Big Savings Through Leakage Reduction as Part of Water Demand Management

The wise old saying: "Waste not, want not" is gaining pre-eminence in the management of South Africa's (and the world's) piped water supply. Particularly in water-scarce countries like ours, but even in water-rich countries where urban reticulation imposes significant costs on utilities and consumers, the losses caused by dripping taps and weak points in the mains network which burst when the water pressure rises, can be ill afforded.

Fortunately, a highly cost-effective technology has been developed over the past decade to reduce urban water leakage. A South African engineering company retained by the Water Research Commission (WRC) to address this problem – namely WRP (Water Resource Planning and Conservation), based in Pretoria – has taken the technology to new heights of international acclaim.

A series of intensive one-day short courses is scheduled by WRP for November this year – in East London, Johannesburg, Kimberley, Cape Town and Pietermaritzburg – to inform local authority leaders, policymakers, water supply managers, financial managers and product manufacturers of the very significant savings attainable through leakage reduction and water supply management. (See advertisement on page …)

LEAKAGE REDUCTION THROUGH PRESSURE CONTROL

WRP Managing Director, Dr Ronnie McKenzie says one of the many water demand management (WDM) intervention measures available to water suppliers is that of leakage reduction through pressure management in the reticulation system. Normally, water pressures increase at off-peak times, such as at night when few people and industries are using water. The increased pressure causes dripping taps to drip faster, and causes weak points in the mains network to burst. The resultant loss of water is significant. The implementation of advanced pressure control was first introduced to South African water suppliers in the mid-1990s by Dr McKenzie through a Water Research Commission project. This technique helps to reduce water losses by monitoring water pressures – sector by sector in the town or city concerned – and reducing off-peak pressures to a level which is adequate for users who require water at such times, but which does not stress worn tap washers and weak points in the mains system.

Quantification of the savings thereby achieved depends upon the size and character of the consumer environment concerned, and on

factors such as the age and technical standard of the water reticulation system. The WRC PRESMAC Model was developed to assist water suppliers in understanding the relationship between leakage and pressure as well as assessing the potential savings that can be achieved through pressure management. While pressure management is not effective in every situation, it can be very successful in certain cases.

An extreme example of water saving, which is recognised by international water management experts as the most technologically advanced and successful in the world, and which is regularly visited by them to see it in action, is the water pressure management system designed by WRP for Khayelitsha, a large and rapidly-growing township in the Cape Town metropole, which was commissioned in 2001.

In an area serving 600 000 people (up by 100 000 on the half-million residents when the system was installed), it saves 9 million cubic metres of water a year. The Convenor of Planning and Policy for Water Services in the Unicity of Cape Town, Mr Heinrich Mostert, converts this into financial returns, as follows: "Conservatively, it saves us R30 million per year. The cost of installing the water pressure management system was just over R2 million inclusive of preliminary studies – so the payback time was just one month. What a return on investment!"

He added: "With R2 million of ratepayers' money at stake, we were brave in going for such a big project all at once. But having embarked on it, we had no options – it simply had to be successful. The result speaks for itself!"

In physical terms, the project saves 1 000 cubic metres per hour – enough water to fill an Olympic-sized swimming pool every two hours; 24 000 cubic metres – the capacity of an average urban concrete distribution reservoir – per day; while the 9 million cubic metre annual saving equals the capacity of a medium-sized reservoir/dam – a significant consideration in a part of South Africa where erratic rainfall necessitates periodical urban water restrictions.

NATIONAL WATER POLICY

The opportunity offered by water demand management technology to achieve meaningful savings is in line with South Africa's present national water policy. It represents a clear departure from the previous approach of resource development to meet growing water demands, to one of water conservation.

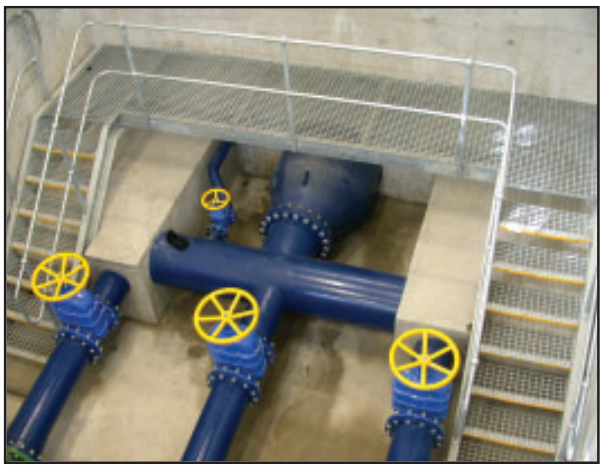
A paper on recent developments in water demand management in South Africa, by RS McKenzie and JN Bhagwan (of WRP and the WRC respectively) points out that the country's increasing water demands cannot be sustained indefinitely. If the growth in demand is not curbed, the country will face a serious water crisis during the present century. Water conservation had thus become a major issue, supported by numerous new initiatives from the Department of Water Affairs and Forestry as well as the Water Research Commission. The aims were to curb the growth in demand through education and more efficient use of the available resources.

The paper goes on to say that many proposed water supply augmentation schemes could be postponed for several years if the growth in demand could be trimmed by only a few percent – a target that is certainly achievable. The savings associated with delaying new water transfer schemes are so large that the measures needed to achieve the delays are not only environmentally attractive but also very cost effective.

Another paper by the same authors, on leakage management, reports that the Water Research Commission has initiated and supported numerous projects in recent years in support of government legislation to encourage efficient water usage. Some very sophisticated software was available locally and internationally, but was out of the financial reach of smaller municipalities. The WRC had therefore focused on providing low cost software solutions to help water suppliers understand and manage their non-revenue water.

THE BABE METHODOLOGY

The new low cost models were based on the Burst and Background Estimate (BABE) methodology developed for the UK water industry in the early 1990s. The BABE approach was introduced to South Africa in the mid-1990's through a series of courses and seminars presented by Dr McKenzie and Mr



Allan Lambert (founder of BABE) at the request of the WRC.

The methodology and concepts have been widely accepted by most water suppliers in the country through the efforts and initiatives of the WRC, and South Africa is now regarded as one of the key players in this field worldwide.

SHORT COURSE

The forthcoming intensive one-day short course on leakage reduction and water demand management, to be presented in five strategic centres in November, is a "must attend" for local government councillors, policymakers, water supply managers and financial managers, and product manufacturers in the water supply industry.

The course is to be hosted by WRP (Water Resource Planning and Conservation) in association with Rand Water, Umgeni Water, the Department of Water Affairs and Forestry, the Water Research Commission, City of Cape Town, Buffalo City Municipality and Sensus Metering Systems. The main presenters will be Ronnie McKenzie and Willem Wegelin of WRP, and Basil Bold of Sensus Metering Systems.

It is proposed to publish abridged information on the various WRC leakage reduction and water management models in the next issue of *Water Wheel*.