good idea. If, on the other hand, you’re trying to get your wife to hospital as quickly as possible, their dangerous and thoughtless obstructive habits are beyond the irritant. I passed my cycling proficiency test when I was 11, so I know what I’m talking about. If the aristocracy is denied hunting foxes, why not let them track down and slaughter, as inhumanely as possible, these peddling invaders?

Lastly, by no means least, 31 March marked the end of an era when our retiring chief executive Kevin ‘Mr ICES’ Blackwell can finally dust off his Ella Fitzgerald 78s and settle down to listen to his gramophone without the phone ringing. Or so he hopes. Lots has been written about this amazing, wise and utterly delightful man and all the extraordinary things he has done for our institution. Kevin isn’t escaping yet, oh no, he’ll be doing part time work for us and he remains MD of SURCO. I don’t intend adding to what has already been said other than to say, from my heart, thanks for everything, Kevin, you’re a star.

Ed Danson FInstCES, President, ICES

SURCO Limited launches online cost file

SURCO Limited, the trading company of ICES, has launched an online civil engineering cost file (CECF). The cost file, available now, will be an invaluable tool to those involved in preparing budget estimates, quantum on claims, valuations of variations and final accounts. It will be constantly monitored and a revised edition issued at least three times each year. The file consists of thousands of fully-priced civil engineering items presented in accordance with the requirements of CESMM3. Each item is broken down into labour, plant and material costs to produce a net total plus an allowance for profit and overheads to give a gross charge-out rate.

Access to the CECF is gained online at www.cecf.uk.com or through the ‘links section’ on the home page of the ICES website www.ices.org.uk. It is worth noting that in the future subscribers will also have access to previous editions of the cost file which will be archived for easy access. The yearly subscription cost is at an introductory rate of £125. A free sample of the earthworks section can be viewed online now.
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<tr>
<th>Region</th>
<th>Chair</th>
<th>Secretary</th>
<th>Contact Details</th>
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</tbody>
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Events organised by the regions are published in this journal and on www.ices.org.uk. Alternatively, contact any of the regional representatives listed above. If you are unsure as to which region you are covered by, please contact Juliette Melkee at ICES HQ on t: 0161 972 3113 e: training.membership@ices.org.uk

**Yorkshire**

9 April 2007: Committee Meeting, Trett Consulting, Leeds, 7pm
All welcome.
14 May 2007: Committee Meeting, Trett Consulting, Leeds, 7pm
All welcome.
5 June 2007: Committee Meeting, Trett Consulting, Leeds, 7pm
All welcome.

**South West & South Wales**

19 April 2007: RICS/ICES Evening Geo Lecture: Applications of inshore LiDAR, Pavilion, Colston’s School, Stapleton, Bristol, 6pm
Lecture by Ken Hall, chairman South West and South Wales and RICS Geomatics, and Ed Danson, president ICES. A cold buffet will be served at 5.15pm prior to the lecture. Contact James Kavanagh at RICS for more details e: jkavanagh@rics.org

**North West & North Wales**

The committee meeting was held at the end of March. Many thanks to all who attended. Full details to follow.

19 April 2007: ICES Network North West, Dominion House, Sibson Road, Sale, 6pm-7pm
Come along to the first ICES North West meeting for early-career members.
Refreshments will be provided. Contact Gary Jones at ICES HQ for further details t: 0161 972 3115 e: marketing@ices.org.uk

**Anglia & Central**

17 May 2007: Planning and Programming Issues for the Civil Engineering and Construction Industry
Details to follow.

July 2007: Newmarket Races
Following last year’s event, another social visit to an evening meeting and supporting concert.

October 2007: Debate
A debate is being organised on a major issue currently under scrutiny within the industry.
Details of all events will be made available to members nearer the time. The committee welcomes suggestions any member may have, or know of, that will be of interest to a wider audience. Naturally the committee will make all arrangements regarding venue, timings, publicity etc to make the event a success.
Anglia & Central members are also invited to attend South East region events.

**Northern Counties**

The committee meeting was held at the end of March. All committee posts were open to re-election. A full report will follow.
13 April 2007: ICE/ICES Annual Dinner, Martello Room, Jury's Hotel, Ballsbridge, Dublin, 7.30pm for 8pm
This will be the inaugural joint annual dinner between our two institutions in Ireland. Blacktie. Tickets are €85 per person. Please contact Don McEntee, Dublin City Council, Floor 3, 68-70 Marrowbone Lane, Dublin 8 e: dmc@rbc.dublin.ie to order your tickets. Places are limited so please book ASAP. Flyers have been sent out to all ICE and ICES Ireland members.
14 May 2007: ICES application and upgrade workshop, Grand Hotel, Malahide, Co Dublin, 6.30pm-8pm
Paul Brown, ICES Education, Training & Membership Officer will be presenting a workshop for potential new and current ICES members who are considering an upgrade of their current status. Contact Mark Hudson if you are interested.
Ireland’s largest geospatial engineering surveying conference, survey equipment and software exhibition. Officers from ICES HQ and members of the Ireland regional committees will be attending.
22 May 2007: Committee Meeting, Red Cow Hotel, 6.30pm
14 June 2007: ICES/ICE Ireland Golf Day #1, Rathasallagh Golf Club, Dunlavin, Co Wicklow, 12.30pm first tee
The committee would like to invite members and non-members to participate in our first golf day of 2007. Numbers are restricted to 40 players, making pre-booking essential. Please contact Mark Hudson to register your interest. Flyers have been sent out to all ICES Ireland members.
11 September 2007: Committee Meeting, Red Cow Hotel, 6.30pm
A briefing by Jacqueline Masterton, solicitor, A&L Goodbody’s, on the administration of the new public works contracts. There will be a small cover charge for non ICES/ICE members. The talk will commence at 6.30pm and will be preceded by a committee meeting.
16 April 2007: Committee Meeting and Talk on Administration of the New Public Works Contract, Rochestown Park Hotel, Douglas, Cork, 6pm
A briefing by Jacqueline Masterton, solicitor, A&L Goodbody’s, on the administration of the new public works contracts. There will be a small cover charge for non ICES/ICE members. The talk will commence at 6.30pm and will be preceded by a committee meeting.
11 June 2007: Committee Meeting, Rochestown Park Hotel, Douglas, Cork, 6pm
3 September 2007: Committee Meeting, Rochestown Park Hotel, Douglas, Cork, 6pm
15 October 2007: Committee Meeting, Rochestown Park Hotel, Douglas, Cork, 6pm
12 November 2007: Committee Meeting, Rochestown Park Hotel, Douglas, Cork, 6pm
Please contact Mark McGreevy, branch chairman at m.mcgreevy@skis.ie if you would like to assist in developing ICES in south Ireland.
2 April 2007: ICE Brunel International Lecture on Engineering Civilisation from the Shadows, Waterfront Hall, Belfast, 6.15pm
ICES members are invited to attend ICE NI events. How can engineers help to alleviate worldwide poverty? What role can they play in addressing the impacts felt by climate change and creating a more sustainable future for civilisation? These are the central themes covered by Professor Paul Jowitt in this year’s Brunel International Lecture. The lecture is being presented to influential engineers, parliamentarians and business leaders, and will raise the profile of civil engineering’s capabilities and responsibilities to get involved in tackling poverty and climate change. The event is free to attend but please register your interest in attending by contacting Michelle Murphy t: 028 9087 7157 e: michelle.murphy@ice.org.uk
18 May: ICE NI visit Engineers Ireland
Full details of this event will be emailed to all ICES Ireland members when more details become available. Contact David Cleland t: 028 9097 4747.
13 September 2007: Committee Meeting, Quigg Golden Ltd, Belfast, 6pm
1-3 Brunswick Street, Belfast BT2 7GE. All welcome
Please contact James Golden, branch chair at james@quigggolden.com or Kevin McKeown, branch secretary at kevinmckeown@quigggolden.com if you would like to attend meetings and assist in developing ICES in Northern Ireland.

If any member would like to find out more about region events please contact Steve Lam or Eric Lo.

www.ices.org.uk

EASTERN & MIDLANDS
26 April 2007: Geospatial talk
Further details to follow.
June 2007: Annual Golf competition
Date tbc
9 July 2007: An evening at the dogs
Racing at the Nottingham Greyhound Stadium.
Further details/updates of events will be posted on the ICES website. Ideas from members for future regional events are always appreciated. Help can be given by the committee to arrange events.

DUBLIN BRANCH
12 November 2007: Committee Meeting, Red Cow Hotel, 6pm
A briefing by Jacqueline Masterton, solicitor, A&L Goodbody’s, on the administration of the new public works contracts. There will be a small cover charge for non ICES/ICE members. The talk will commence at 6.30pm and will be preceded by a committee meeting.
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HONG KONG
If any member would like to find out more about region events please contact Steve Lam or Eric Lo.

MUNSTER BRANCH
AGM: The AGM was held at the Rochestown Park Hotel, Douglas, Cork and was attended by the elected officers, Mark Hudson, ICES Ireland chairman, Richard Cronin and Michael Elliott, both active committee members and several members from the Munster region. The following officers were elected: Mark McGreavy — branch chairman, Philip Desmond — branch secretary and Brian McCarthy — branch education, training and membership representative.
16 April 2007: Committee Meeting and Talk on Administration of the New Public Works Contract, Rochestown Park Hotel, Douglas, Cork, 6pm
A briefing by Jacqueline Masterton, solicitor, A&L Goodbody’s, on the administration of the new public works contracts. There will be a small cover charge for non ICES/ICE members. The talk will commence at 6.30pm and will be preceded by a committee meeting.
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SCOTLAND
5 April 2007: Legal Update from Pinsent Mason
Bernhard Becker or Alistair Taylor can be contacted on any business regarding the Institution.
AGM: The South East AGM took place in the boardroom of Canary Wharf plc situated on the 30th floor of One Canada Square. The impressive venue attracted over 40 members to the meeting. After the main business of the AGM had been completed, we were treated to an extremely interesting presentation given by David Tomlin, external projects director for Canary Wharf Contractors. We were given an enlightening insight into the history and development of Canary Wharf plc from the construction of the original dock in the eighteenth century, through to the present day. After the heyday of dockland trade and commerce in the 1960s, the steady decline began, due in part to the increase in large vessel container traffic based at Tilbury. By the early 1980s, regeneration of the area was considered to be essential and eventually, via the developers Olympia and York, Canary Wharf came into existence. During the following years, Canary Wharf Construction became specialists in building multi-storey office tower blocks; in 17 years they have built 24 office buildings ranging from 10-50 storeys. Their expertise in this type of construction is now widely sought after.

Canary Wharf plc is also environmentally friendly; it is constantly trying to lessen the impact of its construction and office management activity on the surrounding eco-system. Recycling heat and energy loss from their office developments is an ongoing concern for their technical staff and, from what we were told by David, they appear to be well advanced in this area. David Tomlins is to be congratulated on a well prepared and balanced presentation which everyone present found fascinating.

David was an extremely difficult act to follow but our new CEO, Chris Deighton, rose to the occasion and captivated the audience with his vision and aspirations for the future. The lively discussion that followed was rounded off by Eric Zeeven, our region secretary and a past employee of Canary Wharf, giving us a guided tour of the Canary Wharf model room. 100m² of display space with scale models of Canary Wharf, the River Thames and extending as far as the city with illuminated roads, railways and airports is truly a most impressive sight. Couple this with the breathtaking views of night-time London on a perfectly clear evening and the WOW factor was unanimous. Our thanks go to Canary Wharf plc for allowing us to use their boardroom and making it such a memorable AGM.

All members of Anglia and Central are invited to attend South East region events. It is acknowledged that many of you are close to London, so should events be of interest, please feel welcome to attend.

24 April 2007: Crossrail — Where are we now? The Auditorium, Lovells, London, 5pm for 5.30pm
This is a King’s College Construction Law Association event open to ICES members. Douglas Oakvee will speak on the project’s progress to date. Admission is free. Contact Sharon Goodreds on e: sharon.goodreds@lovells.com

24 May 2007: Royal School of Military Engineering, Chatham, 6pm

Members will be met by soldiers who will then give them an escorted tour of the Royal Engineers Museum in small groups, with all the history that entails. After about an hour, visitors will gather in the museum lecture room where they will be brought up-to-date on what people have been up to in Iraq and Afghanistan, focusing on the surveying/engineering that has been undertaken and the challenges the surveyors have had to face. This will be followed by supper, with an opportunity to chat or see more of the museum, which closes at 9pm. Meet at 6pm for tours of the museum, with the presentation starting at 7pm. The RE Museum has its own access and car park. For further information on the museum, including maps showing the location, please visit www.remuseum.org.uk/index.htm Security clearance will need to be obtained prior to arrival, and the school would also like to know numbers for catering purposes so please contact Alan Barrow or Eric Zeeven with names, including vehicle registration numbers, if you intend coming.

June 2007: World of Mercedes
The social event for 2007 will take place at World of Mercedes. Further details to follow in future editions of CES.

19 July 2007: Pan Peninsula
A visit to the Pan Peninsula residential development near Canary Wharf has been arranged. The project comprises twin residential towers of 40 and 50 storeys, and includes Europe’s tallest residential tower at 153m. The visit will include a presentation by one of the project management team and a visit on site.

September 2007: Commercial Management
Further details to follow in future editions of CES.

October 2007: Dispute Avoidance and Resolution, ICE, One Great George Street, Westminster
A presentation organised by the Dispute Avoidance and Resolution Panel is tentatively planned for October. Further details including presentation content, time and date will follow in future editions of CES.

November 2007: Civil and Marine Slag Cement Factory Visit
Including a presentation on the product followed by a guided visit around the factory. Slag cement is a byproduct of iron smelting and produces 10% of CO2 emissions compared to traditional cement.

December 2007: Black Pudding Roadshow Breakfast Debate
A commercial management event similar to the well received debate held in October 2006 will be arranged. Further details to follow in future editions of CES.

If you have any questions regarding these, please contact Alan Barrow or Eric Zeeven. Further details of the events planned for 2007 will appear in later editions of CES and on the website.
Location Asia 2007: International Conference and Exhibition on Positioning, Navigation and Timing
4-5 April 2007: InterContinental Hong Kong
e: info@location.net.in  w: www.location.net.in

Buried Assets: Data integration and visualisation
17 April 2007: University of Leeds
Sarah Miller, Pipelines Industries Guild  t: 020 7235 7938
e: hpsec@pipeliguild.co.uk  w: www.mappingtheunderworld.ac.uk

RICS/ICES Evening Geo Lecture: Applications of Inshore LIDAR
with Ken Hall, Chair RICS Geomatics and Ed Danson, President ICES
19 April 2007: Pavilion, Colston’s School, Stapleton, Bristol
(a cold buffet will be served at 17:15 prior to the lecture which will begin at 18:00) James Kavanagh  e: jkavanagh@rics.org

BAUMA 2007
23-29 April 2007: Munich, Germany
w: www.bauma.de

SPAR 2007: Capturing and Documenting Existing-Conditions
Data for Design, Construction and Operations
26-27 April 2007: Kawasaki, Japan
Tom Greaves  e: tom.greaves@sparklc.com or
Koji Kawamura  e: kojikawa@a6.ctktv.ne.jp

UK Society for Trenchless Technology Annual Dinner & Awards
Ceremony with Chris Packham and Ian Keable
27 April 2007: Holiday Inn, Birmingham
Claire Gowdy  t:0191-301 6014  e: claire.gowdy@nw1.co.uk
w: www.ukstt.org.uk

Survey Ireland
15 May 2007: Grand Hotel, Malahide, Dublin, Ireland
Paul Brown, ICES  t: 0161 972 3115  e: education@ices.org.uk

Regional meetings are open to all. Go along, meet your colleagues.
If you have any ideas or suggestions, get in touch. We are here to represent you. Let us know what you think and need.
Don’t moan about it. Change it.
The might of the Mississippi
The largest drainage system in North America, the Mississippi River delta, empties 16,800m$^3$ per second into the Gulf of Mexico in this image taken in February. The drainage area of the Mississippi and its tributaries is approximately 3,250,000km$^2$; running through Wisconsin, Iowa, Illinois, Missouri, Kentucky, Tennessee, Arkansas, Mississippi and Louisiana.

Envisat’s MERIS instrument acquired the image in full resolution mode to provide a spatial resolution of 300m. The imagery will be used by GlobWetland, a European Space Agency initiative, to provide detailed views of individual wetlands to aid national and local conservation efforts.

The Mississippi delta, which was built up over millions of years through sediment deposition, has been drastically reduced over the past few decades and is now decreasing at a rate equivalent to losing a football pitch-sized piece of land every 30 minutes. Many scientists attribute the scale of the disaster caused to New Orleans (the light yellow crescent just below the inland Lake Pontchartrain) by Hurricane Katrina in 2005 to the loss of surrounding wetlands. Envisat has just marked its fifth year in space, having orbited Earth more than 26,000 times and travelled a distance of more than a billion kilometres.

Image credit ESA.

Exploring the benefits of artificial reefs
A study has begun into the use of artificial reefs in coastal defence. Funded by the Environment Agency, Westminster Dredging and Royal Haskoning, the CIRIA project will examine multi-functional artificial reefs as a viable alternative to traditional forms of coastal defence and investigate the marine habitat creation that the reefs can bring.

The aim of the study is not to provide detailed technical guidance but to offer a broad overview of their use and future potential for adoption in the UK. If you are interested in participating in the project contact Simon Vilarasau at CIRIA, t: 020 7549 3300 e: enquiries@ciria.org w: www.ciria.org/rp753.htm

Call for Scottish public procurement shake-up
The Scottish Construction Forum (SCF) has presented a manifesto to MSPs asking them to cut the amount of red tape tying up public sector contract awards. The request comes almost a year after a cross party parliamentary group acknowledged inconsistency, confusion and a lack of transparency in public sector procurement in Scotland.

The manifesto, Building a modern construction industry, also calls for improvements in health, safety and environmental awareness and “more relevant” training. SCF chairman, Graeme Millar, said the manifesto represented a “significant moment within the construction industry; never before have we acted with a single voice and agreed a list of issues we think should be being addressed by government.”

The Scottish construction industry contributes more than £12b to the economy every year, almost 10% of Scotland’s total economic output and accounts for one in every 11 jobs across the country.

McAlpine victim to £13m fraud
Alfred McAlpine has uncovered a suspected £13m fraud scheme in its Slate subsidiary. An internal audit team found “a systematic misrepresentation of production volumes and sales for a number of years by a number of senior managers.” A statement from the company also said those involved “sought to conceal the financial implications of their actions through the pre-selling of slate at substantially discounted prices.”

Two senior managers have been suspended. The news immediately wiped £140m off McAlpine’s market value. Independent auditors have been employed to look into the suspected fraud.

Ash separation plant for Cheshire
Scottish and Southern Energy are to build a new £22m ash separation plant at the Fiddler’s Ferry power station in Cheshire. The plant will remove ash produced in power generation and process it for sale as cement substitutes and industrial minerals. It is expected that the plant will be able to process up to 800,000 tonnes of ash every year. Construction work is expected to begin in the second quarter of 2007, with the plant becoming fully operational in the summer of 2008.

In brief: Autodesk have released AutoCAD 2008. 35 additions have been made including a more simple editing tool for the management of annotation scale, tables, text and leaders. The 2D drafting software AutoCAD LT and Design Review have also been upgraded. • Trimble have bought out the German photogrammetry company INPHO for an undisclosed sum. • Volvo have acquired Ingersoll Rand’s road development division for $1.3b to expand their market for road construction equipment.

• The Asian Development Bank has granted $400,000 to Bangladesh, Bhutan, India and Nepal in a technical assistance project to assess hazardous waste problems. The project will also draft policy rules to manage waste and report on the potential for private sector involvement. • A consortium of AMEC, Babcock International and Mott MacDonald, has been awarded a five-year £500m contract with National Grid to upgrade overhead power lines and underground cables across the western half of England and Wales. • The IStructE has launched a Technician grade of membership for CAD operators, structural detailers, site supervisors, estimators and risk assessors. • Carillion has won a 20-year maintenance contract for the M40 motorway from Junction 1 at Denham to Junction 15 at Warwick. • Intermap has been awarded a $3.1m contract to collect digital surface model (DSM) and orthorectified radar imagery (ORI) data in Southeast Asia. • The Society of Construction Law’s annual lunch raised £1200 for the Construction Youth Trust. • The GIOVE-A signal interface control document has been released to receiver manufacturers to allow the development of new receivers.
New HQ for British Geological Survey

British Geological Survey (BGS) is to receive a new £6m headquarters in Keyworth, Nottinghamshire. The headquarters, designed by Pick Everard, will be funded by the Natural Environment Research Council and the Office of Science and Innovation.

The current accommodation comprises six obsolete buildings at the Kingsley Dunham Centre. These will be demolished and replaced with a single, purpose-designed structure, built from wood with glue laminated frames and TermoDeck floor slabs - the first time this combination has been used in the UK. The floor slabs use their high thermal mass to transfer heat around the building. The new offices also feature an atrium, which will be covered with ETFE panels, the same material used for the Eden Project and National Space Centre.

Pick Everard and the BGS are aiming for the hard to achieve BREEM ˚excellent’ rating for sustainability and energy efficiency. Construction begins in August.

Something ‘tragically predictable’ about PFI tendering

750 deals down the line with a combined capital value of £55b, the National Audit Office (NAO) has released a worrying report on the state of PFI tendering. The number of projects receiving three or more developed bids has reduced by 18% in two years. The drop is said to be down to the length and volatility of the tendering process.

During 2004-2006, PFI projects took an average of almost three years (34 months) to tender, with the final stage with a single preferred bidder lasting 15 months. The NAO’s main concern is that PFI is losing value for money during this stage. A third of the projects examined by the NAO made significant scope and specification changes during final negotiations — amounting to ±17% of the total project value.

Speaking in response to the NAO’s report, Edward Leigh MP, chairman of the Committee of Public Accounts, said tens of millions of pounds had been wasted and warned “the public sector must not be left dancing to the tune of a sole bidder... I wish I could say I was amazed, but there is something tragically predictable about it all.”

Familiar face at Knowles

David Carrick FInstCES has joined Knowles as vice president and joint MD. David, a past president of ICES, registered adjudicator and chartered arbitrator, sits on the ICE/ICES joint commercial management board.

When it was acquired by Hill International in September 2006, Knowles became part of the largest claims consultancy company in the world, with 1,400 employees across 60 offices worldwide. Renny Borhan, Hill’s managing director said David’s appointment marked the start of an “aggressive expansion programme.” The company plans to add a further 80 consultants by the end of 2007.

Small dams fulfil potential in Burkina Faso

The use of small dams has proved successful in Burkina Faso. With 700mm, capital Ouagadougou receives more rainfall than London per annum, but because of the hydrogeological conditions and flat topography, much of this rainfall becomes unavailable and the country’s water demands exceed availability by up to 22% each year. A UN report found only 51% of the population had access to clean drinking water.

Since the Burkina Faso government and WaterAid implemented an integrated water resources management (IWRM) strategy, small dams have been installed to slow down rain water run-off and allow for better seepage. The dams, from Action Micro Barrages (AMB), comprise two main parts; a compacted breakwater and a concrete buttress which acts as the spillway. Depending on their size, the small dams are able to keep water for up to a year.

No piezometric tests have yet been made to accurately establish the link between the dams and the sustainability of underground water resources. However, all villages reported the dams had brought about the permanent availability of water in wells, which now retain water by up to two months longer than was previously possible.

HRH praises GIS export

GIS software company Cadcorp received a visit from HRH the Duke of York, to acknowledge their export achievements over recent years. Prince Andrew (pictured above right with Cadcorp MD Mike O’Neill) was visiting the company in his role as UK special representative for international trade and investment. 60% of Cadcpr’s sales are export-led to Europe, Japan, the Far East, Australia and USA. HRH received a live web-based demonstration of the GeognoSIS software in use by North Sydney Council in Australia.

Avoiding the triffids

CIRIA is researching best practice methods for dealing with invasive plant species (including Japanese knotweed and Himalayan balsam). Interested parties should visit www.ciria.org/rp739.htm

Liverpool buys birds-eye view

A Merseyside consortium of police, fire and public transport services and six local councils has bought 12.5cm resolution aerial imagery of Liverpool and Merseyside. As European City of Culture 2008, Liverpool, and its surrounding areas, is enjoying an extensive programme of regeneration and development. The imagery from Cities Revealed is expected to contribute to land development programmes and assist the emergency services in managing resources as the city changes and develops.

The Royal Liver Building is pictured below as it was captured in May 2006. Aerial photography © The GeoInformation Group 2006.
UK awarded second Galileo satellite contract
A €30m contract for the construction of the second Galileo satellite has been awarded to Surrey Satellite Technology. The contract for GIOVE-A2, awarded by the European Space Agency (ESA), will guarantee the continuity of Galileo by keeping a spacecraft in orbit and maintaining European rights to the frequencies governed by the International Telecommunications Union (ITU).

Its predecessor, GIOVE-A, gained the frequency rights in March 2006, three months after the satellite began transmitting. The navigation signals have allowed testing of Galileo ground equipment during its continuing 27 month mission — an essential activity to encourage uptake of Galileo in the user communities.

The new satellite will incorporate some enhancements over GIOVE-A which will allow additional signals to be generated and received on the ground. The aim will be to provide early in-orbit experimentation with the common baseline L1 open service signals. In the future, these open service signals will provide free of charge positioning and timing competitive with other GNSS systems. GIOVE-A2 will be ready for launch in the second half of 2008, with full Galileo deployment expected for 2011-2012.

Topcon to buy out Sokkia
The two greats of Japanese surveying instrument manufacturing are set to merge as Sokkia becomes a subsidiary of Topcon. Reasons cited for the merger include “intensified competition in the surveying instruments market.” A statement from Topcon said if the two companies were to continue business independently, “it will not be easy to maintain their current market presence... there is concern that they may lag behind the leading manufacturers in US, Europe and Asia.” Sokkia, which began life in 1920, is set to take the name of its younger (by 12 years) half and be rebranded Sokkia Topcon.

RedR–IHE gains UN approval
RedR-IHE has been recognised by the United Nations as a leading agency in the area of water and sanitation. RedR-IHE has been allocated a selection and training role, involving 50 experienced relief water engineers allocated for co-ordinator posts on an immediate-deployment emergency roster.

IPY sets off with mosaic of Antarctica
British Antarctic Survey (BAS) has teamed up with NASA and US Geological Survey to create a map of Antarctica from 1,100 satellite images. The Landsat images are being digitally woven together to create a single, seamless, cloud-free image of the continent.

The scenes being used to create the new mosaic were drawn from over 8,000 collected by Landsat 7’s enhanced thematic mapper plus (ETM+) sensor from 1999 to 2006. Images from NASA’s moderate resolution imaging spectroradiometer (MODIS) instruments onboard the Terra and Aqua satellites will be used to fill in the South Pole which is not ‘seen’ by Landsat 7.

The project forms part of International Polar Year (IPY), a multinational collection of research centred on the polar regions. IPY will run until March 2009 and focus on the Arctic and Antarctic in a sustained effort to understand large-scale environmental change in the Earth’s polar regions. Image credit US Geological Survey.

£2b waste PFI for Lancashire
Lancashire County Council and Blackpool Council have signed a 25-year £2b PFI waste contract. The contract with Global Renewables Ltd and Bovis Lend Lease is one of the largest waste PFI projects in the UK.

Global Renewables and Bovis Lend Lease, with international finance backing, will invest £320m in the design, construction and operation of two UR-3R waste management facilities at Leyland (pictured) and Thornton to handle 600,000 tonnes per annum of household waste.

Waste will be sorted using a mechanical and biological treatment (MBT) process that recovers recyclable materials such as paper, metal, glass and plastic. It then transforms the organic portions of the waste into renewable energy and compost.

Flood standard review
The BSI have launched a review of its PAS1188: Flood protection products specification. The review relates to the parts on building apertures, temporary and demountable products and building skirt systems. Contact the BSI by 16 April if you are interested in taking part. Contact Liliana Mulvany, t: 020 8996 7053 e: Liliana.mulvany@bsi-global.com

New JCT form launched
The latest JCT form of contract was launched on 1 March. JCT-Constructing Excellence was formally presented to over 200 MPs and industry representatives at the House of Commons by Sir Michael Latham and the Rt Hon John Spellar MP, chairman of the All Party Parliamentary Construction Group.

The new form aims to promote collaborative and integrated working; providing a single contract to regulate all the relationships involved in a project. Sir Michael said “it is brief, it is in plain English, it is user friendly and it is perfectly understandable and practical.”

Using a series of bilateral contracts within a common framework, the contract has the flexibility to be used whether or not the supplier is to design the works to be carried out in sections and regardless of whether a target cost or lump sum is required. It can also be used with or without the project team agreement, which is designed for use where members of the project team wish to enter into a multi-party pain/gain arrangement.

It is expected the contract will be used by the whole supply chain for the procurement of the construction works, including the provision of professional services, whether public or private sector.

JCT-Constructing Excellence is published by Sweet and Maxwell.
Postgraduate & Part-time Degree Programmes in the Built & Natural Environment

The School of the Built & Natural Environment has an excellent reputation in the provision of programmes designed to suit the needs of industry and the professions. The School continues the tradition of offering courses by a combination of full-time, part-time and web-based means, allowing you the choice and flexibility to study in a way that suits your lifestyle and work commitments.

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**Postgraduate Programmes:**

**MSc Construction Economics (Web-based programme)**
Also available by distance learning, this innovative new programme is aimed at graduates who aspire to a career as a Chartered Surveyor.

**MSc Construction Management (Web-based programme)**
Also available by distance learning, this course was designed to suit the needs of the construction industry. Its development was sponsored by CITB Construction Skills and receives full accreditation from the RICS.

**MSc Environmental Civil Engineering**
Designed for the professional development of civil engineers by the incorporation of environmental issues into the programme, this course assists those progressing towards Chartered Engineer status.

**MSc International Project Management (Web-based programme)**
Designed to prepare construction professionals for work on international projects and to gain insights into international practice.

**Part-time Undergraduate Programmes:**

**BSc (Hons) Environmental Civil Engineering**
This programme is fully accredited by the Joint Board of Moderators under the SARTOR3 guidelines as an approved programme leading to the professional designation of Incorporated Civil Engineer. Reaccreditation is due to be carried out under the UK-SPEC guidelines for partial satisfying the requirements for Chartered Engineer.

**BSc (Hons) Quantity Surveying**
This programme is fully accredited by the RICS and has also been approved by the Construction Industry Board.

If you would like further information on any of these programmes, please call 0141 331 3300 or e-mail schoolbne@gcal.ac.uk, or check out www.bne.gcal.ac.uk.
Non-cognate diploma proving successful
The CIoB’s non-cognate programme has awarded its first set of graduate diplomas. Criminology and Irish studies were among the varied first degrees held by graduates on the course. The diploma was established for graduates working in construction without construction-related degrees by a consortium of employers and Anglia Ruskin, Greenwich, Leeds Metropolitan and Central Lancashire universities.

The three-year programme consists of 12 modules and can be delivered via a residential course or through distance learning. For the residential option, students follow a week’s course at a university followed by ten weeks on site with coursework and assessments to complete. The distance learning option follows the same modules but on an open learning basis.

To register for the diploma, a candidate must have already gained an honours degree and either be accepted for employment or already be appointed within the industry.

There are currently 79 students on the course, with a further 35 waiting to join.

£12m for climate change research at Imperial
Imperial College London has received a private donation of £12m to set up a new climate research centre. The donation has come from Sheffield University graduate Jeremy Grantham, co-founder of a $140b global investment management company in Boston, and his wife, Hannelore.

It is the largest private funding given to climate change in the UK and will create 10 new research posts at the university’s new Institute for Climate Change. The university’s civil engineering department is already conducting research into assessing and mitigating flood risks from climate change.

UCE’s planning courses turn 50
The University of Central England is celebrating 50 years of planning courses. The school of property, construction and planning will be hosting a series of lectures, seminars and panel discussions on planning the economy, society and the environment. They are also hosting an online digital photo archive where alumni can look for old friends, add photos and make comments at www.planningis50.com

UCE has also awarded its surveying prizes recently, with Damien Donnelly BSc(Hons) Quantity Surveying winning the Wakemans prize for the best dissertation in a law topic and Padmore Worrell and Giles Williams also winning QS prizes.

Uncertain future for MEngs
The ICE has raised concern about the future of some UK MEng degrees. The UK has signed up to the Bologna Process, an inter-governmental initiative which aims to establish a common HE system in Europe. The process recommends a ‘3+2’ masters system — a three year first degree followed by a two year masters.

There is a risk that the UK’s four-year integrated undergraduate MEng degrees may be regarded as an ‘intermediate qualification’ at a lower standard to European courses. It could also affect those wishing to undertake further study to doctoral level in another European country. The ICE has warned that companies, particularly those operating across Europe and beyond, may adopt a ‘play safe’ policy and prefer to employ those with internationally recognised qualifications rather than UK MEng graduates.

The next ministerial meeting about Bologna will be in May and the ICE has written to the government asking for protection of the MEng status.

Further information is available from Deborah Seddon at the ICE e: deborah.seddon@ice.org.uk

STUDY FOR MSc IN GEOGRAPHICAL INFORMATION SYSTEMS (GIS) AND REMOTE SENSING
The University of Greenwich School of Science has an established history in postgraduate degrees for Geographical Information Systems (GIS) and Remote Sensing. These are rapidly developing disciplines that are becoming increasingly important to many civil engineering projects. GIS and remote sensing also contribute to the range of skills required for geospatial surveyors.

The MSc is offered as either GIS with Remote Sensing or Remote Sensing with GIS, and can be studied full time or part time.

If you have a first degree, postgraduate diploma or equivalent professional qualifications in any of the following subjects, the School of Science would be interested to hear from you:

- Surveying
- Civil Engineering
- Computing
- Geology & Geotechnics
- Geographical Sciences
- Photogrammetry

For further information please contact:
Dr. Richie Simon
MSc Programme Leader
School of Science
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Kent ME4 4TB
Tel: +44 (0)20 8331 8435
Fax: +44 (0)20 8331 9805
Email: r.simon@greenwich.ac.uk

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School of Architecture, Design and the Built Environment

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The School of Architecture, Design and the Built Environment has a strong reputation for providing highly regarded and professionally accredited courses.

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- MSc: Geotechnical Engineering (accredited by the Joint Board of Moderators – ICE, IStructE and IHT)
- MSc: Construction Management (CIOB and RICS accredited)
- MSc: Project Management (Construction) (RICS and RICS accredited)

*Subject to review in September 2007

www.ntu.ac.uk/sbe

LLM / MSc CONSTRUCTION LAW AND ARBITRATION

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Today, many professionals in disciplines such as civil engineering, architecture, surveying, construction contract negotiation, the oil industry and the legal profession need a good working knowledge of construction law and arbitration.

The Masters course in Construction Law and Arbitration offered by The Robert Gordon University caters for exactly this need. What’s more, for the busy professional seeking to acquire this knowledge, we can offer direct access to the course via our award winning Virtual Campus.

This means you can gain the necessary knowledge working at your own pace and from anywhere in the world.

This Masters course is entirely flexible with postgraduate exit awards available after Year 1 (Postgraduate Certificate in either Construction Law or Arbitration), Year 2 (Postgraduate Diploma in Construction Law and Arbitration) or the full LLM/MSc in Construction Law and Arbitration, available, as the earliest, from just over two years.

In addition, the course carries professional examination exemption status from the world respected Chartered Institute of Arbitrators. Students can, depending on performance, gain exemption from the Membership or Fellowship examinations of the Institute after only one year of study.

Flexible, focused and professional, this is an opportunity to advance your career online and in your own time.

To learn more about this course visit our website: www.rgu.ac.uk/abs

To learn more about the Virtual Campus go to: www.campus.rgu.com

For further details contact the course leader, Alan S Reid, on 01224 263417 or at a.s.reid@rgu.ac.uk
Bircham Newton to keep crane training

Tower cranes and heavy plant training will continue to be delivered by the National Construction College at Bircham Newton, despite the centre’s uncertain future. The decision was made following “positive discussions” with the Learning Sector Skills Council.

The more ‘transferable’ training is to be delivered through the CITB’s other training facilities and site-based learning.

The NCC’s future was thrown into disarray when a planning application for the sale of some of the college’s land was rejected. The sale would have raised funds for the renovation and expansion of the college.

The college’s board will review its decision in July, pending its proposed application for National Skills Academy capital funding. A further option being discussed is for the college to become a centre for the practical ‘hands on’ training in civil engineering degree courses.

ICES accredits Derby

ICES has accredited two new courses at the University of Derby; the Construction Surveying course and the foundation degree in Built Environment (Civil Engineering). Both courses are led by Derek Spalton in the faculty of arts, design and technology.

These courses meet the academic requirement for Technical membership of the Institution.

t: 01332 591572
e: addenquiry@derby.ac.uk

Surveying scholarships announced

Two new scholarships have been made available for Robert Gordon University’s mechanical engineering and surveying courses. Sponsored by subsea construction company, Technip UK, the scholarships amount to £15,000 worth of funding.

Successful applicants will be given Technip UK mentors and placement opportunities.

w: www.rgu.ac.uk
t: 01224 262286

www.nottingham.ac.uk/iessg

Adjudication refresher courses

The RICS, CIArb, ICE, RIBA and AICA (the Association of Independent Construction Adjudicators) are holding a joint course for practised adjudicators. The bodies hope the course will help standardise the training of construction adjudicators.

The two-day course will include latest developments in case law and interactive sessions on decision writing and plain English which will be accompanied by a ‘take away’ test to be marked by the College of Estate Management. The course will run in Coventry from 19-20 April, with further dates expected later in the year.

For further information, including venues, fees and course content visit www.rics.org.uk/drs

Construction Youth Trust wins funding

The Construction Youth Trust has won funding from the Nationwide Foundation’s Investor Programme for the next three years. The money will support a project to provide work placements for young offenders.

Lovell and a number of companies in the West Midlands region are interested in getting involved.

ConstructionSkills scholarships on the rise

ConstructionSkills will increase the number of Inspire Scholarship places for 2007 by 50%, bring this year’s total to 300. Sir Michael Latham congratulated the scheme saying the scholarships are one of very few ways in which undergraduates can obtain extra funding as an incentive to choose construction. He said “we want construction to be an industry in which students see employers invest in them from day one.”

The scheme provides funding of up to £9,000, plus 10-week summer placements and the possibility of employment during a sandwich year.

w: www.bconstructive.co.uk/inspire
Postgraduate Taught Courses at Cardiff School of Engineering
Commencing September 2007

- MSc in Civil Engineering
- MSc in Geoenvironmental Engineering
- MSc in Structural Engineering
- MSc in Sustainable Energy and Environment
- MSc in Water Engineering

The above MSc programmes are available in either full-time or part-time modes of study (1 year full-time, 2 or 3 years part-time). They are ideal for engineers or those in engineering related professions wishing to upgrade their qualifications to postgraduate level. All programmes involve two semesters of lectures and coursework followed by a dedicated period for a project and dissertation. The entry requirements are generally an upper second class honours degree (or equivalent) from a British or recognised university. Applicants with relevant professional experience will also be considered.

A limited number of studentships are available for some programmes.

For further information please contact: Mrs Gillian Morgan,
Cardiff School of Engineering Queen’s Buildings, Newport Road,
Cardiff, CF24 3AA. Tel: 029 20874656. Email: MorganGR3@cf.ac.uk
or visit our website at: www.cardiff.ac.uk/engineering

Researching the buildings of the future
Loughborough has become the only UK university to join the €17.5m I3CON project. I3CON — industrialised, integrated and intelligent construction — involves 26 partners from 14 countries.

The project aims to research sustainable construction and production technologies to create ‘intelligent buildings of the future’. Services, such as electricity, communications and plumbing, will be ‘rapidly manufactured’ into the structure directly from CAD.

The theory is that future buildings will know if the temperature needs to go up or down, or the lights on or off, without the need to flick a switch; making them more efficient and better for the environment.

I3CON buildings will also be constructed using high thermal capacity materials and controllable glazing to optimise energy consumption and waste production.

New NVQs for water engineers
The UK Society for Trenchless Technology is offering accredited training programmes for utility companies and their water network engineers.

The training, run in conjunction with Develop, is in response to the launch in January of the new Networks Construction Operations (Water) NVQ at levels 1, 2S, 2M and 3.

The scheme, which is awarded by CABWI, covers the full range of roles and activities for those performing work on the water network infrastructure. This range extends from an entry level qualification for new people joining the industry (NVQ Level 1) through to the more complex qualifications needed by craftspersons at levels 2 and 3.

Contact Gary Fisher at Develop on t: 01332 663031 e: gary.fisher@develop-solutions.co.uk

ICES Review Examiner Training
The training and retraining of review examiners continues apace with the following events successfully completed: London, Sale, Dublin, Stirling, Dubai and Hong Kong. The next training events are being planned for:

- London (ICE) – Thursday 19 April 4-6pm
- Sale (ICES HQ) – Thursday 17 May 4-6pm

It is essential that all examiners taking part in Corporate and Fellow review interviews are trained. The following have now attended a training event and have been sent an examiners certificate and guidebook, which allows them to examine using the new ICES competencies.

If you would like to attend one of our training events, either as an experienced examiner or as a new volunteer, please contact Juliette Mellaza e: membership@ices.org.uk

Trained examiners

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<td>Richard Maltby</td>
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<td>Graham Morrott</td>
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Developments in industry, education and IT behind a new approach to teaching project management

Nick Spencer Chapman, Senior Lecturer, Real Estate and Construction, Oxford Brookes University

Construction faces a skills crisis, in project management as well as in trades. The Financial Times recently reported (6 March 2007): “Construction output, already on a high, is predicted to grow by almost 11% by 2011 led by a surge in schools construction, increased spending on transport and projects on the London Olympics... There will be... strong demand for professional roles such as construction managers, architects and technical staff.”

A CIOB pilot survey showed that 77% of the 623 respondents “had difficulty recruiting skilled staff from the UK or abroad” in 2006. The CIOB comments that “2007 will be worse with 72% expecting demand for workers to increase and 68% feeling that the existing workforce is not skilled enough.” While participation in higher education grew sharply in the last ten years, numbers graduating with first degrees in architecture, building or planning (the category embracing construction management) dropped 2% in the ten years to 2004/05, down to 6,565 (Higher Education Statistics Agency). In the same period, those obtaining first degrees in business studies increased 74% to 42,190 and in social studies 52% to 28,825.

Some employees in the industry are retraining or extending their qualifications while employers are also recruiting ‘non-cognates’ — those with degrees unrelated to their business; long the practice in certain other professions such as accountancy, law and banking. Various combinations of on-the-job training and study are adopted and, for project management in the built environment, courses are available which can accommodate both those with related qualifications and non-cognates. For non-cognates, a few firms offer in-house training while others take advantage of courses or particular modules on offer locally. Focusing on site management, the CIOB offers a graduate diploma programme for non-cognates currently working in the industry.

Mode of study can be a problem. At one time, day-release courses were widespread, especially at HNC level but also for degree courses. However releasing employees for a day per week was never easy and growing pressures on staff make it even harder. Block-release courses were never as popular as day-release — again because it was hard to let staff go for periods of up to four weeks at a time. Distance learning courses traditionally suffered from student isolation and high drop-out rates.

New developments
Recent developments have made a new approach to course design much more attractive, using limited blocks and web-based learning. The main developments are ‘blended learning’ and various web-based software tools which can aid study and communication; paralleling to some extent the use of web technologies in project management itself. Those studying remotely can feel much less isolated. Tutors engaged in distance learning courses using the Internet claim that they get to know their distance learning students better than their full-time campus students. According to Distance Learning NET, “carefully designed Internet courses can enhance interactivity between instructors and learners and among learners.” Note the phrase “carefully designed” — learning via poorly structured Internet courses can produce more frustration than learning!

A further development, not so recent in origin as blended learning, is “problem-based learning” (PBL), which can enliven study and reduce the gap between theory and practice.

Blended learning
Blended learning is any combination of face-to-face and web-based learning, usually using ‘virtual learning environment’ (VLE) software offering downloadable materials, discussion boards, calendars and self-testing or assessment quizzes. Blended learning is being used in many on-campus courses as well as for distance learning and can lead to a transformation of courses to improve learning. A study on blended learning (October 2006) for the Higher Education Academy, led by Rhona Sharpe of Oxford Brookes University, found that “student response is overwhelmingly positive to the provision of online information to supplement traditional teaching.” The study quotes one respondent; “students want more of it, wider and deeper.”

Blended learning has most to offer to those needing flexibility and who study remotely. The VLE software (typically WebCT or Blackboard) not only provides a secure means of providing learning materials and assignments to students, it also provides methods of assessment and self-assessment, either by electronic quiz with immediate feedback or through electronic submission of work and tutor marking and feedback. Students like the way the software provides for an organised and stable source of documents and a one-stop-shop. Staff can monitor usage and progress. Online quizzes provide an incentive to keep up with the course and immediate feedback helps learning. Quizzes may include traditional multiple choice questions as well as multiple response questions (one or more responses are correct), matching questions (e.g. ranking items by order of magnitude or importance, or matching different procurement routes with

...web-based software tools can aid study and communication; paralleling to some extent the use of web technologies in project management itself.
Problem-based learning
Discussion with industry before the Oxford Brookes MSc in Project Management in the Built Environment course was designed, indicated a feeling that courses, including MScs, tended to be too theoretical and ‘academic’. This is where PBL comes in. In its modern form, PBL has been pioneered and thoroughly researched in the context of medical education since McMaster University in Canada introduced a PBL medicine course in 1969.

It has nearly become the norm in medical education; with some courses dispensing almost entirely with lectures and others including PBL elements. In PBL, groups of students, sometimes shadowed by a mostly silent facilitator, puzzle their way through real or realistic problems without prior tuition. Groups discuss any prior knowledge to determine what they need to learn and then individually find-out and share what they’ve learned. Research has shown that what’s learned in this way is remembered better and is applied better than that learned through academic-subject based study. Real-life problems rarely have clearly defined boundaries, so study becomes multidisciplinary and somewhat open-ended. This can be challenging to begin with but intensely stimulating. Students not only learn subject matter but also how to learn and work within a group.

In the form adopted by the Oxford Brookes’ course, problems are developed in conjunction with advisors from industry and practitioners may be available for consultation and to act as ‘problem-owners’. Internet technologies
It's hard to keep up with new facilities and software, mostly free, which can aid communication and study. Voice-over-the-Internet-protocol (VOIP), e.g. Skype and Voipbuster, can be used for free conference calls, video-calls and exchanging documents and images while talking. Live messaging (Windows Live Messenger or via Skype) is popular. Google Docs & Spreadsheets is
Students often lead the way in employing what’s available. However, well-established electronic facilities remain indispensable.

ideal for collaborative work; groups can set up document access rights. Staff and student blogs have uses; staff may ‘publish’ ideas and thoughts about current topics. Even social networking, e.g. www.facebook.com or www.myspace.com, can be useful. Related ‘personal learning landscapes’, e.g. www.elgg.net, “promote learning through sharing knowledge, conversation and reflection in a social/academic setting.”

Students often lead the way in employing what’s available. However, well-established electronic facilities remain indispensable. All Oxford Brookes students have access over the Internet to the ‘electronic library’ — usefully making thousands of electronic journals and databases available. Of course, the open Internet also can provide much reliable (and some not so reliable) information.

Conclusion
The shortage of construction related skills will intensify. Some people are upgrading their qualifications or retraining and many companies now recruit non-cognates. Courses can take advantage of blended learning, incorporating much less face-to-face contact than traditional part-time courses, but involving much more interaction than the stereotypical distance-learning course. Combining this with problem-based learning allows courses to be rigorous but less ‘academic’ and more stimulating; particularly important for mature students who can draw on colleagues and company support. Industry is keen to collaborate and is persuaded of the benefits.

The MSc in Project Management in the Built Environment being offered at Oxford Brookes University has brought together many of these developments and industry involvement benefits students directly and indirectly.

Nick Spencer Chapman, Senior Lecturer, Real Estate and Construction, Oxford Brookes University
t: 01865 483362 e: nspencerchapman@brookes.ac.uk

Blogs
w: http://constructionpm.brookesblogs.net
w: http://spencertree.wordpress.com
w: http://nickzsc.brookesblogs.net

Websites
w: www.distancelearningnet.com
w: http://docs.google.com
w: www.facebook.com
w: www.myspace.com
w: www.elgg.net
geomatics.org.uk
The past, present and future

Tom Bramald, Jon Mills MInstCES MRICS, David Parker FInstCES FRICS & Stuart Edwards MRICS

For several years now the UK geomatics (geospatial, for those who prefer the term!) community has enjoyed significant growth in the demand for its services. Global navigation satellite systems, geographical information systems and even non-specialist software such as Google Earth are proving to be essential, value-adding or exciting tools for many people in different walks of life. Unfortunately, as our community has grown, a problem has come to the fore — that of raising public awareness of geomatics and, ultimately, recruiting the next generation of geomatics practitioners into the profession.

Many in the geomatics community will not only be aware of, but will have actively supported the geomatics.org.uk initiative that was set up to try to address this very problem. The overall aim of geomatics.org.uk for several years now has been to raise the profile of geomatics, as well as science, engineering and technology in general, by providing relevant, contemporary materials and equipment to support the teaching of mathematics, geography, science and ICT in schools and colleges. The project has galvanised the UK geomatics community’s schools engagement efforts by bringing together research council funding, universities, trade associations, professional bodies and many practising geomatics companies under the geomatics.org.uk umbrella.

In April 2004, Civil Engineering Surveyor reported that the geomatics.org.uk project had secured funding from the Engineering and Physical Sciences Research Council (EPSRC) to run for a further two years. The continuation of the project was largely down to the first term of EPSRC-funded work being rated as ‘outstanding’ by independent peer review. The team is now in a position to report on the project’s work over the last two years and update readers on what is happening now and how they can help in the future.

Project structure
Since 2001, the initiative has been based within Newcastle University’s geomatics group under the stewardship of Dr Jon Mills. EPSRC funding has afforded the project full time staffing with all other costs being met by donations, fund raising or ‘in-kind’ support. The project has been open to all in the geomatics community to support in whatever way they can, including cash and equipment donations, dedication of staff time and preparation of case studies and profiles for the geomatics.org.uk website. As the name suggests, geomatics.org.uk is largely web based but there is also a large pool of modern, surveying equipment that schools can borrow at no charge so as to incorporate geomatics into their field and/or practical work.

The website
More than 20,000 unique visits have been made to the geomatics.org.uk website since January 2005, with 10% of visitors browsing through ten or more of the site’s pages. There are three main areas to the site; public, teachers and members. The public pages include news, a large links library, a forum that allows people to explore the disciplines and applications of geomatics, and the ‘people’ section that includes student and career profiles from a wide variety of surveyors. The teachers area exists to support teachers with resources, ideas and information to use geomatics in the classroom or in the field. There are now more than 1,000 teachers registered to use the area, the majority of whom are geographers but with significant membership from the maths and science communities. The members area exists for you, the geomatics community.

Information about project progress, detailed background information and our Surveyors Outreach to Schools (SOS) scheme are all detailed there.

Equipment loans
The equipment pool has grown significantly in the last two years and now consists of 24 engineering levels, 14 hand-held GPS receivers, four digital theodolites, four field computers and ancillary equipment (ranging rods, 30m tapes etc) — the replacement value for the pool stands at £23,000. The larger pool of kit allowed for over 50 loans of equipment to be made to over 30 institutions across the UK — eight schools requested equipment loans twice or more in the last two years.

By calculating the value of equipment that has been used on each equipment loan, it is estimated that a total of £260k worth of equipment has been employed on engagement activities in the last two years. Bookings are already in place for Easter and summer 2007, a popular time for school field trips.

Promotion
The project has never taken a ‘build it and they will come’ approach — if
teachers and students don’t know our resources are there, they will not be used. A significant part of the project has, therefore, always been to actively promote geomatics.org.uk to schools and many of you reading will have also spread word of the project on their behalf. In the last two years, our promotion has included:

- Spending a total of 80 days at 63 different events to promote and support geomatics.org.uk activity.
- Exhibiting at six national teaching association conferences, including presenting a lecture at one of them.
- Publishing articles in teaching and careers magazines to publicise geomatics.org.uk resources.
- Contributing to The Survey Association’s parliamentary lobbying event in 2004.

**Is it working?**

The true impact of geomatics.org.uk is very difficult to measure. Yes, the project is busy; the website is lively, the equipment loans popular and teachers and students give us positive feedback about using geomatics to support teaching and learning. We continue to explore new avenues to reach and increase our audience, for example by working with trainee teachers and ‘gifted and talented’ school students. Having found the geomatics.org.uk website, the producers of the popular BBC2 television programme Coast incorporated a short section on how geomatics can be used to model coastal erosion into series two (aired November 2006) — valuable publicity in promoting the subject to the general public. There are also examples of people who have experienced geomatics.org.uk at school and have now progressed to employment within the UK geomatics community. Ultimately, the number, and quality, of students entering the geomatics profession at all levels is the best indicator of project success.

Geomatics.org.uk continues to galvanise the UK geomatics community’s attempts to engage with teachers and students in secondary education. The project has enjoyed significant success but it is essential that the work of the project continues. With EPSRC funding now at an end, Newcastle University is keeping the project going for the moment — equipment loans continue to be sent to schools and the website is maintained, although not actively developed.

The plans for the future are for another push on the initiative in 2007 and there will be many ways that you can get involved. In addition to the website, we hope to build a personable face to the project through the SOS element of the project — we need practicing surveyors to volunteer just a little time to support equipment loans and promotion activities in and around their local area. We also need members to continue to lobby their professional and trade groups, encouraging them to continue their recruitment and promotion efforts and to coordinate them through geomatics.org.uk.

Any support for the project, in whatever form, is greatly appreciated and will, we are sure, help to support the continued growth of the UK geomatics community.

**Tom Bramald, School of Civil Engineering and Geosciences, Cassie Building, Newcastle University NE1 7RU e: t.m.bramald@ncl.ac.uk**

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**Feedback collected directly from secondary/16-19 students (319 responses).**

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<td>never heard of geomatics but think I could have guessed</td>
<td>124</td>
</tr>
<tr>
<td></td>
<td>never heard of geomatics and would not have been able to guess</td>
<td>82</td>
</tr>
<tr>
<td></td>
<td>Answer missing, spoil or unclear</td>
<td>8</td>
</tr>
<tr>
<td>After today’s session...</td>
<td>I feel I understand what geomatics is</td>
<td>312</td>
</tr>
<tr>
<td></td>
<td>I still don’t know what geomatics is</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Answer missing, spoil or unclear</td>
<td>5</td>
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<tr>
<td>Did you enjoy today’s session?</td>
<td>Yes</td>
<td>312</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>2</td>
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<td></td>
<td>Answer missing, spoil or unclear</td>
<td>5</td>
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<tr>
<td>In the future, would you consider geomatics as a study and/or career option?</td>
<td>Yes</td>
<td>121</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>166</td>
</tr>
<tr>
<td></td>
<td>Maybe</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Answer missing, spoil or unclear</td>
<td>2</td>
</tr>
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**Acknowledgments**

Two EPSRC grants (GR/R78930/01 and GR/S83180/01) have provided full time staffing for the geomatics.org.uk project since 2002. Project partners on the awards (Ordnance Survey, The Survey Association, Royal Institution of Chartered Surveyors and Leica Geosystems) have been joined by numerous other organisations including ICES, the Hydrographic Society in Scotland, Trimble and Topcon. The authors would like to thank all supporters and contributors for their continued support.

**References**


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For what we are about to receive, may we be truly concerned...
The CDM Regulations 2007

Robin E Jones FInstCES, Director of Training, SURCO Ltd

On 7 February, Lord McKenzie, minister with responsibility for health and safety, agreed the CDM 2007 regulatory package, when he signed the new regulations. The package was laid before Parliament on 15 February and is due to come into force on Good Friday, 6 April. Until then, we won’t know what the regulations actually provide for but we believe that they will be substantially the same as the October 2006 draft statutory instrument and the draft approved code of practice published at the same time.

This article has been written and published on the basis of these draft documents with a view to preparing members for the new regulations and to promote debate while we wait...

W

HILST the Construction (Design and Management) Regulations 2007 (CDM 2007) are, like their predecessors, primarily concerned with health and safety issues, there will be much in them that has secondary commercial interest.

There are those, of course, who will argue that the 2007 amendments contain few significant changes from those first introduced in 1994. Others will maintain that there are major modifications; many of which will result in considerable delay and increases in cost.

Whatever the case, the redrafting of the regulations themselves and the Managing Health and Safety (Approved Code of Practice) makes the relative obligations of those involved much clearer and it may indeed be the case that the obligations placed 10 years ago are only now being brought into full focus.

One thing clear to me, however, is that very few civil engineers or QSs, whether involved in project design, project management or any other aspect of the industry, have more than a passing knowledge of the regulations. This, frankly, is unacceptable.

This article is an attempt to draw attention to some significant, but perhaps lesser known, secondary commercial consequences of compliance.

Purpose of the regulations
Taking a lead from the introduction to the approved code of practice (ACoP), the key aim of CDM 2007 is to integrate health and safety into the management of the project and to encourage everyone involved to work together to:
• Improve the planning and early management of projects from the very start.
• Identify risks early on so that they can be eliminated or reduced at the design or planning stage and the remaining risks can be properly managed.
• Target effort where it can do most good in terms of health and safety.
• Discourage unnecessary bureaucracy.

The regulations are intended to focus attention on planning and management throughout the construction process; from design inception onwards.

Application
The regulations are applicable to all construction work in Great Britain and its territorial sea. Construction work excludes surveying, which is defined as “including taking levels, making measurements and examining a structure for faults.” Some construction projects will include operations which are not themselves construction work and, in these cases, any overlap between construction and non-construction operations should be accounted for in the management arrangements and the health and safety plan. Matters such as these should not be left in doubt, and should be checked with the appropriate authority. Work for a domestic client is also excluded.

Clients
Because the client has one of the biggest influences over the way a project is procured (it is the client, in most instances, that decides the terms and conditions of the contract and the risk balance) they have a substantial influence and contractual control over the way it is run. As a result, they are held accountable under the regulations for the impact their approach and decisions have on the health and safety of the project.

Most interestingly, the ACoP makes it clear (paragraph 24) that the client’s approach determines:
• The time, money and other resources available for the project.
• Who makes up the project team, their competence, when they are appointed and who does what.
• Whether the team is encouraged to co-operate and work together effectively.
• Whether the team has the information it needs about the site and any existing structures.
• The arrangements for managing and co-ordinating the work of the team.

The regulations recognise, however, that clients may have very little, if any, construction expertise and, as a consequence, they are not expected to plan or manage projects themselves.

For notifiable projects (those projects expected to last more than 30 days or to involve more than 500 person-days), clients are required to appoint a competent CDM co-ordinator (formerly the planning supervisor) at an early stage in the proceedings. Part of the CDM co-ordinator’s duties will be to ensure that clients are aware of their duties under the regulations and to identify, collect and check the pre-construction information. If there are gaps in the available data, the CDM co-ordinator is required to advise the client if surveys need to be carried out to make good any significant shortcomings.

Whilst the provision of this pre-construction data is driven by reasons of health and safety, clients and contractors should be in no doubt that the data is likely to have a considerable bearing on the basis and sufficiency of the contractor’s tender.

The client’s duty in relation to information is set down in regulation 10. The ACoP (at paragraphs 55-58) does not equivocate:

“Clients must provide designers and contractors who may be bidding for the work (or who they intend to engage) with the project-specific health and safety...
The CDM Regulations have largely been ignored by clients since their introduction in 1994. This is not what the regulations demand. Completeness and accuracy are required, and clients and their advisers should act accordingly. (How else can the designer ensure that the works can be built safely and the contractor consider, plan and price the construction risks?) The position with ground conditions and soils contamination data is, I suggest, the same.

Commonly, contractors are required to take account of data made available or provided by the client and, subject to practicality and reasonability, the findings of their own inspections and examinations of the site in making their bids.

These obligations have always proved difficult to interpret with engineers and architects consistently refusing to consider them in the light of short tender periods and contractors consistently arguing that anything not identified in data supplied by the employer automatically qualifies as unforeseeable. Neither stance is correct.

In the context of the CDM Regulations, however, the contractor does not need to check the validity or completeness of the data provided by the client — it is required to be complete and accurate. It follows that the risk balance has shifted in favour of the contractor and it is going to be very difficult for an engineer or architect to argue that contaminated ground and services, for example, not recorded in the pre-construction information can be anything other than ‘unforeseen’ if they are subsequently encountered.

It would not be too great an exaggeration, I think, to suggest that the CDM Regulations have largely been ignored by clients since their introduction in 1994. The requirement for the provision of pre-construction information is not new (see CDM 1994, regulation 11) although it was not, perhaps, so clearly stated and was focused on data for the planning supervisor rather than the main contractor.

Nevertheless, contractors have been as backward in insisting on receiving a proper pre-tender health and safety plan (including the pre-construction data) as clients have been in providing them. This is a poor and potentially dangerous practice and both parties should clearly understand the potential consequences of failing to comply with both the letter and spirit of the regulations.

The client has a host of other duties most of which are defined in regulations 4-10. Of particular interest amongst these is the duty placed on the client to give the contractor sufficient time to plan and prepare before construction work commences on site and to advise the contractor of the minimum period allowed. It is to be hoped that reasonable tender periods are also included within this requirement, particularly as the ACoP (paragraph 45) cites unrealistic deadlines as one of the largest contributors to poor control of risk.

Appendix 2 of the ACoP lists a number of topics that must be considered when drawing up the pre-construction information. Included amongst the listed safety and health hazards are:

- Boundaries and access
- Adjacent land uses
- Location of existing services
- Existing ground conditions, underground structures and water courses
- Contaminated land, including results of surveys.

Notwithstanding the rider that the level of detail in the information should be proportionate to the risks involved in the project, it is difficult to envisage a situation where a client can fully comply with his obligations without carrying out detailed tests and surveys.

As an example, it would hardly be compliant for clients to approximate the position of existing services in pre-construction data for new works on an existing urban road and then, in the manner of old, decline to accept any responsibility for the accuracy or the extent of the data provided.

CDM co-ordinators (briefly)

A competent CDM co-ordinator is appointed where a construction project is notifiable. The CDM co-ordinator’s main role is to help clients understand and carry out their duties; to co-ordinate health and safety aspects of the design work and to prepare the health and safety file. Full details of the CDM co-ordinators role are given in regulations 20 and 21.

They should also assist the client to appoint competent designers and contractors, identify and collect the pre-construction information and advise clients if surveys need to be commissioned to plug any gaps.

It is the CDM co-ordinator who has the duty (on behalf of the client) to provide the designer and the contractor with the specific pre-construction information at tender or early procurement stage.

Designers

The CDM Regulations were primarily introduced to place an obligation on designers to ensure that works they design can be built, managed, repaired, utilised, maintained and demolished safely. Designers are in a key position to reduce many of the risks associated with construction work and their responsibilities extend way beyond simple buildability considerations. Under regulation 2, designers are defined, inter alia, as:

- Those who prepare designs for construction work.
- Those who prepare drawings, design details, specifications, bills of quantities as well as all related analysis, calculations and preparatory work.
- Those who arrange for their employees or other people under their control to prepare designs.

On this basis, designers include such folk as:

- Architects, civil and structural engineers, building surveyors,
foreseeable risks and otherwise). More of this later.

Obligation to produce designs that avoid risks. This obligation extends to any other person on whom the regulations place a duty and includes clients, CDM co-ordinators and contractors (both principal and otherwise). More of this later.

Designers have a fundamental obligation to produce designs that avoid foreseeable risks “so far as is reasonably practicable, taking account of other relevant design considerations.” Obviously it will not be possible to eliminate all risks and designers are required to provide information that other team members need to manage any residual risks. This is particularly important in cases where the risks may not be obvious or may be difficult to manage.

As the number of people classified as ‘designers’ for the purposes of the regulations goes beyond an ordinary classification (who would have thought that QSs would be classified as designers?), the meaning of the term ‘design’, in the context of the industry as a whole, is much wider than many appreciate.

In Hughes (Norman) & Co Ltd v Ruthin Borough Council (1971) 222 EG163, it was conceded that if settlement of a sewer was not due to bad workmanship by the contractor, it must follow that there was a deficiency in the engineer’s design. In this particular case, it was decided that the ground conditions had rendered the design unsuitable. This being the case, the concept of ‘design’ includes site and ground suitability and any other issue that may have a bearing on the fitness of the ‘design’ for whatever its purpose, wherever it may be.

Slotting this concept into the CDM Regulations’ requirement of safe buildability, there are precious few aspects of the site and its environs that the designer doesn’t have to consider for potential risk. On this basis, the data that the contractor can properly expect to receive at tender stage should cover the site and its surroundings and be specific to both.

Where does this leave unforeseen physical conditions and artificial obstructions?

Principal contractors

The role of the principal contractor is much the same in the new CDM Regulations as it was under the old ones. The principal contractor is usually the main contractor and their key duties are to plan, manage and co-ordinate work, properly, during the construction phase in order that the health and safety risks are fully controlled.

Although written health and safety plans are only legally required for notifiable projects, all projects must be properly planned and managed. Principal contractors must, inter alia:

- Satisfy themselves that clients are aware of their duties and that a CDM co-ordinator has been appointed and that the HSE has been notified before work commences.
- Make sure they are competent to address the health and safety issues likely to be involved in the management of the project.
- Satisfy themselves that they and anyone they employ or engage are competent and adequately resourced.
- Make sure that the construction phase is properly planned, managed and monitored, with adequately resourced, competent site management appropriate to the levels of risk and activity.
- Make sure that every contractor who will work on the project is provided with the information about the project that they need to carry out their work safely and without risk to health.
- Make sure that any designers and contractors they engage are competent and adequately resourced.
- Make sure that all the workers have been provided with suitable health and safety induction, information and training.
- Not commence work unless reasonable steps have been taken to prevent access by unauthorised persons to the site.
- Obtain specialist advice when planning high risk work.

Whilst there can only be one principal contractor for a project at any one time, it is possible for two or more projects to take place on a site concurrently. This is anticipated in some recently published versions of standard forms of contract (such as NEC3), where contractors are given access to the site rather than possession of it.

This approach is likely to be greeted with resistance from contractors who will not want the extra responsibility. Contractors should be careful to identify the exact position at tender stage and, if the client is insistent, make suitable arrangements and allow for the cost of so doing in the tender.

Where a single principal contractor isn’t appointed, great care must be taken to ensure that all the principal contractors co-operate and that their plans cover the interfaces (traffic movements, for example) satisfactorily.

Competence and competencies

Some people may be wondering why a piece on the new CDM Regulations is appearing in an edition of the journal focused primarily on education and training. The heading above should give you a clue...

A fundamental plank of the CDM Regulations is competency and an important feature of the new regulations is their uncompromising stance on the individual and corporate competency of all those engaged in the construction process.
...only the top few construction employers seem to appreciate the importance of being able to demonstrate the competence of every person they employ in specific rather than general terms.

These are no longer general requirements but are specific to the task and project. They deal with professional and work based competency as well as those directly associated with health and safety. Competency is no longer (assuming it ever was) just a matter of demonstrating a basic level of health and safety knowledge. The ACoP (paragraph 195) sets down two criteria for establishing individual or corporate competency:

- “Sufficient knowledge of the specific tasks to be undertaken and the risks which the work will entail.
- Sufficient experience and ability to carry out their duties in relation to the project; to recognise their limitations and take appropriate action in order to prevent harm to those carrying out construction work, or those affected by the work.”

Organisations and individuals will need specific knowledge about the tasks they will be expected to perform and the risks associated with these tasks. The ACoP makes a specific point (paragraph 197) that appropriate experience is a vital ingredient in competence and that people are much more likely to adopt safe working practices if they understand the reasons why they are necessary.

It follows that companies and individuals (either in management or technical roles) will not satisfy the criteria unless and until they have sufficient experience of the construction process to match their role in it. This may seem an odd sentence to write but the industry has never been short of individuals being promoted to levels above their demonstrated competency or being educated beyond their natural intelligence.

If these are the criteria laid down, then, at some stage or another, employers (as well as the individuals themselves) are likely to be called on to give evidence of competence. This is particularly important in cases where individual appointees, upon whom the regulations impose a duty, are not permitted to accept such an appointment or engagement unless they are competent and, it follows, can demonstrate their competency if required by the appointing authority or, God forbid, by the courts if something goes wrong.

A word of warning to some individuals who may be tempted. Only accept such an appointment if you have sufficient skill and experience to match the demands of the role (and can demonstrate such skills and competence) or you are confident that you can be supervised by people who do have what it takes.

A word of warning to their employers. If you appoint people to full specific roles and they prove to be incompetent and/or you cannot demonstrate that you have properly assessed their competence to carry out the duties demanded by the role, you will be in breach of the regulations.

Chapter 6 of the ACoP is dedicated to competence and training and how to assess it. It should be read, noted and complied with. Assessing the competence of individuals is listed as a two stage exercise; stage 1 — an assessment of task knowledge and stage 2 — an assessment of experience and track record.

In assessing the competence of individual CDM co-ordinators and designers, membership (at corporate level) of a construction related professional institution is cited by the ACoP (paragraph 221) to give a strong indication that the person has the necessary task knowledge and experience to fill the role.

I would urge caution with this. Considering the obligations placed on a designer, it is very difficult to conceive of one who would properly fit the bill without having at least ten years’ onsite experience actually building things. Failing this, he or she should be supervised by someone who has!

Conclusion

One of the reasons that ICES moved to demonstrated competencies as a basis for Corporate membership was to ensure (in so far as it ever can be ensured) that Corporate members of the Institution are competent to carry out their duties in the workplace and in industry. The training that SURCO is currently delivering is designed (and has been selected by its clients) to support this goal and to assist employers in producing competent members of staff.

Industry has a worrying habit of assuming that knowledge levels amongst its people are higher than they really are. This is no better demonstrated than by the continuing attempts of employers to place QSs trained on long term cost reimbursable projects onto traditional measure and value jobs in the belief that they will have the necessary skills to perform competently. As many companies are discovering to their cost, this sort of transfer simply doesn’t work without additional training.

We are rapidly approaching the situation in which it will no longer be appropriate to appoint a site agent or project manager unless it can be demonstrated that the person concerned has experience of the construction techniques specific to the project.

Whilst the CDM Regulations are primarily concerned with the competence of individuals to deal with health and safety risks, it is concerning that only the top (in terms of turnover) few construction employers (and mainly contractors at that) seem to appreciate the importance of being able to demonstrate the competence of every person they employ in specific rather than general terms.

Amongst early and mid career site staff, knowledge levels of the 1994 regulations and the obligations imposed by them are, in my experience, unacceptably low. If this is the case amongst the biggest construction employers, I shudder to think what the knowledge levels are where money for training isn’t available.

In these days of pre-qualification and quality bidding, the competence of every member of staff to fit a specific role in the project team, whether it be technical or managerial, is fundamental to getting to the tender list as well as to winning the work.

There is no substitute for competency and skill in the workplace. Development of these requires investment in structured training and workplace experience. Make that investment and be a part of it...

Robin E Jones FInstCES
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Much of this piece has been carved from the draft Construction (Design and Management) Regulations 2007 (Annex 5 to Paper HSC/06/54) and Managing Health and Safety (Draft Approved Code of Practice – Annex 6 to Paper HSC/06/54). I acknowledge the work of the authors accordingly.

Hughes (Norman) v Ruthin Borough Council, Engineering Law and the ICE Contracts (Fourth Edition), Max W Abrahamson.
It never rains but it pours

Tom Wrzesien, Associate, Construction and Engineering Group, Taylor Wessing

CONTRACTORS worried about damage caused by carrying out works in the recent spell of bad weather may be breathing a sigh of relief as a result of the recent case of CA Blackwell (Contracts) Ltd v Gerling Allegemeine Versicherungs AG.

However, the decision was not clear-cut and contractors must still be aware of the risks of undertaking work in bad weather.

Blackwell was the earthworks contractor on the construction of the M60 motorway around Manchester. Works were carried out between 1998 and 2000 and, as a result of the programme being behind schedule, Blackwell continued with the works out of season through December of 1999. During this period, the works were damaged by heavy rainfall. That is to say rainfall, combined with other factors, including the type of capping material, the works being performed out of season, the permanent work design and the temporary drainage, gave rise to the damage. Initially, Blackwell believed that the weather conditions were exceptional, but by the time the matter had come to trial, the experts retained by both parties agreed that the rainfall was neither exceptional nor unforeseeable.

Blackwell brought a claim under their construction all risks (CAR) policy. However, their insurers, Gerling, refused payment. Gerling argued, among other things, that the damage was not covered, as it was inevitable. They also maintained that Blackwell, by undertaking the works as it did, including working during the winter and using allegedly inadequate temporary drainage, was guilty of wilful misconduct entitling the insurers to decline the claim.

The thing about all risks insurance is that it is intended to protect against risks. It will not pay out for losses that are inevitable. Rain, even heavy rain, in Manchester during December, may perhaps be inevitable...

Rain, even heavy rain, in Manchester during December, may perhaps be inevitable...

earlier damage caused to the works by rainfall. The court stated that “it may be reasonable to infer that the incidents resulted from a want of care,” but made it clear that negligence alone would not amount to misconduct so as to invalidate a claim under the policy. There was no evidence, according to the court, that Blackwell knew of a risk and deliberately ran it without taking precautions. As the judge pointed out:

“We all expect our insurance to cover us, subject to any policy exclusions, against eventualities which are not wilful misconduct but which result from negligence in the legal sense.”

So, the court held that the damage was covered by Blackwell’s CAR policy. There are a number of lessons to be learned from this case:

- If works are damaged as a result of being carried out during bad weather, the damage may be insured, even where the weather is not out of the ordinary. The key point is that, for insurers to decline cover, it is the damage that must be inevitable, not the bad weather.
- Where a contractor’s negligence increases the risk of damage, this alone will not invalidate a claim.

This last point should sound as a clear warning for clients and contractors alike. When delays occur, there is often pressure to recover time wherever, and however, possible. If the contractor knows the risks, and takes them, it will not be insured.

This is not just a problem for contractors, it is a problem for clients too. If a contractor goes out of business (and they sometimes do), not only will the client be left without a remedy against the contractor, they may also have no claim under a CAR policy or project insurance. This case is therefore a salutary lesson for those tempted to risk all in the hope of completing on time.

The case was good news for Blackwell, and may perhaps be inevitable...

If a contractor deliberately runs a known risk, by carrying out works in a way that it knows will increase the likelihood of damage, this will avoid cover under the policy.

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The case was good news for Blackwell, and may perhaps be inevitable...
28 days later

David Carrick FInstCES, Knowles

Well here we go again. The Notebook has taken a bit of a back seat recently because of... well, lots of things. However, the respite is now over and you, dear reader, are no longer excused duties. The New Vitaliy Improved Notebook (with added whitener) is back on the tracks and, assuming that train wrecks can be avoided, I’ll be back to a regular service from now on. I am always keen to answer any queries or to pick up on any particular topic you would find interesting, so please drop me an email or talk to our long suffering editor.

In last month’s CES, you will have found Nigel Ribbands’ dissection of a couple of extremely interesting cases and I commend this to you [CES March 2007 pp25-29]. Nigel’s commentary is spot on so far as these cases are concerned. What I want to do in this month’s Notebook is to look behind the series of cases that have considered the adjudicator’s requirement (and that now seems to be what it is) to reach a decision within 28 days if the courts are to enforce his/her decision.

You may well ask yourself the question: What is it about adjudicators? Don’t they have watches or calendars? Why is getting a decision within 28 days such a big deal? In my opinion, the real issues are much deeper than lazy and chronologically challenged adjudicators.

The first reason is quite straightforward. We, in the construction industry, must have been a frightfully bad crowd of fellows because our government singled us out of all industries to have statutory dispute resolution. Up until the Housing Grants Construction and Regeneration Act (HGCRA) came along, the construction and engineering industries were like any other; the parties chose their method of dispute resolution. Yes, of course the superior contracting party often abused that choice. This was particularly the case in main contractor’s cases where they sought to impose unaffordable long term, and frankly inappropriate, resolution methods on subcontractors; usually arbitration. Don’t get me wrong, arbitration has its place and so does adjudication. The problem is that the construction and engineering industries (excluding the exceptions given in HGCRA) have a ‘one size fits all’ adjudication procedure. Of course the aggrieved party need not use it, but that rather defeats the object of the whole exercise. It is there as a statutory right.

Speaking as an adjudicator, I have had issues ranging from one that was resolved in literally a few hours through to final accounts contained in five lever arch files. No, that’s not the backup for the final account, that was the final account itself. The sad truth of the matter is that the government of the day foisted a single mechanism with a single period, i.e. 28 days, on to the industry. You might well say, with some accuracy, that the government of the day was only foreshadowing what successive governments would do. Since then, we have had a government that has attempted to decree how many of the road wheels on parents’ cars taking children to school are driven by the engine. They have also mandated how we kill foxes. Notwithstanding the million plus signatures on a relatively under-publicised petition against further taxes to drive vehicles (with any number of wheels driven) on our roads: our present masters appear hellbent on dictating that as well. Perhaps it is simple to say that our good old chancellor, Gordon (Filcher) Brown, only wants to make more money. Whatever else, we can’t blame the previous government for stealth taxes in introducing adjudication. The original statute may have been so badly drafted that it has introduced a job creation scheme for judges, but I doubt that was intentional.

So, what are we going to do about the 28 days? In theory, the answer is nothing needs to be done because the referring party can extend the 28 days to 42 days unilaterally and both parties can agree on any length of time. However, short of threatening to resign, the adjudicator has no say in the duration of the adjudication, either before he is appointed or during his decision making progress. If parties respond favourably to requests for further time, there is no difficulty. In my experience, this has generally been the case, but I would have to say, no names, no pack drill, some lawyers treat adjudicators like some form of low level pond life. Generally, that isn’t true but what happens in the circumstances where a ridiculously complex matter or series of matters is referred as one adjudication and the parties do not agree to extend the time beyond the 28 or 42 day period? Regrettably, I think any adjudicator worth his or her salt would probably resign. That, of course, defeats the whole object of speedy dispute resolution. It also undermines the adjudicator’s likelihood of receiving any fees for his efforts up to resignation. My recommendation to the people who draft the statutes concerning how to kill foxes would be that a much better task for them would be finally getting round to revising the HGCRA. Allowing the adjudicator some discretion on the period of time to reach a decision would, in my opinion, be a good thing. Frankly I do not think it would be abused by adjudicators.

On the subject of abused adjudicators, let us turn to a really serious matter; fees. Having read Nigel’s article, you would clearly understand that the courts draw a sharp distinction between the statutory requirement to reach a decision within 28 days and what happens to the decision thereafter. Having reached a decision, there is only one reason why the adjudicator would not transmit that document to the parties; fees. I appreciate I will almost immediately regret saying this, but frankly I have not had a lot of difficulty with parties refusing to pay fees. To date, I have never had to use joint and several liability. That is to say where one party defaults and the other one becomes liable. Perhaps others will disagree with me, but I am not aware of the courts having definitively decided whether or not an adjudicator, having reached it within 28 days and not dispatched it to the parties, is left holding an unenforceable decision. If I am wrong, please tell me.

The original statute may have been so badly drafted that it has introduced a job creation scheme for judges.
The matter was considered in the St Andrews Bay case by Lord Wheatley who held there were two distinct provisions, one dealing with 28 days within which to reach the decision and the other the intimation or communication of the decision. In his judgement, he said:

“The Act is totally silent on the question of intimation of communications of that decision. In these circumstances it must therefore follow that the obligation to reach a decision must include a contemporaneous duty to communicate that decision to the interested parties. Not to require such an interpretation of the obligation to reach a decision would render the whole purpose of the litigation meaningless.”

I particularly note the expression ‘contemporaneous duty’. Lord Wheatley’s decision in Ritchie Brothers PWC Limited v David Philip Limited was successfully appealed, albeit in a two-to-one decision by the Inner House of the Court of Session, but only on the point of his having wrongly allowed some latitude in the 28 day period. It therefore seems to me that Lord Wheatley’s decision in St Andrew’s Bay in the terms I have quoted above still stands. The distinction that Lord Wheatley drew was followed by Judge Havery in the Epping Electrical case, but he did not make any finding on the dispatch or communication of the decision. Read the decision carefully. The only relevance of the dispatch of the decision was that the time periods had been extended conditionally upon the issue being achieved within the further extended period and it was not.

The ICE adjudication procedure was, of course, a work of art considering those who helped to draft it. Although, perhaps not such a work of art now because it has been rendered obsolete by Judge Havery following his decision in Epping Electrical. However, the ICE procedure did contain another provision that, to my knowledge, has not been tested in the courts and that concerned the retention of a decision by the adjudicator until fees were paid. The mechanism to which I refer is contained at paragraph 6.6 of the procedure in the following terms:

“At any time until seven days before the adjudicator is due to reach his decision, he may give notice to the parties that he will deliver it only on full payment of his fees and expenses.”

If ICE, in redrafting the procedure, was to retain such a provision, would it be struck down by the courts as not compliant with the HGCRA? On the face of it, the HGCRA contains various terms to which any contract must conform, failing which all of the adjudication mechanisms will be struck down and replaced by the scheme. Given that the HGCRA is completely silent on the dispatch of the decision, I cannot see why it would be non conforming. However, we now turn back to Lord Wheatley’s decision where he considered that the dispatch should be a contemporaneous duty. If that was to mean that it was to be done at the same time, it would mean that it would have to be done within the 28 day period, would it not?

One would think that although the government appears to have made a bit of a foul up in drafting GC/works contracts (see Nigel's article for further details), they might have managed to draft their own statutory instrument properly. The statutory instrument to which I refer is the Scheme for Construction Contracts. This contains an obligation at section 19(3) in the following terms: “as soon as possible after he has reached his decision, the adjudicator shall deliver a copy of that decision to each of the parties to the contract,” in other words, not contemporaneous but afterwards. If the scheme gets away with it, even by the smallest margin, then why can ICE not get away with it by retaining the provisions in the existing procedure?

It seems to me, the courts have bent over backwards to protect parties’ interests in the implementation of the HGCRA. Quite a few adjudicators to whom I have spoken have had difficulties in getting fees paid and, in some ways, that shouldn’t be too surprising. Adjudicators have, via the scheme, the ability to apportion their costs. That is mirrored by almost all the procedures. It therefore usually follows that the person who is less than gruntled with the decision also gets the bill — not really a recipe for prompt payment. So what do we do to solve the second conundrum?

A useful start would be for ICE to retain a mechanism such as the one in the now defunct procedure that would encourage parties to pay the fees if they wanted to get the decision. Clearly, if some court in our wonderful land was to refuse to enforce a decision because it had not been communicated contemporaneously, then that would put a different slant on the matter altogether. In passing, there is one other mechanism contained within the procedure that I think merits retention, particularly in an engineering environment. That is the provision for the parties indemnifying the adjudicator (contained in paragraph 7.2). In most disputes, it is highly unlikely that a third party would suffer damage and attempt to come after the adjudicator. However, if an adjudicator, asked to find whether or not a structure was designed and/or constructed to an appropriate standard, wrongly decided that it was properly designed and constructed and the structure subsequently collapsed on a passer-by, then having such an indemnity would be a good thing.

What am I therefore suggesting? In summary, I am suggesting that with the redrafting of the statutory provisions, some latitude should be given to adjudicators to unilaterally extend the 28 day period. Until such a mechanism exists, I commend to the parties a sympathetic view towards adjudicators requesting extensions in complex adjudications — that is if you want to get the right answer.

In terms of the dispatch of decisions; unless or until the matter is decided properly by the courts to require conveyance of the decision within the 28 day period, the drafting bodies should provide some mechanism to provide some certainty of payment for adjudicators. Of course, if all adjudicators got together and said that they would not accept appointments without some form of advanced payment or some form of decision withholding mechanism, then job done, box ticked. However, that seems to me about as likely as all the motorists in Britain getting together and refusing to have devices fitted to their cars so Filcher Brown can make off with their hard earned pennies — not likely, but a million signatures on the petition might be a good start.

Anyone with any views on the subject is most welcome to make a contribution. Never a dull moment in adjudication.

Well, that brings us to the end of this month’s Notebook and I hope you found it interesting and relevant. If there is any moral to this month’s Notebook it is this: Do not write adjudication procedures and do not allow disputes to arise such as may require to be referred to adjudication. As far as adjudicators are concerned, well, it is up to us to look after ourselves.

David Carrick
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Blast analysis with a laser scanner

Jane Ball, Maptek

The accuracy and high volume of data collected with laser scanners makes them ideal systems for surveying blast sites. When combined with powerful modelling and scan interrogation capabilities, laser scanners provide investigators with abundant data for analysis.

I-SITE was contracted to perform pre and post-blast surveys at an Australian trial designed to test the ability of a normal house to withstand a large explosion. The site included a house built to normal specifications and various other structures built to test properties for military and civilian applications. The survey area was approximately 130m².

Using a 4400 laser scanner, a complete survey was made of the site before the explosion. Scans were conducted from 11 set-ups with more than five million points acquired in only a few hours, providing analysts with a complete and accurate profile of the site before the explosion. Models of the house and terrain were constructed for comparison with the post-blast data.

Following the explosion, the terrain had changed drastically. A large crater marked the location of the explosion and the damage to the house was so extensive that the structure was determined to be unsafe for entry. Using the laser scanner, the structure and surrounding terrain were able to be safely surveyed for comparison with the pre-blast data. The interior of the upper storey of the house was surveyed from an elevated platform, providing investigators with data that otherwise could not have been acquired.

The crater formed by the blast was more than 2m deep and highly unstable. Using conventional techniques, a surveyor would have had to enter the depression to collect measurements, whereas the laser scanner allowed the crater and ejected material to be safely surveyed from the perimeter.

More than three million points were gathered from nine set-ups, building up a detailed profile of the crater and surrounds post-blast. Software was then used to create an accurate model from which contours and sections were generated for analysis.

Powerful modelling capabilities, combined with the scanner’s high-resolution imaging, allowed for in-depth analysis of the crater and house, so that investigators could better understand the devastating effects of such an event. A bonus of using a laser scanner is the simultaneous acquisition of a high-resolution digital image automatically registered to the 3D laser point returns. These post-blast images allowed...
investigators to view details as fine as cracks in the house walls, with the confidence that their position was automatically located on the 3D data.

The laser scanning system provided a rapid and detailed survey of the blast site. The high level of detail obtained from the unique digital imaging abilities of the system allowed investigators to initially focus on acquiring data from the scene with the confidence that significant features could be identified and later analysed thoroughly in a safe office environment.

Damage to the house in terms of its overall stability, as well as the destruction of individual materials, can be clearly seen on these images acquired and registered automatically to the 3D data by the laser scanner.

The results produced by the laser scanning system can be used to review building standards and designs for high risk locations. They also allow investigators to better understand the impacts and stresses created by an explosion of this magnitude.

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Thanks to the Australian Department of Defence

No merger on the cards for ICE and IMechE
The ICE and IMechE have decided against merging the two institutions to form one UK institution for engineering after almost three years of talks. Instead, the two have agreed to more joint initiatives on topics such as waste, energy and transport, and a combined group for younger members.

A statement from the ICE said the IMechE had “sought a more proactive approach towards convergence of the Institutions.” However, the ICE council opted for “a more limited partnership.” Alec Osborn MBE, IMechE president, said he was “naturally disappointed that more extensive convergence will not be pursued.”

Future of UK waste management
A joint report on resource management has been released by the ICE and IMechE. How to Deliver a Resource Management Strategy advises local and national government to work more closely with the private sector in reducing dependence on landfill by recovering and recycling materials and using rubbish to generate energy.

Both institutions believe their recommendations will save costs by reducing landfill taxes, whilst creating jobs and complying with EU waste targets. At a time when London alone is expected to need 50 new large scale waste processing facilities over the next five years, the report calls on several central government departments to improve; the Treasury to create better financial incentives for improved environmental practices, the DTI to look into optimum use of materials and DEFRA to research recovery and recycling.

The report also asks the Communities and Local Government (CLG) department to ensure local councils meet waste targets and the Department of Education and Skills to promote sustainability to schoolchildren.

If the report’s recommendations are followed, the ICE and IMechE optimistically expect a new waste infrastructure to be in place by 2012.
In the course of my work, I read a lot of material regarding professional indemnity (PI) insurance, some of which is very straightforward and some which makes me question if I am working in a completely different market all together. As a professional risk insurance broker, I wanted to try and give you an overview of the subject with, of course, special reference to your industry. In doing so, I hope that I can give you a broad enough insight to help you make informed choices when thinking about your exposure, negotiating a contract, signing a warranty or just looking to buy or renew your own policy.

In short, a professional indemnity policy covers you for negligent acts, errors or omissions that might occur in carrying out your business activities. This type of policy is known as a legal liability contract. There is a wider contract, civil liability, but this is unlikely to be offered as it includes, in essence, cover for some contractual liability too. Cover may be offered where you are if you have a RICS surveyor or RIBA architect in the practice as they are compelled by a standard policy contract which is driven by their governing bodies.

It is worth focusing on your business when thinking about your professional indemnity insurance. An underwriter is going to look at risk based on a number of factors. Once they are past who you are, how long have you been doing what you do and how are you qualified, they will be looking at:

- What type of work are you doing?
  This will be broken down on the proposal form and will give the underwriters the rates to be applied to each area of work.
- Who are you doing it for?
  This gives a feel for the likelihood of a claim if things go wrong and who your client base is. Underwriters usually like to see (unless you are a new start-up) that you have more than one client as a sole source of income.
- What is the maximum exposure?
  This centres on your largest contract values but it is also worth remembering the 'consequential loss' that could flow from an error here. Not only are the costs to redo the work exposed, but by far the greatest costs are those associated with the greater loss of time; re-engaging all of the other parties involved with rectifying any errors made and all the additional costs that could flow from this.
- What is your income?
  Income is the factor that allows the underwriter to ascertain the quantity of work undertaken. It also provides the other half of the equation to apply their rate income x rate
- Any claims in the past?
  Past claims are sometimes seen as a blotted copybook. However, an underwriter is going to be looking for good risk management. Claims happen. How we deal with the claim and what steps are put in place to ensure that the likelihood of a reoccurrence is minimal is the important factor here.

To set the correct limit of indemnity, you must look at your maximum exposure again. The areas just discussed should give you a feel for this but you also need to think about the number of contracts you currently have undertaken. There are two bases of limit:

- Aggregate (AGG) — one aggregated limit for a whole year.
- Any one claim (AOC) — which is per claim with no cap or aggregated limit.

The latter being the wider, however some insurers will not always offer this as they want to keep some control on their own exposure to losses. If you have AOC, then you only need to consider your largest possible claim and make sure that your limit is as great as this. If however you buy on an AGG basis, you need to think of all the pieces of work that you have conducted and multiply that number by the maximum possible loss to ensure that you have adequately protected yourself.

It is also worth thinking more laterally too when considering these areas. PI is one of the few classes of business that is written on a 'claims made' basis. Most other classes of insurance are written on a ‘losses occurring’ basis. To you, this
means that unlike most other policies which give cover within a set period even if that period has expired — a claim can still be brought as long as the matter happened whilst cover was in force — PI does not. This is especially relevant to any contracts you sign, or work you take on, that specifies you must maintain PI cover.

Historically it was thought that the certificate of insurance was satisfaction enough that cover was bought, then as soon as the need to have this or the completion of a piece of work was over, it would be cancelled. Most current building contracts will warrant that all parties carry PI insurance and do so for anything up to 12 years after completion. This ‘tail’ is very long and is often overlooked when entering into a new contract or even tendering. You need to think of the financial cost to you when entering such a contract and also how you will fulfil it.

Lastly, when looking to buy or renew your PI, it is important that you start early as there are a great number of underwriters to be covered to ensure that you get the best array of options. Again, historically there have been many brokers who have sold continuity of insurers. This seems to still be a very powerful argument — the reality is that it seems to centre on a scare tactic; if you build up some continuity with your underwriter, they will look favourably on you when you have a claim — maybe somewhere in the past this was based on a small amount of truth, but in today’s highly professional and highly regulated environment, this cannot be used as a reason for a lazy broker to only offer you one quotation. If you know that you are going to a particular company or broker that is only going to offer you one quotation, then you need to get a second broker to conduct the full market exercise for you. The current insurance market is in a highly competitive place with premiums tumbling and everyone chasing prices down. Now is a good time to have a broker taking a thorough look at your risk and to conduct a full review of both the cover, that you can renegotiate, and the premium that you pay. There is also one last factor that should always be considered, just as you would with every other company you deal with. You must make sure that your broker understands your business, your work, your clients and, most importantly, is someone you trust with your company’s protection.

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When is a variation not a variation?

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In the absence of express terms, an employer has no power to instruct a contractor to undertake varied or additional work: to do so would constitute a breach of contract. This general principal was recognised over 100 years ago in the case of Dodd v Churnton 1897, and remains as true today as it did then. This is the reason why modern forms of construction contract include provisions allowing the employer, or their authorised representative, to instruct the contractor to undertake variations to the original scope of works.

Variations are variously identified within forms of contract as comprising additions, omissions or substitutions to, or of, the scope of works and/or the specification and/or the way in which the works are to be undertaken.

One may have thought that such provisions would provide an almost unfettered right for the employer to vary the works. But the courts have held that in two particular circumstances, this is not the case.

Omission of work

The first limitation is this: In the absence of express terms, the employer/architect is not entitled to omit works from the contract in order to give that work to another contractor to undertake. Fullagar J, in the Australian case of Carr v JA Benniman Pty Ltd 1953, set out the principle thus:

"[a variation order] enables the architect to direct additions to, or substitutions in, or omissions from, the building as planned... but they do not... authorise him to say that particular items so included shall be carried out not by the builder with whom the contract is made but by some other builder or contractor... very clear words would be required [to achieve this result]."

Stephen J, in the later Australian case of Commissioner of Main Roads v Reed and Stuart 1972 explained why this should be. In addressing the question of whether the architect in the case was legally entitled to omit contract works and give them to another, he concluded that such a result "runs counter to a concept basic to the contract... the contractor should have the opportunity of performing the whole of the contract works."

From a commercial viewpoint, as well as a legal viewpoint, this has to be correct; the contractor will have planned, programmed and priced the contract works on the basis of undertaking everything specified. To allow the employer to omit parts of that work, and give it to another, would render the whole basis of the original contractor's tender meaningless. Planning, programming, resourcing, cashflow and profitability would all be affected, leading to much uncertainty and unfairness. Claims for loss and expense would inevitably follow.

But does this principle apply in relation to the omission of a provisional sum? As we know, there is no guarantee that a provisional sum will be expended by an employer. This question was considered in the English case of Amec Building Limited v Cadmus Investment Company Limited (1996). The court’s view was that a provisional sum was to be treated in the same way as measured works — if work was to be instructed that would have ordinarily fallen within the ambit of the provisional sum, being part of the contract, Amec had the legitimate right to undertake that work. The employer was held to be in breach of contract. So this general limitation applies to all works included within a contract, whether they be measured or provisional.

More recently, in the case of Abbey Development Limited v PP Brickwork Limited 2003, HHJ Humphrey Lloyd examined the question of the omission of work from a contract. The defendant in this case had been appointed on a labour-only basis to provide bricklayers to construct 69 housing units. The contractor’s performance was not considered to be of the required standard and the employer omitted from the contract all units that had yet to be commenced by the contractor. These would be undertaken by another contractor. Although the contract provided that the employer could vary the number of units, it was held that, in the absence of express terms, this did not allow omission, for whatever reason, where the consequence would be that the remaining units would be constructed by another contractor.

What this train of cases demonstrates is that work cannot be omitted from one contractor’s contract and given to another, unless clear and express terms to that effect are provided for in the contract. The principle that a contractor has the right to complete all the works for which it has been contracted, remains sacrosanct.

Excessive variations

The second limitation recognised by the courts is that of ‘excessive’ variations. This principle holds that an employer does not have the right to instruct variations, either singularly or together, that fundamentally and substantially change the scope and extent of the original contract. For example, a variation to build a hospital to a contract to build a house would constitute an ‘excessive’, and therefore invalid, variation of the contract.

This principle was the basis of the holding in Pepper v Burland 1792 that, where a contract is varied to such extent that the original scope of works is "so entirely abandoned that it is impossible to trace the [original] contract," the contractor is entitled to have the whole works paid for on a measure and value basis "as if no contract had ever been made."

Consequently, there must be some limit to the nature and extent of variations that an employer is entitled to instruct under a contract. But where should this line be drawn? In Blue Circle Industries Plc v Holland Dredging Company (UK) Limited 1987, the contractor was required under the contract to deposit dredged material at specified locations within a dock. The employer instructed that instead of this, the material was to be deposited out in the loch, to form an artificial island. The court held that this was such a fundamental change to the contract that, rather than constituting a variation to that contract, a wholly new contract had come into existence.

But, in practice, it is often not quite so clear as to what could constitute an excessive, and therefore ultra vires, variation. In McAlpine Humberoak Limited v McDermott International Limited 1992, the court ruled that, provided the extent and scope of the variation changes fall within the express terms of the contract, the variation will not be ‘excessive’. However, this approach can lead to disputes between the parties, since they may have different interpretations of what the variation provisions extend to cover.
Contract drafters have responded to this tension in two principal ways. The most popular is the introduction of provisions giving the contractor the right to make reasonable objection to any variation that he considers may be ‘excessive’ or issued _ultra vires_. For instance, the JCT, ICE and IChemE forms of contract, amongst others, include ‘reasonable objection’ provisions. On notice of reasonable objection, the employer/architect is required to review the proposed instruction to affirm that it does fall within the limits of the variation clause. If this does not resolve the matter, the parties may incept the adjudication provisions. The advantage of ‘reasonable objection’ provisions is that potential excessive variations are raised at an early stage, allowing the parties to resolve the matter with minimal delay, disruption or dispute to the contract.

The second way in which contract drafters have sought to deal with potential excessive variations is by introducing provisions that limit the extent of variations by reference to the value (either singularly, cumulatively or both) of the variation(s) compared with the original contract sum. The model form MF/1 is one such form of contract that adopts this approach. However, the problem here is that variations are limited purely by value, rather than content. And this raises the difficulty of determining the value of the variation, and therefore whether it is excessive or not, before it is undertaken. As we know, this can lead to problems and disputes on its own account. All things considered, this approach is possibly not the best way to head off potential disputes.

To conclude, the general rule regarding variations is that if a proposed change falls within the definition of a variation, as prescribed by the contract, it will be legitimate. As a rule of thumb, if the change is connected to the original scope of works, it is likely to be valid; if it is entirely new work, it may not.

Of course, in practice, a contractor is unlikely to turn away additional work instructed by the employer. The real issue then becomes whether the nature of that additional or changed work is such that the contractor is entitled to a reassessment of their basis of pricing. But therein lies another tale...

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The principle that a contractor has the right to complete all the works for which it has been contracted, remains sacrosanct.
THE VIRTUAL CITY OF GLASGOW project is being produced by Glasgow School of Art’s Digital Design Studio (DDS) for Glasgow City Council. The contract involves the production of two virtual representations of the city, a real-time web version and an architecturally accurate, photorealistic version. Both models will include the dense city centre, Merchant City, as well as the new development areas along the Clyde.

The real-time application is to be hosted through the council’s website and will allow individuals to explore the city from their computer. It will eventually be integrated into other components of the council’s e-planning services.

The photorealistic high-resolution model is considerably more detailed – doorways, window depth, cornices, roadways, terrain and vegetation etc. Every building and structure within the project area is being modelled to an accuracy of 20cm or better. Through the use of onsite scanning, all buildings are being modelled in situ, not from drawings or in an idealised form.

Once complete, the high-resolution model will likely be the largest and most detailed virtual city model in the UK, possibly Europe. Both 3D models will be used by the council, designers and the development industry for assessing planning proposals and visualising design alternatives. The models are intended to address the significant limitations of 2D plan-based information to help the public make informed decisions about what is best for their community.

Established in 1997, the DDS is a centre for advanced 3D visualisation and interaction research, supported by Scottish, UK and international industrial and academic partners. The DDS helped the GSA become the first art school in the UK to hold an EPSRC research grant. First and foremost, the research activities of the DDS are driven by the imaginative use of new and emerging digital tools such as 3D laser scanning for architectural visualisation and the development of large 3D/virtual city models. Research partners including the European Commission, Ford Motor Company, City of Glasgow and BBC Scotland demonstrate the value that this approach has delivered. When the school was awarded the commercial contract for the Glasgow City model, it immediately knew that it would be necessary to use the latest technology and scanning equipment. With some research, it was decided that 3D laser scanning was the best solution for the rapid creation of accurate 3D urban models.

The DDS currently integrates their onsite point-cloud scans with other sources of 2D and 3D information, aerial lidar and 2D orthographic data. Every city block within the Glasgow project area is being photographed and digitally scanned, then post-processed using Leica Cloudworks and AutoCAD. All of the final 3D modeling is being done in 3D Studio Max.

Although the laser scanning system has only been on site for six months, the immediate benefit for the project is the confidence that the models accurately reflect the built environment. The speed of capturing and processing the data is amongst many of the benefits of using the scanner, along with resilience — we can even scan in the rain (not a rare occurrence here in Glasgow!).

The system (Leica ScanStation) will be extensively used by the DDS in the development of other city models and will be utilised in future virtual heritage and applied research projects.

Doug Pritchard, Head of Visualisation and Project Manager, Digital Design Studio, Glasgow School of Art  w: www.gsa.ac.uk/gsa.cfm?pid=12
Remember my first cold call into the operator of one of the world's largest copper mines. They had expressed some interest in what we could do to help them with a particular mine water treatment issue. But the issue soon escalated into the larger question of how to better manage water across the entire mine site.

The Codelco is one of Chile’s largest copper producers, producing 74% of the country’s copper. Only a decade ago, Codelco had the monopoly on all mining prospects in Chile. Its large-volume water pumping to support the mine influences water levels not only in surrounding areas, but also in neighbouring nations.

The department we were dealing with at the mine had responsibility for water treatments; so they were only seeing that part of the problem. Using mind mapping software (Mindjet’s MindManager) to identify the mine’s existing water usage and treatment processes, we were able to demonstrate methods to reduce treatment alternatives by increasing the effectiveness of water management and reducing water inflows.

Mind mapping software helped our engineers quickly gain and communicate to clients a useful overview of these complex topics. Once created in the software, the map of our thinking was exported into Word and PowerPoint to present the kind of proposal in three hours that used to take two days to create.

How to map a mind

Mind maps have many applications in personal, educational and business situations, including note taking and brainstorming. Ideas are inserted into the map radially around a center node, without the implicit prioritisation that comes from hierarchy or sequential arrangements.

Typically, remote teams will share a map through a server. One person will ‘run’ the map, using key words and concepts, branch relationships and symbols to capture the team’s thinking, due dates and assignments on what are often very complex projects. The server supports asynchronous input — electronic data sent in one direction, one character at a time — as well. If we send a 10-20 page document, like the proposal for this mining company, the response tends to be minimal because it’s hard to get people to stop what they’re doing and read a long document. But with the information held in a mind map on the server, a selected group of people can open a map at any time, get access to detailed information and add their thoughts to the map at a time that’s convenient to them. For a company like ours, whose success is tied directly to our ability to access intellectual capital located all around the world, the ability of these maps to significantly increase feedback provides a huge benefit.

Mind mapping also helps during face to face meetings. We used to use flip charts; a method that, whilst still common, is now somewhat cumbersome. By projecting the mapping interface on a screen, we can capture our thinking immediately, making sure projects are organised in a way that makes sense to all participants. They can see solutions emerge before their eyes, and leave the meeting with a clear understanding of key issues, next steps, timelines and assignments, without there being a time lag. Meeting minutes and any supporting documents can be hyperlinked to the maps and instantly “packed and delivered” via email. For each meeting we used to get an email with 10-12 pages of minutes to read through and approve. Board meetings that lasted days would generate even larger documents. It would take a number of weeks before everyone could sign off on decisions that were often key to company operations. Now we circulate minutes in the form of maps. The information is more concise, and we know much sooner if we are all on the same page, so to speak.

On another project, we were taking part in a strategic planning meeting among dozens of representatives of a large South African mining company. We ran into scepticism of the mapping at first, but within 20 minutes everyone was jumping in, telling us to add this thought to the map over here and move that branch over there. The meeting suddenly became very interactive. Getting people to participate in these larger meetings can be like pulling teeth. But the mapping interface does encourage interaction. Participants see their ideas added to the map in real time for all to see. Everyone understands immediately that their input is heard and valued.

The ability to efficiently evaluate what can be very complex problems is what attracts and retains clients. Companies hire consulting engineers because we prove to them that we thoroughly understand the problems they face and can quickly devise innovative solutions. Mind mapping has proved a useful tool in achieving this.

Jeff Parshley, Principal at SRK Consulting
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Profiles/Recruitment

Compressed air specialist Thorite has released three new products. The high quality, 15m long, 3/4“ bore, mandrel-built air hose features JayMac safety clamps and claw couplings (RTH 34). The whip-check air hose tether device, designed to prevent personal injury or damage in the event of a hose ‘blow out’ is an indispensable aid to on site safety (WCSD 1332). The Cubeair air fuse safety valve offers a simple, but effective, additional operator safeguard by instantly cutting the compressed air flow if the hose is holed or damaged (No.281AO511). The complete compressed air hose assembly would normally retail at £96.30+VAT but Thorite is offering the three products through its online shop for the £76.30.

Vari-Stem stemming plugs from MOCAP provide a valuable tool for today’s quarrying and mining industries and are becoming widely used and accepted. They are designed to improve blast performance, control flyrock and increase productivity, whilst providing savings in secondary breakage and downstream costs. Vari-Stem plugs are used for vertical and horizontal blasting applications and work by creating a blocking effect within the drill hole by wedging the stemming material between the drill hole wall and the plug. Vari-Stem is quick and simple to install and requires no special tools or drill hole preparation. t: 0800 856 2466 w: www.varistem.com

Abbey Pynford has developed the piled raft style foundation systems, Housedeck and Comdeck. Housedeck has a low construction depth requiring minimal dig. An arboricultural package is offered which can predict tree root activity. So, housedeck can be designed around any underground obstructions. Housedeck utilises a structural reinforced concrete slab only 225mm deep that covers the entire footprint of the building and is supported directly on piles between 140-350mm dia. Comdeck offers the same benefits as Housedeck but is designed to support heavier loads for industrial structures on larger piles with a slab thickness of up to 300mm. Karen McAuley, Abbey Pynford, Second Floor, Hille House, 132 St Albans Road, Watford WD24 4AQ

Lanes takes part in landmark island project
Since 1960, the only way on and off the Isle of Sheppey for its 35,000 residents was over the Kingsferry Bridge, which had to be raised every time a ship came through the estuary. But the £100m A249 Iwade bypass gave the islanders a new, 34.7m high level bridge over the Swale which allows sea traffic to sail through — without any disruption to road users. Main contractor, Carillion, chose Lanes for Drains as its drainage partner. Lanes jetted and surveyed approximately 10km of pipework running along 5km of new dual carriageway. With the resulting CCTV footage and reports they were able to establish the integrity of the drainage easily. The A249 project finished on time. w: www.lanesfordrains.co.uk

VIGIL EVAS is a range of DSP controlled voice alarm products and is the latest addition to Baldwin Boxall’s expanding product repertoire. The main unit – BVRD2M – is the feature-rich DSP controlled router. Only 1U in height, the BVRD2M has seven audio outputs, eight audio inputs and six flash stored messages. Adding one BVRD2S slave unit increases the number of inputs by 12 and outputs by 16. Up to five slave units can be connected to each master – providing 68 inputs, 87 outputs and 30 messages! The EVAS range can provide a decentralised network and up to 128 units can be linked together, creating a voice alarm system for larger sites. w: www.baldwinboxall.co.uk

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