A.O. Smith high-efficiency solar systems: SGE & SGS

Thanks to the single intelligent control system incorporated in our SGE & SGS water heaters, we can guarantee the **highest level of solar efficiency, up to 40% extra** when compared with a standard solar system. This is achieved by saving as much solar energy as possible in the systems stored water and using the fossil fuel burner only when absolutely necessary.

For full information on these intelligent solar systems please see the “ReNEWables” page of our web site, alternatively call our technical department who are available to answer any questions on sustainable hot water applications. **0870-AOSMITH (2676484) or www.aosmith.co.uk.** We are always happy to assist you in finding the perfect hotwater solution!
A Message from the Chairman

It is with great pleasure that I can introduce this Summer 2010 edition of the SoPHE Newsletter which contains a wide range of technical articles. It is with even greater pleasure that I can introduce our next Chairman, Chris Northey, and his team, namely Vice Chairman, Ian Fellingham and Hon Secretary, David Shaw. As most of you will be aware, they were elected at our AGM at Lord’s Cricket Ground on 22 June 2010. Many of you will know Chris from his time as Hon Secretary, SoPHE and also the very active role he plays in our industry at the highest levels. We are very fortunate to have such a strong team as Chris, Ian and David at the helm supported by members of the steering committee.

As well as looking forward, I would like to reflect on the past eight years of SoPHE. I had the privilege to chair SoPHE following its transition from the Public Health Engineering Group to a Society within CIBSE. There are too many of you to thank for your support, however I would like to mention my predecessors, Alan Watson and Ken Hatter, who both encouraged me to take on a role in SoPHE. Ken and Alan were amongst those who originally responded to the need for a community of public health engineers in the early 1990s and successfully guided the Group to become a Society. We have an article from Ken on the early days of the PHE Group in this issue.

Over the past eight years, SoPHE has become a key player within CIBSE together with the other Societies of Light and Lighting, and Facades. Indeed, we are now well represented at Council level able to influence the future development of CIBSE. There have been four main strands to the development of the Society, namely, growing membership; development and sharing of technical knowledge; representation; and training. I would like to highlight some achievements below.

Growing membership – we now have a membership structure which allows us to recognise the various levels of experience and competence of our members. Our regional organisation has helped build membership; as well as London, we have groups in the NW, SW, Scotland and overseas.

Development and sharing of technical knowledge – the strong technical seminar programme that Alan Neall and colleagues put together has helped us share best practice as well as indentifying new and emerging technologies. A new revision of CIBSE Guide G (Public Health Engineering) is under production.

Representation - it is encouraging to see that SoPHE is recognised by government and our advice is sought on matters related to our sector. The Society has played a key role in the development of new technical guidance and the revision of regulations including input to the recent revision of the Building Regulations Part G (Sanitation, hot water safety and water efficiency).

Training – the Society has collaborated with CIPHE and others to help develop an undergraduate degree for public health engineers at the University of Greenwich and I’m pleased to report that this year we had our first graduate James Day (AECOM). Further developments are underway.

In terms of bringing the industry together with one voice, it has been very encouraging to see the support given to SoPHE by our Industrial Group. As well as being the providers of extremely useful technical knowledge they have been kind supporters financially. Their generosity has allowed the SoPHE Annual Dinner to go from strength to strength.

I am pleased to be able to continue to serve SoPHE in my new capacity of Hon Treasurer (taking over from Richard Mountney) and I look forward to the on-going development of our Society under Chris’ stewardship.

Martin Shouler
Hon Treasure, SoPHE
Ex-Chairman, SoPHE
LOOKING BACK

By Ken Hatter

My colleagues and I are Honorary Fellows of SOPHE and were very grateful to be invited to the 6th Anniversary Dinner held on 5th November 2009.

It was yet another super event. We really enjoyed meeting old friends and new, reminiscing about the past and learning how you are coping with the present day pressures.

We were impressed with the professionalism and achievements of SOPHE and feel very proud that we have helped in the formation of the Public Health Group within CIBSE. Martin Shouler suggested that I should write down some of the background relating to the formation of SOPHE.

I and many of my colleagues started our careers back in the 1950s and beyond. At that time there was a regular intake of young people into the plumbing industry. We were generally employed by firms engaged in M&E services contracting and design notably Matthew Hall, Haden Young, Ellis and many others. They sponsored our training; some of us were indentured apprentices for up to 7 years. We were encouraged to attend technical colleges for formal education notably The Brixton School of Building, Willesden Tech., Nescot and many others. At that time the aim was to qualify as Public Health Engineers by gaining Associate Membership of The Institution of Public Health Engineers (formerly The Institution of Sanitary Engineers). This was achieved by passing the City & Guilds Plumbing, also the C&G San., & Dom., (Sanitary & Domestic Engineering) plus Ordinary and Higher National Certificates in Building Construction & P.H.Engineering. We also had to pass a qualifying examination for Associate Membership of the I.P.H.E. (now known as C.I.W.E.M).

This training was part time in the form of day release plus evening classes taking up to 7 years requiring deferment from National Service that then took another 2 years. It was tough at the time but on reflection most of us appreciate the practical background to our training that has enabled us to enjoy exciting and varied careers.

As Public Health Engineers we shared a growing concern about the future of our profession and we resented that when compared to other disciplines we were generally treated as the poor relation in the building design hierarchy.

Towards the end of 1980 we became alarmed that new candidates were not being recruited into the P.H.E. discipline and that training establishments were closing because of insufficient students. Following discussion with other senior colleagues we drew up a list of all the known senior people actively engaged in the P.H. profession. I then called a meeting of as many of those that we could contact; approximately 50 people attended.

At this meeting I was asked to lead the initiative. I outlined our concerns and suggested that we had a responsibility to act and help influence the future. We recognised the need to form a professional focus where we could channel our efforts. These were aimed at improving the professional recognition of P.H. engineering also helping to encourage future recruitment. We also recognised that in order to compete on equal terms with other disciplines we needed to attract trainees and graduates into the profession and to ensure that they had a good career path to match their ambitions.

We agreed a plan of action that included approaching the three most likely Institutions with a view to exploring the possibility of forming a specialist P.H. group. The IOP and CIWEM were both less than enthusiastic but CIBSE were extremely keen and supportive. In 1990 it was decided that we form a new P.H. group within CIBSE.

We set up a steering committee with myself as chairman, Jim Buckmaster as secretary, Arthur Churchyard as vice chairman. The committee included Don Barron and Bill Bumstead. We met once a month and CIBSE secretary Andrew Ramsey always attended; he was most appreciative of our approach and the way that we organised ourselves.

It was all very much a team effort. We gradually expanded, recruiting new members onto the committee and generally extended our interests including making and renewing our contacts with Technical Colleges and Universities. We encouraged participation and published regular Newsletters; we reviewed and commented on proposed changes to existing and new legislation affecting P.H. engineering. We held a number of professional meetings on current P.H. affairs and also started professional discussion meetings seeking the involvement of manufacturers and suppliers.

I carried on as chairman for 7 years ably supported by a host of energetic and capable colleagues. I persuaded Alan Watson to take over from me as chairman. He had done a sterling job heading up the contributions of various authors that resulted in the P.H. and Fire Engineering guides.

You have come a long way from our early beginning. The group was renamed SOPHE some 6 years ago and the chairmanship is now in the very capable hands of Martin Shouler backed by a strong team who are doing an excellent job of further expanding the ability and influence of P.H. engineering.

In conclusion I would like to say how much I have enjoyed my career, I would gladly live it over again. I firmly believe that P.H. engineering has an exciting future in helping to deal with the considerable challenges that lie ahead. Your specialist skills will be essential and in great demand.

KEN HATTER – Hon F SOPHE
(with comment / contributions from Jim Buckmaster, Arthur Churchyard, Don Barron, Bill Bumstead)
‘City of Sails’ Airport takes the LEED in Rainwater Harvesting
By Les Wilson

Its 5.05am Wednesday 4th November ‘09 …here I sit at Gate 15, coffee peppe but still bleary eyed as I await the early morning flight out of Auckland to Melbourne. Close by, a gaggle of high school boys, all built like pro-wrestlers discuss their forthcoming rugby tour whilst, to the side, a loan backpacker in a state of somnolence is spread out across four seats, resonating a spittle snoring slumber across the lounge…

Even though I’m no stranger to the departures and arrival hall, I still get a kick out of being at the airport – albeit… at the crack of dawn! Since 2006 I’ve been part of Beca’s Building Services team and have now undertaken several refurbishment and new build projects out at Auckland ‘City of Sails’ Airport. One of the perks… I get to go airside. This was preceded by a security vetting process which took several months to see if I had any unpaid parking fines or if I’d been involved in any dubious practices…. rest assured, your SoPHE representative Downunder is squeaky clean!

Moving around airside has afforded me the opportunity to see the business end - from the fuel bowsers and fire trucks to plane crews and uncollected luggage. I’m treated no differently from a regular passenger even though I swan around in a hi-vis vest looking vaguely important … my personal belongings consisting of I x wallet (invariably empty), I x comb (a legacy of my younger days) and 1 x safe breaking kit all get x-rayed and scrutinised from every conceivable angle plus I have to submit to a series of body searches as I move from one section to another.

In my last contribution I wrote about a healthcare project, so I thought it would be fitting in this issue to outline my involvement out at the airport, in particular the 3A Arrivals and Pier B projects. Auckland Airport decided to apply for LEED (Leadership in Energy and Environmental Design) certification for embracing sustainable development. We put forward a list of potential energy saving technologies under the LEED umbrella and all were adopted…. this included photovoltaic panels, rainwater harvesting, domestic solar heating, low flow ‘hands free’ sanitary fixtures and sub-metering. We had our own LEED champion on board - a Canadian mechanical engineer who had previous experience of LEED projects in her native country. Joanna was a huge asset and became a valuable member of the team. She was also a fair athlete who thought nothing of running 25 kms on a Sunday morning before breakfast!

The extension of the 3A arrivals project provided a sizeable roof catchment area for rainwater reclaim. At preliminary design, I consulted a land department survey map for the North Island and noted the isoline line reference for Auckland. Using a rainfall duration factor and a return period conversion table which took into account standard error (all thankfully supplied courtesy of the map makers) I arrived at a figure of 126mm based on a 10 min rainfall for a 50 yr storm return. I used this figure to size the internal rain water system for peak flow conditions. To realise the potential for rainwater harvesting, I referenced NIWA (National Institute of Water & Atmospheric Research) records to ascertain potential average monthly rainfalls from 10 years of data collected out at the airport from 1996 to 2005.

Auckland airport 10 yr average Rainfall in mm

<table>
<thead>
<tr>
<th>Month</th>
<th>Average Rainfall</th>
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<tbody>
<tr>
<td>Jan</td>
<td>63.2</td>
</tr>
<tr>
<td>Feb</td>
<td>84.8</td>
</tr>
<tr>
<td>March</td>
<td>79.0</td>
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<tr>
<td>Apr</td>
<td>91.6</td>
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<tr>
<td>May</td>
<td>129.6</td>
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<tr>
<td>June</td>
<td>134.2</td>
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<tr>
<td>July</td>
<td>156.8</td>
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<tr>
<td>Aug</td>
<td>105.6</td>
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<tr>
<td>Sept</td>
<td>110.4</td>
</tr>
<tr>
<td>Oct</td>
<td>92.2</td>
</tr>
<tr>
<td>Nov</td>
<td>95.6</td>
</tr>
<tr>
<td>Dec</td>
<td>94.6</td>
</tr>
</tbody>
</table>

Mean Average 103.1mm / mth

Based on the roof coverage, this amounted to 5950m²/yr… roughly the volume of 2.4 Olympic pools (which is a PH engineer’s favourite SI unit of measurement when offering volumetric comparisons). Given the necessarily limited quality of the run–off (with airborne aviation fuel plus bird fouling due to the coastal location) the decision was made to designate the potential rainwater reclaim for the tank farm.

The initial run-off passed through a ‘First Flush diverter’ system which was suitably sized to discharge dead possums, cicadas and errant plane spotters to the stormwater reticulation, the balance entered three inter-connected roto-moulded poly tanks. A booster set assisted the flow over a distance of 250m+ towards a series of storage tanks known as the ‘tank farm’. These in turn formed the mass storage to supplement two water cooling towers following chemical dosing.

The BMS controlled the stop/start pump runs via level switches.

With reference to the solar system, we included a ‘Sonometer’ to measure the water and energy consumption so the airport could monitor the savings. We choose flat panels over evacuated tubes as Auckland enjoys high sun radiation which bodes well for collector performance. With reference to the solar system, we included a ‘Sonometer’ to measure the water and energy consumption so the airport could monitor the savings. We choose flat panels over evacuated tubes as Auckland enjoys high sun radiation which bodes well for collector performance.

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With reference to the solar system, we included a ‘Sonometer’ to measure the water and energy consumption so the airport could monitor the savings. We choose flat panels over evacuated tubes as Auckland enjoys high sun radiation which bodes well for collector panels but not so well for beach goers.

And finally, to complete the PH package we offered ‘hands free’ 4.5 ltrWC sensor flush valves; sensor activated taps with 1.9 l/min spray aerators and individually activated sensor urinals. I’m rather proud of what we have jointly achieved and I genuinely believe that our city can boast of having one of the cleanest and most water-savvy airports in the world.

Right! Guess I better board the plane. The backpacker’s still fast asleep and no one has bothered to tell him that the aircraft is about to depart – I’d better go and save him.
SoPHE North West and SoPHE Scotland on a joint technical CPD visit to the AO Smith factory in Veldhoven Holland
By Dr S Ingle

An offer was made for a visit to the AO Smith Factory and R&D department in Holland which, after a brief circulation, was accepted by some 20+ engineers from SoPHE North. On the visit it was interesting to see the type of members volunteering which represents the industry today. There were four Ladies who attended and a few assistant engineers joined the group as well, from Senior up to Associate Director representing a broad section of the Public Health Discipline.

After a discussion on the brief and confirmation that it would be a technical event, with the possibility of visiting the R&D section, Mr J Fretwell, Mr R Smith and a very nice and patient lady in AO Smith’s HQ called Natalie got to work co-ordinating the event from the two regions. The dates agreed were the 20 to 22 May 2010 in order to minimise disruption in the various consulting practices and to coincide with availability for the technical staff at the factory in Holland.

After many emails, the two groups of delegates met at 04.00am in Glasgow and Manchester airports and flew to Schiphol airport in Holland where we were met by Mr Luc Van Gemert, Product Manager, who transported us by coach to the factory in Veldhoven.

We were greeted and made most welcome by the Factory Management Team and given a very brief history of AO Smith. From this we learned that, in the past, they had made the chassis for Henry Ford’s Model T, prams, electric motors and many other unusual items.

This was followed by a presentation on direct gas fired water equipment, how it is made, the developments of applying the lining in a uniform coat all over the cylinder from the specialised gyrating machinery, critical viscosity of the lining material and baking technology. We broke for a splendid Dutch buffet lunch with time for a group photo opportunity.

After Lunch we broke up into four groups with management/technical guides for the factory tour. We went from the initial entry to the system of steel plate which was plasma cut and bent welded into shape. In addition we saw how heat exchangers were cut and welded in the same process, all before being welded together and then de-stressed. We were shown how developments had been put in place to aid the coating process in the preparing of the bosses before welding after which followed the full pressure testing phase.

Finally the cylinder was taken into the assembly area and had all the components fitted which included batch quality control, packaging, transporting and record keeping of who did what to each heater/storage vessel up to 3000L capacity. Finally we went into the solar panel area to see and discuss the “drain back” module after which we were taken on to the R&D department. In the R&D department we saw some recent developments and accurate longevity testing of the current equipment, accurate data on the combustion using gases from all the different countries the systems are exported to and allowable flue lengths. We also saw the company’s new developments in the controls for providing accurate feedback.
to the client on the operation of the equipment.

The groups then went back into the classroom for a final session on the reasons for using condensing down firing burners, gaining maximum heat transfer via log mean temperature differences and counter flow heat exchangers. This was followed by an explanation of the advantages and disadvantages of large storage preheat or after heat when incorporating solar heating and the effects of these on the solar fraction and the overall efficiency of the system.

Throughout the day, any question asked was fully answered, even if it was negative to the product.

Everyone was taken back to the hotel for 18.30 and then there was a splendid evening meal in Eindhoven with Joseph and Frank, who had organised the presentation of a Quaich (traditional Scottish drinking cup) and a bottle of single malt whisky. Frank made a presentation to thank Eelco Van Driel, General Sales Manager on behalf of all his team for looking after us.

The following day the group was transferred to the Hotel in Amsterdam followed by a leisurely lunch and a wonderful leisurely boat trip around the canals of Amsterdam. Finally there was a walkabout guided tour around the centre before returning to the hotel for a spruce up and out for an evening meal. Everyone finished the night off relaxing and doing their own thing.

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Saturday morning goodbyes were said to everyone after breakfast and everyone returned to the airport to fly home.

I would like to take this opportunity, on behalf of all the members attending, to thank the Management Teams of both the Holland and UK branches of AO Smith for organising an excellent, intellectually challenging visit that will have enabled engineers to perfect their designs with more confidence.

STOP PRESS

SoPHE Another Year Older

The 7th Anniversary SoPHE annual dinner takes place on Thursday 4th November 2010 at the same venue as last year, The Royal Garden Hotel, Kensington, London, with pre dinner drinks at 5:30pm.

Room rates have been negotiated with the hotel for anyone wishing to stay overnight.

SoPHE will once again make a donation to our adopted charity Water Aid. Please contact Nyree Hughes (nhughes@cibse.org) or Mike Darvill (mike.darvill@roth-uk.com) for further details.
We tend to treat water as an unlimited resource and place little monetary value on it. But when the taps run dry it suddenly becomes very precious.

The UK rarely suffers from water shortages which is why, until recently, metering of domestic water use was rare and water conservation was not given much importance in building regulations.

In 2007 the Environment Agency developed a methodology for identifying and classifying relative levels of water stress in water company areas in England.

The government used this map (Fig 1) to designate areas of significant water stress for the purpose of accelerating water metering.

In July 2009 DEFRA published maps predicting the impact of climate change in 2050 on summer temperatures and summer/winter rainfall across the UK for a variety of emissions and probability scenarios (refer Fig 2). While this is not an exact science the conclusions are not unsurprising – wetter winters and drier summers. The south of England is predicted to have up to 30% less rainfall in the summer. Over the same period the population in these areas is predicted to increase by between 15% and 30% placing more demand on dwindling resources.

The UK is not the first country to face the challenge of water stress in the future. In Australia, it’s not only the future that will be stressed, but also the present, with many parts of Australia having endured over a decade of drought. For such a dry continent it may be surprising to many that Australians are among the biggest users of water in the world, especially around the home.

This article provides an overview of some of the initiatives and approaches that have been used to reduce water consumption in Victoria in the south east of Australia, a state where dam levels are currently at historic lows.

Water consumption in context

For new houses in the UK the design water consumption target for the new Part G is 125 l/p/d with the code for sustainable homes setting tougher design targets of 105 l/p/d (level 3/4) and 80 l/p/d (level 5/6). In 2008/09 the average Londoner consumed 161 litres per person per day (l/p/d) with the UK average at 149 l/p/d.

Fig 1: Map of areas of relative water stress (from consultation on identifying areas of water stress, Environment Agency, 2007)
Figure 3 provides a snapshot of historic daily water use per person in Melbourne. Households account for approximately 60% of the total. Domestic water consumption in 2007 was 164 l/p/d which, while more than the UK, represents a massive reduction compared to the excesses of the eighties.

Over the last 15 years there have been significant shifts in public awareness, behaviour, legislation and technologies related to saving water in Australia. The recent extended drought, and serious concerns about water supply shortages, have increased the urgency to save water. There is still a long way to go.

Water Meters
All mains water use in Victoria is metered. A typical household water bill will contain information on quarterly water use over the previous 12 months and provide benchmarks to allow households to determine if they are water guzzlers or water savers.

Water efficiency - legislation
Dual flush (dual button) toilets were invented in Australia by Caroma in 1981 and were soon made mandatory for all new buildings. In Victoria all new homes must achieve a 5 Star standard which requires a 5 Star energy rating for the building fabric plus water-savings measures, and the installation of either a rain water tank or a solar hot water service.

In 2004, the New South Wales Government introduced its planning assessment tool BASIX to assess the credentials of all residential development, both single and multi-residential. The rating process covers many environmental issues, with minimum requirements for water efficiency and mains water consumption. The developer is required to confirm the water efficiency of all taps, showerheads, WC’s and water consuming devices (e.g. dishwashers) that they install, as well as water saving features such as rainwater harvesting, greywater recycling and/or blackwater treatment for toilet flushing and landscape irrigation and complete a water calculator.

In many ways this is similar to the new Part G requirements in the UK, but the key difference is that the process all occurs on-line.

This provides live reporting to the planning authority on how well developments are scoring against the minimum efficiency requirements, and then allows for annual adjustments to be made to targets to map towards continual improvement and reduced water use.

Water efficiency – incentives
In 2003 the Victorian Government introduced the Water Smart Gardens and Homes Rebate Scheme in January 2003 to encourage households to replace old showerheads (typically 15 to 20 l/min) with water efficient versions (7 to 9l/min), replace old toilets with dual flush versions, install rainwater tanks or greywater systems, and reduce garden irrigation. Since its launch over 228,500 rebates have been claimed, helping Victorians save more than 2.24 billion litres of water each year.

Water Efficiency Labelling Scheme
The Australian Government’s Water Efficiency Labelling and Standards Act 2005 (The WELS Act) provides the legal framework for the WELS Scheme. The WELS water rating label is similar in appearance to the energy rating label and provides a rating of between 0 and 6 stars. In 2006 the WELS label replaced the Water Services Association of Australia’s voluntary water conservation AAA label which started in 1988. A WELS rating must be provided for all showers, taps, toilets, urinals, clothes washing machines and dishwashers, and can be searched on the WELS product database.

Cooling towers
Despite potential legionella risks which have all but eliminated cooling towers in new buildings in the UK, they are widely used in Australia. This is because water cooled chillers are significantly more energy efficient than air cooled chillers, reducing greenhouse emissions. Saving energy therefore leads to increased water consumption – cooling towers can account for 30% of water use in...
commercial buildings and 60% in shopping centres. However, the water does not need to be potable, and recycled water is increasingly used in many green buildings to deliver energy savings without increasing water consumption. The quality of water also influences the cycles of concentration – a measure of how often the water is recirculated in the tower before it needs to be dumped because of high mineral/salt concentrations.

**Rainwater collection**

Many houses in the bush simply collect rainwater from the roof and use it as their main water supply without any water treatment. To reduce the amount of detritus entering the tank there is usually a simple first flush device installed (either above or below ground) and a filter on the inlet into the tank.

Rainwater harvesting is very common in new houses for toilet flushing and irrigation with tank sizes of 2,000 litres as a typical minimum. Whenever a building is able to be connected to a town mains system it is rare for rainwater to be used for potable purposes. The water is considered as recycled water and is filtered and treated (chemical dosing or UV treatment) before being used for toilet flushing. However, on a recent project for CERES Environmental Park, Cundall have designed a new community centre to use rainwater for showers and wash basins and stormwater run-off from the car park for toilet flushing.

**Grey water**

Greywater is waste water from showers, wash hand basins and washing machines. It excludes kitchen waste due to high grease and food waste content. In a household the contaminants in the greywater come from the occupants and provided the greywater is contained within the property boundary and doesn’t pose a public health risk to others, it generally requires no treatment. Grey water recycling occurs with various levels of sophistication. The cheapest option is to buy a plastic diverter valve costing less than £10, connect into the shower/bath/washing machine outlet pipe outside the building and connect this to a hose to irrigate the garden. If the greywater is to be used for toilet flushing it is usually collected in a small tank and then pumped to the toilet cistern (with mains water back-up). The greywater can be stored for up to 24 hours without treatment so these systems have a valve on a timer which dumps any greywater stored in the tank at 3am each morning.

Grey water in multi-residential and commercial buildings requires a high level of treatment not dissimilar to the levels required for blackwater treatment. As the cost of providing dual plumbing to separately collect blackwater (toilets and kitchen) and greywater is usually prohibitive, it is more common to simply collect all of the sewage conventionally in one pipe network and then treat this in a package blackwater treatment plant.

**Blackwater treatment**

A number of green buildings in Australia have package blackwater treatment plant installed with the water treated to potable standard and then used for non-potable uses – primarily toilet flushing, irrigation and cooling tower water. The most common systems use an aerobic process although systems using micro-filters and reverse osmosis have also been used. The recycled water demand in a building with irrigation and cooling towers will typically exceed the amount of blackwater generated in the building. To bridge the shortfall sewer mining has been trialled in a few buildings. This is where water is drawn from a nearby sewer mains and treated to provide more recycled water. There have been challenges due to the variable flows and consistency of the sewage being mined.

**Water restrictions & public awareness**

To make people aware of how critical water supply is, the levels in Melbourne’s water catchment dams are publically available and displayed daily in newspapers. On 9 April 2010 the dams were 34% full (up from a low in 2009 of 27%) – they haven’t been above 40% since 2006 and 60% since 1999. The levels are used by the state government to trigger different levels of water restrictions.

Melbourne has been on Level 3 water restrictions since January 2007 while many other parts of the state have been on level 4 which is the highest. The restrictions on the days (based on house number odd or even) and times (early morning) that gardens can be watered with mains water. Lawns cannot be watered and cars cannot be washed (except at

<table>
<thead>
<tr>
<th>Watering lawns:</th>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
<th>Stage 3a</th>
<th>Stage 4</th>
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</thead>
<tbody>
<tr>
<td>Retention days</td>
<td>Restricted days/rare hours</td>
<td>Restricted days</td>
<td>Drip irrigation only, 2 days/week</td>
<td>All outside watering banned</td>
<td></td>
</tr>
<tr>
<td>Automatic reticulation</td>
<td>Midnight-4am</td>
<td>6-8am &amp; 6-8pm</td>
<td>Midnight-2am &amp; 6-8am</td>
<td>6-8am</td>
<td></td>
</tr>
<tr>
<td>Hose watering/buckets/watering cans:</td>
<td>Any time</td>
<td>2 days/week, 6-8am</td>
<td>2 days/week, 6-8am</td>
<td>6-8am</td>
<td></td>
</tr>
<tr>
<td>Rinsing hard surfaces:</td>
<td>Washed at all times</td>
<td>Washed at all times</td>
<td>Washed at all times</td>
<td>Washed at all times</td>
<td></td>
</tr>
<tr>
<td>Car washing:</td>
<td>Bucket/high pressure cleaner only, hose to rinse only</td>
<td>Bucket/high pressure cleaner only</td>
<td>Bucket/high pressure cleaner only</td>
<td>Bucket only to clean windows, mirrors and lights</td>
<td></td>
</tr>
<tr>
<td>Swimming pools:</td>
<td>No filling without approval*</td>
<td>No filling</td>
<td>Bucket only to clean windows, mirrors and lights</td>
<td>No filling</td>
<td></td>
</tr>
</tbody>
</table>

*No filling without approval
The widely publicised Target 155 campaign (to limit personal water use to 155 litres per person per day) has been effective in raising awareness and making wasting water as anti-social as littering. For example, many people with rainwater / greywater systems now put signs on their gardens saying “tank water in use” to avoid complaints from neighbours if they think the lawn is looking suspiciously well watered! The campaign has been a success with average daily water consumption reducing from 164 litres per person to 149 litres per person, a saving of 10% (refer fig 4).

There is still plenty more that can be done - a target of 100 l/p/d should be achievable if there was sufficient incentive. However the usual response when it gets tough is to build an energy intensive desalination plant - both London and Melbourne are guilty of this.

Water in green building rating tools

WinDes® Software for SUDS Design

‘SUDS Law’ - Legislation/Guidance
Starting at the highest level the EUWFD (Water Framework Directive) is an historic document that encompasses both ground and surface water throughout Europe.

The directive identifies concerns regarding diffuse pollution, SUDS systems such as permeable pavements provide an invaluable element in the SUDS treatment train to help reduce pollutant runoff in urbanised areas (as covered in Brian D’Arcy’s article in Pave-It November 2005).

At governmental level SUDS are being encouraged through a range of processes;


In the PPS25 consultation document Annex F includes a section on SUDS that highlights the need to mimic the undeveloped surface water condition. Developers need to ensure that volumes and peak flow rates of surface water leaving a developed site are no greater than the pre-development or greenfield rates.

As a part of a risk-based planning approach it is also important to consider the impact of extreme rainfall events and future climate change. cont...
PPS25 refers to guidance produced by the National SUDS Working Group. The Interim Code of Practice for SUDS was published in July 2004 and provides support for developers in promoting and implementing SUDS.

The IcP includes a procedure for rainfall runoff management from new developments that includes 3 key objectives;
• stormwater discharge from urban developments to replicate or achieve a reduction from the greenfield response of the site over a range of storm probabilities (return periods)
• to manage runoff on site for extreme events
• to reduce pollution in receiving waters

The building regulations give priority to infiltration systems, where possible, for the disposal of surface water.

The latest SFA edition, implemented from 1st May 2006, includes a clause on SUDS that refers developers to the Interim Code of Practice for SUDS and CIRIA guidance.

CIRIA C582, Source Control using constructed pervious surfaces (2002)
In trying to comply with the legislative requirements regarding management of stormwater in increasingly dense urbanised areas can be quite onerous.

However the use of pervious pavements provide a number of advantages;
• lower peak flows to watercourses
• lessen the effects of pollution in runoff
• they can be used in confined urban situations
• pervious systems respond to rainfall more slowly than impermeable surfaces and provide an attenuation effect
• certain porous surfaces provide absorption and can retain rainfall for subsequent evaporation/ transpiration
• the time frame for discharge can be of the order of 2 or 3 days
• pervious surfaces limit the concentration of pollutants in surface water runoff by immediate, localised interception

Pervious surfaces and their underlying structures provide mechanisms that encourage filtration, sedimentation, adsorption, chemical biological treatment and storage. Pervious systems are relatively shallow structures and the outflow can be controlled into subsequent SUDS structures to provide a SUDS treatment train.

CIRIA C609, Sustainable drainage systems (2004)
This publication covers hydraulic, structural and water quality advice. The guide is split into 2 parts, Part 1 includes chapters covering stormwater pollution, rainfall & runoff. Part 2 includes technical data for a variety of SUDS techniques, the chapter on Pervious pavements summarises the design information provided in CIRIA C582.

All the evidence to date has demonstrated that pervious surfaces provide an improvement in water quality.

Within chapter 3 there is a section on changes in runoff, developments that contain significant areas of impermeable surfaces may increase the flood hazard in other areas by increasing the rate and volume of runoff.

The impact of development on the runoff regime is summarised as (Environment Agency, 1999 “Development and Flood Risk: Internal guidance on Planning Application Responses”, unpublished);
• increased runoff from reduced-permeability surfaces
• decreased baseflow because of reduced recharge of groundwater
• decreased times to peak, changing the timing of runoff from the catchment and making the catchment more sensitive to short duration storms
• changes in critical season – rural catchments tend to flood after long winter storms while urban sites tend to be more at risk from short, heavy, summer storms

The problem of flood risk being increased by changes in runoff patterns caused by development is increasingly recognised as a major issue. The use of Sustainable Drainage Systems (SUDS) is widely promoted as a means of reducing and attenuating runoff from developments and, used appropriately, can be an important part of development drainage design (Martin et al, 2001, SUDS best practice manual C523).
SoPHE Autumn 2010

CIRIA C635 Designing for exceedance in urban drainage (2006)
This good practice guide includes a table summarising drainage design and performance standards for all stakeholders. A generic analysis of the inlet capacity of various SUDS systems was undertaken, in which results illustrated that pavements constructed as pervious pavements throughout did not generate any exceedance flow or volume, even for the 200 year return period events. Only where additional impermeable paving was added did major system flow generate.

Therefore pervious pavements can be seen to provide benefits to both the upstream and downstream conditions;
- upstream – pervious pavements capture the rainfall at source and, designed properly, can accept relatively extreme rainfall events into the structure.
- downstream – pervious pavements provide storage, attenuation and infiltration (in appropriate soils) that can more closely replicate the existing runoff regime.

Code for Sustainable Homes (2008)
All new homes are required to have a Code rating in the HIP since May 2008 and the Government strategy is for all new homes to be Zero Carbon by 2016.

The Code has six ‘star’ ratings with one star being the lowest and six stars being zero carbon homes.

The BRE has generally followed the requirements of the Interim Code of Practice Guidance but added the requirement for Climate Change in accordance with PPS 25 – this part is Mandatory.

CIRIA C644 BUILDING GREENer
Building green roofs has become a popular choice, particularly in densely populated inner cities. This publication includes a range of case studies from North America and Europe.

Micro Drainage has supported and utilised the results of research carried out by Sheffield University. A new green roof algorithm to calculate the time area diagram has been included in the latest WinDes, version W.11.4, released in March 2009.

Draft Flood and Water Management Bill
The government’s response to the EU Floods Directive, the Pitt Report and Defra’s Future Water consultation is a draft Flood and Water management Bill.

This will clarify and legislate to overcome the issues of maintenance and adoption of SUDS.

This is your chance to positively influence SUDS, so download a copy of the draft bill and feedback through;


Drainage software to design a sustainable drainage system
At first glance, to satisfy all the above legislation and stakeholders appears to be very onerous.

The benefit of using industry standard drainage design software to not only design permeable paving but to be able to incorporate SUDS structures within the overall drainage network means that the whole drainage system can be modelled and tested to satisfy all criteria and all parties.

A Systematic Approach to the drainage design can be applied to cover all requirements;
- Check for the 1, Qbar, 30 and 100 year pre-development/greenfield runoff.
- Check the pre-development/greenfield runoff volume for the 360 min storm duration, 1 in 100 year return period.
- Design the conveyance drainage to provide capacity for the 1, 2 or 5 year return period.
- Incorporate storage/infiltration to ensure no surface flooding for the 1 in 30 year return period.
- Control the offsite discharges to the 1, 30 and 100 year pre-development/greenfield runoff.
- Check the difference in runoff volume between pre & post-development for the 360 min storm duration, 1 in 100 year return period.
- Control/convey the difference in volume balance into long term storage, ideally through infiltration, and release at a controlled rate of 2 l/s/ha back into the network.
- Check the post-development discharges and system performance for the 1, 30 and 100 year return periods.
- Check for climate change, 100 year +10% (to 2080), 100 year +15% (to 2110).
- Control the overland flow to ensure property is not inundated and the flow stays in long term storage within the confines of the new develop-
A detailed paper covering a Comprehensive and Systematic Design Approach was presented at the 3rd National Conference on SUDS, Coventry University, 2005 (A. Millerick).

Through the use of drainage design software engineers now have the ability to segment a development and design storage/SUDS structures for the sub-catchments prior to testing. This enables the development’s upstream and downstream runoff regime to be analysed before incorporating into the drainage model.

The engineer can highlight the critical storm durations for each structure and illustrate the effect of one upon the other, providing clarification and a better appreciation of how the whole catchment will interact under a variety of storm events.

The critical storms for each sub-catchment can then be assessed and the extreme events resulting in exceedance can then be controlled.

In summary, there has been a rapid growth in the production of legislation and guidance to satisfy the various requirements of all the stakeholders involved with drainage on new developments.

Developers need to assess the impact of the new development upon the existing hydrology and test the robustness of their drainage design for extreme events and climate change.

Permeable pavements can assist developers comply with the need to minimise the impact of hardstanding areas within high density developments in terms of mimicking the pre-development runoff regime as well as aiding water quality.

The benefits of using industry standard drainage design software are:

- the complete drainage network can be designed and modelled
- impact of the new development upon the existing hydrology can be assessed
- the new drainage network can be tested to exceedance
- effects of climate change scenarios can be checked
- the requirements of all stakeholders can be provided through a systematic approach, without losing productivity
- up to date software provides compliance with current standards
- access to training courses that keep delegates up to date and develop the skills needed to address the critical issues confronting today’s engineers

In conclusion, compliance with all stakeholder requirements can be achieved through a systematic design approach, the use of proven SUDS techniques, fully trained staff and the latest industry standard software. Micro Drainage provide the industry-standard WinDes software, a range of six training courses and regular workshops – details can be viewed at www.microdrainage.co.uk or please feel free to call on 01635 582555.

Peter Coombs
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Micro Drainage Limited

Peter Coombs is a Chartered Water and Environmental Manager on the management team at Micro Drainage Limited.

Peter has over 30 years civil engineering experience in the UK/Middle East and specialises in drainage and particularly SUDS
Following a successful inaugural event held on 9th February 2010, CIBSE were delighted to announce the launch of SoPHE (the Society of Public Health Engineers) in Scotland. Almost 60 delegates attended the Edinburgh-based event, which Ernie Fisher and Darren Crane of Polypipe Terrain provided an interesting and informative CPD presentation on the need for, and the design and implementation of, rainwater harvesting systems.

The presentation itself provided an in depth insight, covering the required design inputs, design information and design outputs that are required into selecting the appropriate rainwater harvesting system. The Q&A session also brought up some interesting discussion into its application, in particular within healthcare establishments, the water regulations, as well as the associated water treatment regimes required. The discussion continued well afterwards whilst the fantastic buffet was served. SoPHE Scotland would like to thank Polypipe Terrain who fully sponsored the successful technical meeting.

The event was run in conjunction with CIBSE Scotland, who’s Chairman, Stuart MacPherson, hosted the evening. At least three SoPHE events will be held each year in Scotland, with the second planned for late May in Glasgow. The SoPHE Scotland organising committee comprises of Paul Angus of WSP, Joe Hendry of Buro Happold and Lynne Jack of Heriot-Watt University; contact details are shown below.

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SoPHE North West Update
By Paul Angus

Looking back over the last few months SoPHE North West has held some interesting and highly successful technical meetings in Manchester. Thanks to Jon Ashby (Barr & Wray) who provided a very informative presentation on modern day design in vitality swimming pools and water features in July, which was well attended and led to some interesting discussions afterwards. William Butler (Homesafe Group) was on hand in September providing a fascinating insight into residential and domestic fire sprinklers. William provided a very well received presentation, which identified some key design guidance and factors to consider for all those who attended. SoPHE NW would especially like to thank the various manufacturers who have sponsored previous and future meetings and in particular everyone who has contributed and attended these meetings, without which, the meetings would not be such a resounding success.

There have been considerable changes within the North West region recently. Malcolm Atherton, (matherton@dssr.co.uk) a long standing attendee of the original SoPHE meetings from when it all began in 2004 has become the new North West secretary. Malcolm replaces Paul Angus, who has recently transferred to Edinburgh with the same company. For further details on future SoPHE NW events please contact Malcolm Atherton, SoPHE NW Secretary, matherton@dssr.co.uk

In addition, Paul Angus, along with Dr Lynne Jack and Joe Hendry recently met to discuss the possibilities of bringing SoPHE to Scotland. I’m glad to report that a new era has begun on the 26th January 2010 in Edinburgh with the topic of Water Conservation Measures, future dates and topics are currently being arranged. For more details of SoPHE Scotland please contact Lynne Jack or Paul Angus (paul.angus@wspgroup.com).

The SoPHE technical meetings provides a unique networking opportunity for delegates to learn about the latest developments in the public health sector, share best practice and an excellent opportunity to debate with manufacturers on new and exciting innovative techniques being introduced within the UK.

The Schedule for proposed SoPHE North West evenings can be found on page 24 within the ‘Forthcoming Technical Events’ section.
It is already well known that considerable energy savings can be achieved by decentralising domestic hot water supply from the main boiler function and installing direct fired storage water heaters close to the point of use. As well as minimising distribution heat losses, a water heater is an economical alternative for heating only water during the summer months.

However, with the introduction of renewable technology, users can harness the energy of the sun by using solar thermal panels for hot water production. Technical innovation has improved performance and life expectancy, and solar water heating has become standard in areas with an abundance of solar power such as the Mediterranean.

But solar thermal can be utilised just as effectively in less temperate climates. Water heating experts at A.O. Smith have been at the forefront of developing a unique solution for solar water heating, overcoming many of the problems associated with traditional solar systems.

Modern solar water heating systems generally consist of solar thermal collectors, a water storage tank and transfer fluid to move the heat from the collector to the tank. However, the main problem with most solar systems is that they can’t be turned off! This is a major headache for many commercial installations with sporadic use such as sports facilities, or schools which are closed in summer time.

To prevent the heat transfer fluid from overheating, many systems using glycol to prevent stagnation temperatures. However, if the system becomes severely overheated the glycol starts to break down, becoming acidic and attacking seals and system components.

In a bid to dump some of the excess heat from the solar collectors, some systems cope by having an oversized water storage tank. This can work out expensive to install, and obviously takes up more space. Plus a pump will have to be used to disperse the heat, which isn’t very energy efficient. Alternatively, specifiers undersize the number of solar collector panels, so that they are not generating as much heat. But equally they are not taking advantage of the maximum free solar energy available from the sun.

The solution pioneered by A.O. Smith uses drain-back to overcome these issues. With drain-back, the heat transfer fluid in the collector is not pressurised. When the pump is switched off, the heat transfer fluid drains back into a compact reservoir at the base of the collector. With the collector empty, it cannot be damaged by overheating or freezing.

The advantages of the A.O. Smith system are straightforward: users can have more solar panels to take advantage of free energy from the sun, without needing an oversized water storage tank.

Rather than supplying system components, A.O. Smith provides a complete system solution incorporating three elements: solar, storage tank/heater and the most vital part – an intelligent controller. Control is key to the energy efficiency of any system, and it’s essential that there is communication between water heating and storage to maximise the use of solar energy.

An intelligent controller should be fully programmable, and ensure the solar collectors and back up water heater communicate with one another. The controller in A.O. Smith’s system senses temperature differences between water leaving the solar collector and the storage tank, and monitors solar contribution. That way it can modulate the pump down to 15% capacity to decrease water flow and increase solar gain if required.

For commercial installations such as sports clubs, the intelligent
controller can be programmed to meet demand. When there is no hot water requirement, drain-back means the system remains dormant without the need for circulating excess hot water to oversized storage tanks.

With a history of creating commercial and industrial water heating solutions, A.O. Smith has used their technical knowledge and expertise to provide a cost effective and energy efficient approach to solar thermal. Faced with further increases in the price of fossil fuels and a need to decrease carbon emissions, solar thermal is a logical way to provide low cost domestic hot water in a wide range of commercial and industrial projects.

Obituary

Stanley Jennings

‘STAN’

2nd June 1917 - 27th December 2009
In response to the Pitt commission, which investigated the UK flooding in 2007, the Government is proposing the introduction of new legislation to reduce the risk of flooding. The Flood and Water Management Bill 2010 also, in light of current knowledge regarding global warming, introduces greater powers for the water companies to manage their water supplies. The Bill is currently on its third reading in Parliament and is set to become law later this year.

It is an important piece of proposed legislation which will have the following impacts:

**Surface Water Drainage**

Due to the lack of cohesion in the design of and responsibility for the ownership and management of sustainable drainage systems, plus the existing automatic right to connect to the surface water sewer, most new developments have relied on conventional means of disposal of surface water, rather than on more sustainable methods.

The aim of the Bill is to encourage the implementation of sustainable drainage systems, and closer dialogue between the developer, designer and approval body to minimise the potential impact of surface water flooding. The main points of the Bill are:

(a) To introduce the concept of sustainable drainage in to law and provides the legal definition for sustainable drainage, which is “…managing rainwater (including snow and other precipitation) with the aim of-

   a. Reducing damage from flooding,
   b. Improving water quality, 
   c. Protecting and improving the environment, 
   d. Protecting health and safety, and
   e. Ensuring the stability and durability of drainage systems.

(b) Make provision for the introduction of national standards for the implementation of sustainable drainage in respect to their design, construction, maintenance and operation. These standards will only be issued following consultation and it is not know, at this stage, to what part CIRIA 697 “The Suds Manual” will play.

(c) It introduces the requirement for the approval of sustainable drainage systems, by an approving body, prior to start of construction.

In respect to this:

The approving body will be the unitary authority for the area in which the construction is to occur; it can be the county, district or borough council. Approval will not be required for works consented under section 38 of the Planning Act 2008 (nationally significant infrastructure projects).

The term construction is defined as any works in connection with the creation of a building or other structure or works that affect the ability of the land to absorb water.

The approving body has the duty to consult the water authority but no obligation to take the water company’s views in to account when considering an application. The Bill requires that the water company must accept the connection of an approved sustainable drainage system to their sewers; this would appear to suggest that this regardless of whether or not the sewer has the capacity to take the new flow. As it stands at the moment, the water companies are concerned as the Bill does not categorically state that a connection from a sustainable drainage system must be to a surface water sewer; the Bill relies on the definitions in The Water Industries Act 1991, in particular section 219(1) which is deemed ambiguous, as it could imply connections to foul sewers is acceptable.

(d) It introduces the potential for the approving body to apply a non-performance bond, to be not greater than the cost of the drainage system and fully refunded on satisfactory completion of the works. The purpose behind the bond, should a drainage system be found to be unsatisfactory, is to ensure that any costs incurred in bringing the system up to standard are met by the developer, rather than the owner or local tax payer.

(e) It amends section 106 of the Water Industry Act 1991 by introducing a new section 106A which removes the automatic right to connect to a surface water sewer; only systems that have been approved by the approving body will be allowed to connect to the sewer (see above).

(f) It requires that the approving body must adopt an approved drainage system, except where the system serves a single property or a public highway, and that the approving body becomes responsible for the maintenance of the system, in line with the proposed new national standards.

**Water Management**

Currently, the water companies are only able to restrict water usage by the implementation of hose pipe bans and the use of drought orders to manage their water supplies.

The Bill introduces wider controls for the water companies to restrict non essential water usage such as pressure washing patios and filling swimming pools.

The proposed legislation still specifies the ban on hose pipes but introduces powers to enable additional uses to be included. The prohibitions must be advertised, stating the date the prohibition takes effect and the area that is affected. In addition, the customer must be financially compensated, i.e. a reasonable reduction in the amount that the customer is charged, for the time their water supply is affected.

It is hoped that the additional powers will enable the water companies to take action earlier during a drought period, thus reducing the seriousness of a drought.
This year’s competition was concerned with the conservation of energy within buildings Public Health Systems.

The competition was open to individuals or teams of up to 3 people, their remit was to propose an innovative idea that could potentially be adopted to conserve energy consumed by the operation of the Public Health systems. The brief asked the teams to consider an appropriate development as an example within which their ideas could be used and compare this with a typical approach. They were also required to demonstrate the predicted energy savings and provide a whole life cost analysis.

The team from Arup Bristol who were Liam Pole, Yewande Akinola and Grzegorz Jaroszewicz were this year’s competition winners. Their presentation was the adaption of current technologies to develop a flushing tank for use in flushing wc’s, which incorporated a passive rain water harvesting system. The proposal made use of the roof to store the rainwater and therefore removed the need for underground tanks and pumping. A system of controls ensured a minimum use of fresh mains water and ensured that the use of rainwater was maximised.

The prize giving took place at the Building Centre in Store Street, prior to CPV’s technical presentation. The evening’s event commenced with last year’s winners, who also happen to be from Bristol (must be something in the water). They gave a presentation of their winning entry on water conservation, which was concluded with a slide show of their prize which was a trip to Las Vegas and the Hoover Dam. The presentation was well received and we would like to thank the Sirens for making the journey from Bristol for the event. This year’s winner received their certificates and a trip to Hong Kong, during their stay they will have the opportunity to meet up with members from CIBSE Hong Kong.

Runner up was Martin Bryan whose presentation was concerned with the conservation of energy by reducing the design temperature within the domestic hot water circulating system. Martin’s submission was Highly Commended. Martin unfortunately was unable to attend the evening but receives a prize for his entry, which is a motor car racing experience.
The Sixth Annual Society of Public Health Engineers Dinner Guest Speaker Professor Rodney Cartwright read the following quote from the Local Government Board’s Report on Cholera in England in 1893:

The Grimsby sewage is ultimately discharged by means of two outfalls, under circumstances which admit of its being washed back over oyster, mussel, and cockle beds. To this disposal of the sewage in connection with the cultivation in of shell fish, and its possible relation to the diffusion of cholera.

He emphasised that this was a stark reminder of the necessity for good public health engineering. Cholera and typhoid fever in Britain were not brought under control by the medical profession but by Public Health engineers. How many visitors to London realise that as they walk along the Embankment that they are above one of the great sewers designed and built by Sir Joseph Bazalgette whose works laid the foundation for the health of London.

The need for a thorough understanding of the importance of Public Health engineering both on a large and small scale as a basis for good health is as real today as it was in the 19th Century. The WHO report in 2008 “Safer Water, Better Health” states that “Almost one tenth of the global disease burden could be prevented by improving water supply, sanitation hygiene and management of water resources.”

A good Public Health infrastructure in communities throughout the world is essential and is something for which he has strived throughout his professional life. He stresses that the medical and Public Health engineering professions are closely intertwined and he developed a reputation for being a medical doctor who did not carry a stethoscope but was more at home with an adjustable spanner and a large screwdriver. When looking for sources of infection a stethoscope is of little use in raising a man hole cover or examining the pipework in a hotel basement. Public Health engineers are needed for large works but also for designing water systems that do not harbour legionella bacteria.

He emphasised the importance and receive proper training for both medical doctors and public engineers. He looked forward to the development of training courses at University level that equip the Public Health professionals of the future of all back grounds to tackle the problems that the microbes will present. University departments should not only teach but be at the forefront of research into the challenges of Public Health engineering.

Infections are not a thing of the past and we forget them at our peril.
Photos from the 2009 Dinner

Professor Rodney Cartwright delivering his after dinner speech at the SoPHE annual dinner.

The Revamped Kensington Garden Hotel plays host to the SoPHE annual dinner.

SoPHE fellows reminisce. Left to right. Arthur Churchyard, Bill Bumstead & Jim Buckmaster.

Left to right: Mike Simpson (CIBSE President), Martin Shouler & Rodney Cartwright.

Martin Shouler, SoPHE Chairman (left) awards Geoffrey Marsh (right) with the SoPHE Honorary Fellow Award.
Marley Plumbing and Drainage - Sustainable management of rainwater

Over the last decade unprecedented changes in weather patterns have caused a high level of disruption to flood control and drainage systems, which have proved unable to cope with the significant increase in storm water run off. Although climate change can be attributed towards a number of factors, an intense rise in urbanisation has also played a key role in increasing flood risk throughout the United Kingdom.

In fact, it is said that around 5.2 million properties in England alone remain at risk of flooding - 3.8 million of which are at risk of surface water flooding, predominantly due to the replacement of the natural landscape by building developments, leading to limited natural drainage and infiltration space.

As areas become more ‘built up’ there are less permeable surfaces left for drainage. Two thirds of the severe flooding the country faced in 2007, which affected 55,000 people around the country, was caused by surface water flooding, due to stormwater drains being overloaded. Surface water run-off is also often diverted to pipelines, reducing groundwater levels. This, coupled with increasingly volatile weather conditions, means existing drainage systems are becoming overloaded.

In November 2009, the Government announced new plans under provisions in the Flood and Water Management Bill to give local authorities new roles and responsibilities to manage surface water flooding, to help better protect the public. The legislation requires all new developments to use sustainable measures first and only then connect to the sewer if necessary. This is in addition to Category Four of the Code (surface water run off) already stating that all housing developments should be designed to protect watercourses and reduce the risk of localised flooding, pollution and other environmental damage.

The Bill is now an Act, and contains another major change to the way stormwater is dealt with, the requirement that Unitary and County Councils will now be responsible for stormwater management. This will involve the Authorities producing a SWMP (Stormwater management plan). They will look at existing catchment areas and analysing how stormwater is managed now. This is not an easy task, as it will mean data will need to be collected from many different stakeholders, from individual building owners to The Environment Agency.

The Act should act as a clarifying document, as there is no clear guidance on how SUDS should be dealt with in a development such as a school and who is responsible for the ongoing management of the scheme. It is hoped also that DEFRA will produce guidance akin to the Building Regulations as to how to interpret the Act avoiding any regional or authority differences.
Sustainable drainage systems provide several benefits over conventional methods: reducing peak flows to watercourse and sewers, reducing flood risk downstream; helping to improve water quality by reducing some of the levels of silts and pollutants; reducing the potable water demand through rainwater harvesting as well as replicating natural drainage patterns, i.e. the recharge of groundwater.

Above ground SUDS schemes (in particular ponds) can be an attractive and environmentally enhancing feature of any development. However the space for a pond is not always available and in such cases below ground solutions come into their own. The design of modular geo-cellular units offer great versatility, being lightweight yet exceptionally strong.

Rainwater harvesting systems can also play a useful part in the management of rainwater, and can be particularly successful for schools, care homes etc, where water usage (particularly for toilets) is heavy. Larger commercial systems are normally designed specifically for each building, as it will depend on the space available for the tank and the plant room requirements for pumps and control systems.

New SUDS cell from Marley with smaller carbon footprint

Marley Plumbing and Drainage has upgraded its Waterloc modular cell with Waterloc250, a new, improved version of the cell used for underground SUDS solutions.

Waterloc250 offers a sustainable and effective method of dealing with stormwater run-off. 95% of the cell volume is available to store water, minimising the plan area or depth needed for the installation, whether the application is infiltration or attenuation. The innovative design of Waterloc250 allows for quick installation in layers, producing a secure tank, which can be configured to suit the area available.

The lightweight modular cells are easy to handle with integral lifting bars, yet are high strength with a maximum vertical load of 35 tonnes. The range includes connectors for 110mm, 160mm 225mm & 300mm pipes. For transport and storage, the cells can be nested, resulting in significant transportation savings, plus an associated reduction in carbon emissions and the amount of packaging needed.

The system is versatile and ideal for either infiltration or attenuation purposes. Infiltration (soakaway) is the temporary storage of water to allow it to naturally soak away into the ground. Attenuation can be used where soakaway is not viable and consists of a chamber below ground, where stormwater is stored temporarily before being slowly released in a controlled discharge to a surface water or combined drain or watercourse - preventing overloading. A flow control device, such as the Marley Flowloc is often used in such circumstances.

“This new Waterloc250 product can be an integral part of a SUDS solution which contributes to achieving The Code for Sustainable Homes, the recommendations from the Pitt Report or the proposed changes to Part G of the Building Regulations,” explains Fiona Bashford, Marketing Manager at Marley.

Marley will also shortly be re-launching their range of rainwater harvesting solutions using the new Waterloc250 cell.
PREVIOUS TECHNICAL EVENTS (2003-2010)

1. TYCO/WORMALD FIRE SYSTEMS. Life and building fire protection
   Contact: www.wormald.co.uk

2. MARLEY PLUMBING. Sanitation sizing to BS12056, Part 2.
   Contact: www.marleyplumbinganddrainage.com

3. HYDROTEC UK LTD. Technical overview of physical water conditioners and ultra violet disinfection.
   Contact: www.hydrotec.co.uk

4. A O SMITH (WATER PRODUCTS Co). Assessing, sizing of direct and storage type hot water heaters for commercial/industrial applications, giving consideration to latest building regulations.
   Contact: www.hotwater.com

5. VERNAGENE. Chlorine dioxide, Disinfection. Understanding the principles of dosing with consideration to health and safety aspects.
   Contact: www.vernagene.com

6. NEW HADEN PUMPS. The design and sizing of both foul and surface water pump sump chambers and stations.
   Contact: SouthEast@NHPumps.com

7. ALLAN AQUA LTD. Design principles for boosted cold water and fire services relating specifically to high rise buildings.
   Contact: www.allanaqua.co.uk

8. THAMES WATER PLC. Discussions on items within the Regulations which required clarification.
   Contact: www.thames-water.com


10. KSB LTD. Grey Water Re-cycling for various types of buildings. General overview on the design principles with advantages and disadvantages on the possible options for re-using water.

11. BRE. Control of Legionella Bacteria in water systems.

12. SPEL Products. An introduction to surface water/Foul water Purceptors, Stormceptors, both full retention and by-pass types. Sizing, Alarms, Regulations and update on the latest Rivers Authority Requirement etc

13. EVAC. Design principles for vacuum drainage systems.

14. GRINEL. Designing Sprinkler Mist systems

15. GEBERIT. Design principles of syphonic rainwater systems

16. HONEYWELL. Applications of Thermostatic Mixing Valves. TM2 and TM3 valves

17. NEW HADEN PUMPS. Over pumping into surcharged sewers

18. GRUNDFOS. The principles of borehole pumping and pump sizing. www.grundfos.co.uk

19. MICRO DRAINAGE. Suds attenuation modelling through the use of Micro Drainage computer software.

20. CONDER. Sizing principles of small sewage treatment works. www.conderproducts.com

21. POLYPIPE. Engineering solutions in relation to SUDS. www.polypipe.com

22. ENVIRONMENTAL SUSTAINABLE SOLUTIONS. Storm water control.

23. HOME ENGINEERING. Design principles associated with the selection of TMV valves.

24. CLEARWATER TECHNOLOGY. Chlorine Dioxide built in line with ACOP L8 & HTM 04

25. HUGHES. Review of standards associated with safety showers and wash basins in Hospital and lab buildings.

26. MIRA. Control of legionella bacteria in water systems

27. BRIAN WHORLOW. Design risk assessment and evaluation of the principles associated with rainwater designs.

28. Keynote speech by Prof John Swaffield

29. GRUNDFOS. Commercial building services pumping solutions

30. Design concepts associated with rainwater attenuation sizing, including oil separation.

31. ACO. Drainage systems for hygienic and corrosion resistant applications.

32. Review of the design principles associated with mist & fog fire suppression systems, including the requirements of FM 200.

33. BLUCHER UK LTD. Review of technical properties associated with stainless steel pipelines and drainage products as used within Public Health Services.

34. AO Smith. Solar hot water solutions.

35. HORNE VALVES. A review of the design principles and standards associated with valves incorporated into Hospital piped systems.

36. BARR &WRAY. Modern day design in vitality swimming pools and water features

37. KEMPER. The causes of Legionella and keeping it under control including key note speech from Dr Tom Makin.

38. Key note speech from Robert Burgon, Chairman of the World Plumbing Council
FORTHCOMING TECHNICAL EVENTS

Full details of events will be advised to members of the Region / Branch prior to each meeting. Members may contact the Secretary for details.

Society of Public Health Engineers (SoPHE) - London and South West Region Forthcoming Events

2011

Two technical evenings are currently being reviewed for 2011:

District Heating - The use of heat boards, central thermal storage and integration of renewable energy sources - design guidance

Guidance on sanitaryware selection for water conservation, BREEAM and Code for Sustainable Homes Compliance.

Dates and Venue will be confirmed in the near future for the above seminars and notice will be sent to members.

If you have any requests or suggestions for future technical evenings for the London and South West SoPHE region Please contact:

Steve Vaughan
Email: steve.vaughan@aecom

or

Alan Neall
Email: ANeall@geneverandpartners.co.uk

Society of Public Health Engineers (SoPHE) - North West Region Forthcoming Events

All technical sessions are held at: The Rain Bar, Board Room (2nd Floor) 80 Great Bridgewater Street, Manchester. M1 5JG 6pm (for 6.30pm start) to 8pm approx.

2010

Full details of each event will be advised to members of the North West region and SoPHE members prior to each meeting.

17 November Wednesday
Energy Efficiency Opportunities from Zip Heaters
Presented by:- Adrian Hibbert (Zip Heaters UK Ltd)

2011

20 January Wednesday
Thermostatic Control Technology
Presented by:- Bill Smith (Horne Engineering)

16 March Wednesday
Innovative Thermoplastic Building Service Systems
Presented by:- David Dickson & Eric Martin (GIRPI)

18 May Wednesday
Automatic thermostatic balancing, system pasteurisation and legionella control of DHW secondary circulation systems
Presented by:- Chris Doherty & Sean Jackson (Oventrop)

NW Secretary: Malcolm Atherton
DSSR
Email: m.atherton@dssr.co.uk

Society of Public Health Engineers (SoPHE) - North West Region Forthcoming Events

2011

3-4 events are being organised. For further details please either contact Paul Angus, Joe Hendry or Lynne Jack
NEW MEMBERS

Associates:
Richard Beattie (transfer from Student)
Richard Smith
David Sorisi (transfer from Student)

Associate Members:
Clive Andrews
Philip Henry
Matthew Hobson
Krzysztof Wojciak

Honorary Fellow:
Geoffrey Marsh

Fellow:
Les Wilson

Student members:
David Hattam
Ryan Fitzgerald

Members:
Malcolm Atherton
John Bailey
Stephen Bourne
Terry Fallows
Alison Franklin
Tony Guest
Nicholas Moore
Daniel Waley
Colin Winant

USEFUL WEBSITES AND EMAILS

The Chartered Institution of Building Services Engineers
www.cibse.org

Society of Public Health Engineers
www.cibse.org/sophe

Technical Group:
Alan Neall – aneall@geneverandpartners.co.uk

Membership Group:
Martin Shouler – martin.shouler@arup.com

Communication Group:
Jonathan Gaunt- jonathan.gaunt@arup.com
Chris Northey- chris.northey@bdsp.com

Education Group:
Ian Fellingham – ian.fellingham@googlemail.com

SoPHE Industrial Group:
Mike Darville (Chairman) – mike.darvill@roth-uk.com
Underground sustainable drainage solutions from Marley. The new Waterloc250 geocellular unit is ideal for attenuation, infiltration or reuse of stormwater.

- Unique nesting ability of cells reduces storage on site and transportation costs
- Layers are quickly assembled by rotating alternate cells 180°
- Modular nature allows for maximum flexibility where space is restricted
- Exceptional vertical and lateral loading capability

For further information on how Waterloc250 can benefit you call 01622 858888 or visit marley.
THE STEERING COMMITTEE

Chairman:  Chris Northey  
  chris.northey@bdsp.com

Vice Chairman:  Ian Fellingham  
  ianfellingham@googlemail.com

Honorary Secretary:  David Shaw  
  dshaw@geneverandpartners.co.uk

Honorary Treasurer:  Martin Shouler  
  martin.shouler@arup.com

Steering Committee

Jim Buckmaster  
Bill Bumstead  
Alan Neall  
Jonathan Gaunt  
Steve Vaughan  
Simon Hedger  
Iain Johnstone  
Allan Homewood  
Mike Jones  
Mike Darvill  
Alan Flight  
Steve Ingle  
Ashveen Jeetsun  
Maria, Delia Marginean  
Geoff Chubb  
Kris Wojciech

Regional Committee Contacts

Manchester:  
Malcolm Atherton  
m.atherton@dssr.co.uk

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David George  
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Lynne Jack  
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Feedback

We would welcome any comments on this newsletter or contributions to future editions, in particular with regards to:

Future events for consideration  
What should SoPHE be providing to our members  
Items or comments you think may be worth raising or informing your fellow members  
Technical articles from members, giving situations encountered and how they were overcome.

Please email comments to Jonathan Gaunt at jonathan.gaunt@arup.com