

Utilities

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ESSENTIAL INSIGHTS FOR MIDDLE EAST WATER, GAS AND ELECTRICITY



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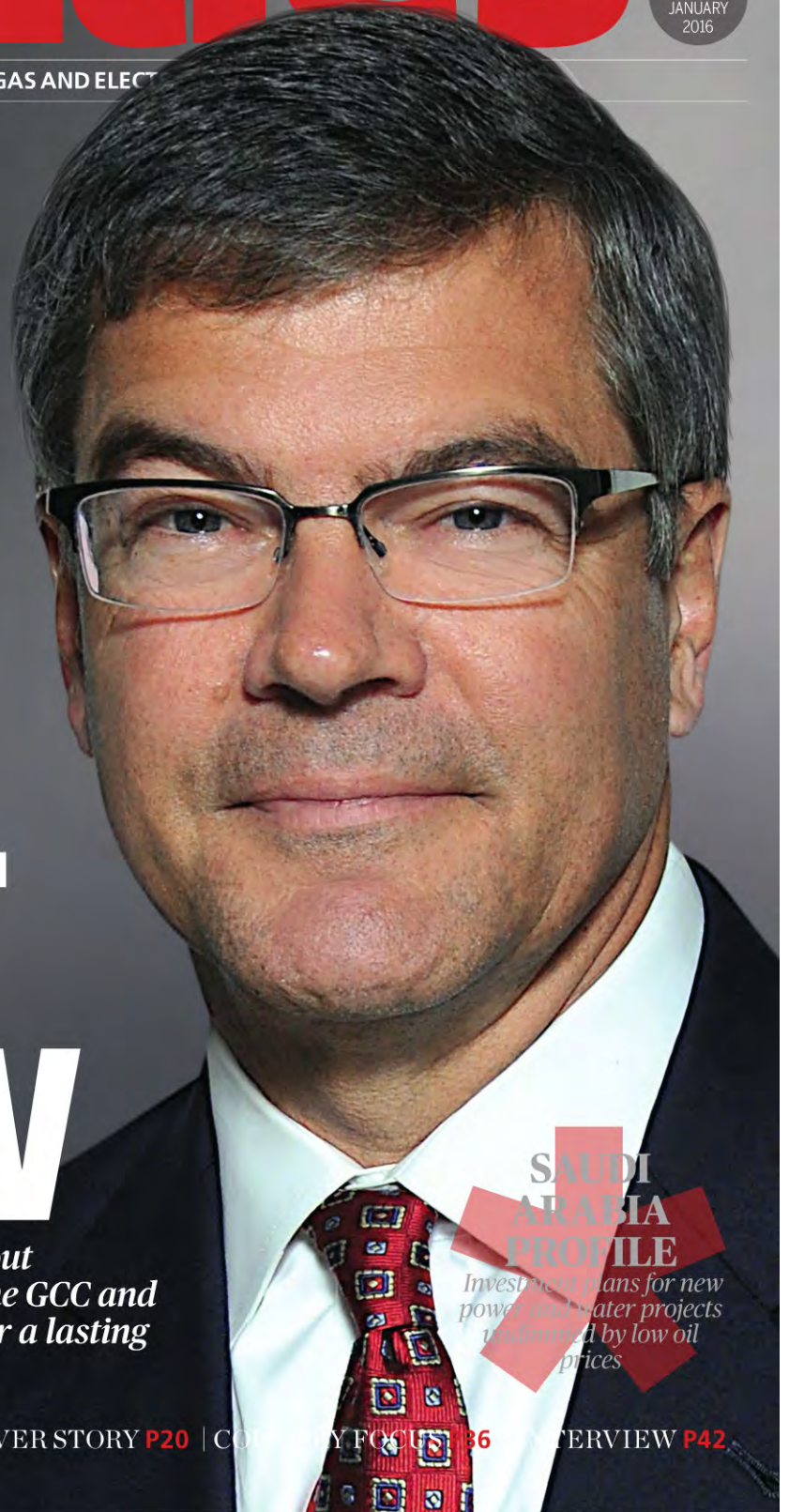
LAST FLOW

Malcolm Walter talks to UME about persistent flooding problems in the GCC and how Bentley Systems is out to offer a lasting solution to the challenge

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STORMY WATERS

Despite massive investments in engineering solutions, GCC countries continue to grapple with recurrent surface water flooding and stormwaters, largely a result of intense rains. But can this very challenge denote a major breakthrough in water resourcing?

In November, Qatar was hit by some of its worst floods in recent history, following a heavy downpour that lasted only several hours, causing the closure of schools as well as key administrative and commercial buildings.

While this happened, neighbouring Saudi Arabia and Oman were also struggling to cope with what has become an annual flooding problem for GCC countries that has often led to disruptions in important utility services and exerting undue pressure on drainage and sewer networks in residential and commercial districts.

Beyond the financial losses suffered, property damages and productive hours wasted in the wake of a flood incident, water flooding remains fatal, with lives lost due to incidents of electrocution and exposure to various health hazards.

Saudi Arabia, Oman, UAE and Kuwait have previously suffered disastrous flooding on key road networks, parking lots and homes, which has led regional governments to step up investments in surface water management and modern flood prevention methods that leverage the latest technologies.

INTERVIEW

While the \$382mn investment by Saudi Arabia for the city of Jeddah seems to be yielding results in citywide storm water, flood control and wastewater infrastructure management, the problem appears half solved.

Oman's Haya Water has committed an annual \$259 mn investment on various projects in the next decade for the construction of sewage networks, sea fallout systems and sewage treatment plants, which is believed to help deal with storm waters.

But experts are now calling for innovative approaches that will not only deal with flooding challenges, but also determine ways to put stormwater to optimal use.

Dr. Babak Bozorgy is a chartered professional engineer (CPEng) and principal civil, water engineer and team leader at MWH, with over 20 years of experience in water resources planning and management as well as in the design of hydraulic structures and wet utilities across multiple countries, including Australia, Qatar, UAE, Saudi Arabia and Iran.

He spoke to Utilities Middle East in a wide-ranging interview and shared his views on the best ways to deal with stormwaters and how to lessen their impact on utility services.

What is your own assessment of the stormwater management challenges in the GCC region and why have these challenges persisted despite vast investments into engineering solutions?

Stormwater management in semi-arid and arid regions of the world, such as the GCC, region is more challenging than elsewhere. This is mainly due to the irregular and isolated storm patterns that usually happen in very high intensities for short periods and cause flash flooding in the wadis and flooding and water ponding in the urban areas. Adding to the challenge is the high water table and the continuous urban development, creating impermeable surfaces.

Of course, there has been significant investment into stormwater management schemes, particularly in recent years, but such investments have not been sufficient to catch

“Adding to the challenge is the high water table and the continuous urban development.” DR. BABAK



up with the rapid pace of urban development. Given the scarcity of rainfall in this region, it is not surprising that other urban utilities have received more immediate priority. However, with more extreme events occurring in the past few years which may be highly attributed to climate change, stakeholders are beginning to turn their focus toward the growing necessity for such systems, not only to protect residents but also their assets.

Some experts argue that recurrence of the problem points to an underlying fail-

ure on the part of urban planners, do you agree?

We must understand that a unique situation requires unique solutions, true innovation and world-leading technology, not just adopting what has already been established in other parts of the world. In water management, there is no one-size-fits-all solution. Innovative tailor-made solutions must involve multiple parties, not just urban planners.

Until recently investment in stormwater systems was not thought to be feasible, probably due to scarcity of rainfall in this region.



Stormwater can cause disruptions to sewer systems



“Until recently investment in stormwater systems was not thought to be feasible.” DR. BABAK BOZORGY

working in the UAE, Qatar, Bahrain, Kuwait and Saudi Arabia. Our head office is located in Dubai and we have operational offices in Abu Dhabi, Doha and Manama. When needed, our Middle East operations also provide expert services and support to our Europe-Africa operations for our projects in Africa.

A few of the major stormwater projects that we have been and are working on in this region include Dubai drainage master plan and Qatar integrated drainage master plan. Others include several stormwater drainage projects in Dubai and Abu Dhabi, such as the deep tunnel stormwater system for Dubai World Central (DWC) and Dubai South and adjacent developments in Dubai. This is a 10m diameter, 24km long deep stormwater tunnel which will serve a large area that is almost 400 km² of new developments in Dubai, including the new Al Maktoum Airport.

We are at the moment also conducting flood and stormwater management studies and design for three governorates in the Riyadh region of Saudi Arabia.

In the absence of proper drainage in most of the affected cities, how can stormwater be stored, treated and re-used?

The scarcity and irregularity of rainfall in this region makes stormwater treatment and reuse a big challenge, especially in regards to justification of the feasibility of the investment. But it is imperative that we move towards such sustainable measures of stormwater management and MWH have been involved in several pioneering examples of this.

In the UK, MWH experts have been involved in developing the Sustainable Drainage Systems (SuDS) guidelines.

In Dubai and as a part of the Dubai drainage master plan, MWH have introduced the principles of SuDS and Water Sensitive Urban Design (WSUD), to the best of my knowledge, for the first time in this region. One of the main objectives of SuDS and WSUD is on-site control of stormwater quantity and quality. As a minimum, this requires individual property developers to control their post-devel-

Moreover, stormwater has always been looked at as a waste stream, not a resource, almost all over the world. In recent years global policy-makers and experts have realised that stormwater can actually be a significant resource.

Even in the developed countries, which pioneered stormwater management, such as the US, the UK, Australia and New Zealand, stormwater management has received due attention only in recent years and strict guidelines and regulations on stormwater management, discharge and reuse have been developed.

What are some of the projects being handled by MWH Global within the GCC to address the problem?

The core business of MWH Global is water and natural resources. In the GCC region, we are

\$382mn
For stormwater and flood control in the city of Jeddah, Saudi Arabia

INTERVIEW

opment stormwater discharge to the level of the pre-development flows by utilising detention, storage and reuse schemes, examples of which are rainwater tanks, underground storage tanks and detention or retention basins, which could also be used as water features within the development areas.

In Qatar, MWH have planned and designed a pilot groundwater and stormwater wetland to test the performance of such systems in this climate. If the pilot project is successful, it will be developed further as a full-scale scheme for treatment and reuse of groundwater and stormwater. This project was showcased at the recent Future Drainage and Stormwater Networks Conference held in Qatar in December 2015.

Do you think that an approach that puts stormwater to public use could in a way help address the stormwater management challenge?

As mentioned, due to scarcity of rainfall in this region, public use of stormwater on a large scale may not be considered a worthwhile investment, unless pilot projects such as the one in Qatar prove otherwise. This is the subject of ongoing debate amongst experts, decision makers and planners in the region.

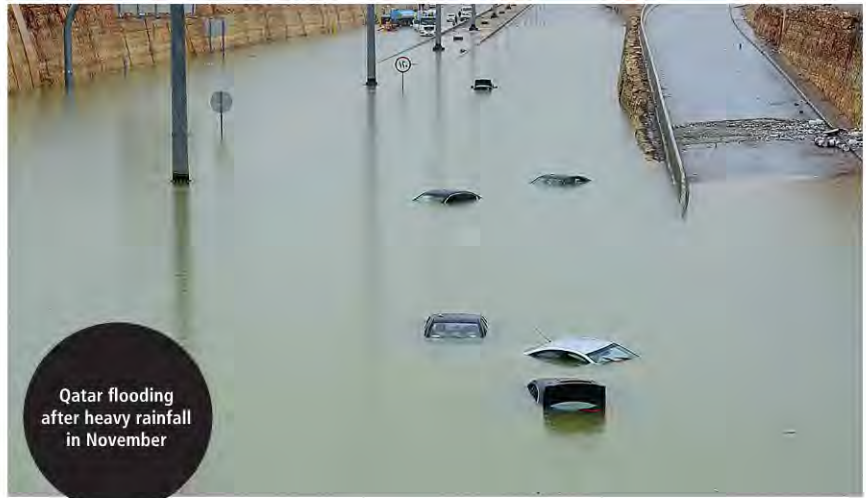
However, there is no reason why local reuse systems within individual development areas should not be encouraged. I always advocate the most sustainable solution.

What are some of the countries that have successfully implemented projects to re-use treated stormwater?

Countries such as the US, the UK, Australia and New Zealand have been developing and encouraging stormwater harvesting and reuse schemes, with proven success.

For example, in Australia, many homes have installed stormwater tanks that are used for watering lawns and also flushing toilets. Several cities in Australia and neighbouring New Zealand also have large-scale stormwater harvesting projects, mainly initiated by city councils. MWH have provided consultancy services on such projects. A good example is the Centroc Water Security Study, which covered 17 local governments in Central New South Wales, where stormwater harvesting is one of the strategies for water security. This project was honoured by Engineers Australia as one of the six winners of the 2010 Australian Engineering Excellence Awards.

It is important to remember that putting



stormwater to public use is not restricted to domestic use. SuDS wetlands, for example, provide recreational and ecological value and the opportunity for landscape irrigation.

How can this approach be easily integrated into the wider water network of GCC cities?

Of course, large-scale reuse of stormwater requires innovative pilot projects to assess and demonstrate the performance and value of such systems in this region. Scarce and irregular rainfall makes stormwater a relatively unreliable source. However, there are opportunities to be harnessed through proper planning and viewing stormwater as an alternative source or supplement to treated sewage effluent, rather than a main source.

Have you suggested this to any of the municipalities in the GCC region? What has been their response so far?

Through our projects in Dubai and Qatar, we continue to encourage the principles of SuDS and WSUD, which emphasise stormwater reuse. Adoption of the SuDS principles has now become a requirement for developers in Dubai when submitting their infrastructure development plans.

“Scarce and irregular rainfall makes stormwater a relatively unreliable source.” DR. BABAK BOZORGY

MWH

Encouraging SuDS and WSUD that emphasise stormwater reuse

Our experience with municipalities in the region is that they are keen to understand and adopt such international best practices in their standards and strategic plans.

In your opinion, what would be the economic benefits for a city that adopts this approach as witnessed in other countries where these solutions have actually been deployed?

SuDS and WSUD are key components of sustainable development. By adopting such principles, we will protect the environment while also providing enhanced urban amenities and landscapes with obvious economic values.

Environmental benefits indeed have an indirect economic impact, as many are only now realising. Most large cities in the GCC region are located in coastal areas. Adopting the SuDS and WSUD principles will reduce the amount of pollutants that are washed off into water bodies during storm events. Controlling this water pollution will help to protect the marine environment and also have a positive impact on the tourism industry. Tourists enjoy clean beaches and pristine coastal waters. Managing the discharge of stormwater will have a great impact on the quality of these natural economic assets. **Utilities**