



Reducing water losses in Vietnam

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THE VIETNAMESE WATER industry is entering a period of change, acknowledging water losses of 45-70 per cent of production, and striving to reduce them. The recent "open door" policy has increased the pace of change by exposing companies to new markets, improved material standards and quality, and the transfer of technology. In 1994, the Ministry of Urban Construction issued an order to water companies to reduce water loss by 50 per cent over the next ten years, and issued guidelines on how this should be achieved. The steps are; to review losses and identify the components, to calculate the cost of control, to eliminate flat rate tariffs, and to improve public awareness. The initiative was supported by the World Bank, who appointed the author as a training consultant to work with water company directors and senior engineers to help them develop short term action plans and longer term programmes which are appropriate to the Vietnamese culture, and sustainable within their social and political structure. To this end, training workshops, in Hanoi and Ho Chi Minh City, were organised throughout 1994.

The workshops

The workshops were attended by 70 delegates representing almost all of the water supply companies in Vietnam. The majority of delegates were Directors, Vice Directors, and Heads of Technical, Financial, and Planning Departments. The primary objective of the workshops was to enable each delegate to design both short term and long term programmes to reduce water loss in his or her particular company. This would be achieved by bringing together delegates from different water companies, but with common problems, so that ideas could be developed from discussion groups and by example (some delegates had achieved success in "model" or pilot areas of their company). The training consultant's task was one of facilitator - the aim was not to compare Vietnamese practice with other countries, nor to dwell too much on the technology of leakage monitoring and detection. The aim was to encourage delegates to develop their own sustainable solutions, to build on what they have rather than devise solutions which are unworkable or unaffordable. This philosophy was implemented during the workshops by encouraging delegates to:

- examine the scale of water loss
- identify the causal factors

- assess the relative significance of non-physical and physical losses
- review appropriate tools, methodologies, and equipment to support programmes to reduce water loss
- design programmes which were feasible and sustainable for the Vietnamese economy, culture, and institutional organisation.

Delegates were therefore encouraged to discuss openly the constraints and weaknesses (and also the strengths) of their system characteristics and their existing procedures, and to propose only those solutions or actions which could be realistically implemented. The workshop style of training course was unfamiliar to the delegates, but one which they welcomed. Previous training had consisted of formal lectures with few opportunities for discussion and no participation by the delegates.

Components of water loss

Delegates were appraised of water loss figures for countries worldwide, noting comparisons between developed and developing countries, the varying significance of the ratios of physical losses to non physical losses, and their components. Delegates were then divided into two discussion groups and asked to consider which of the components were most significant in the Vietnamese water industry. From the presentations which followed this exercise, several important points arose, which influenced the priority tasks for the Action Plans.

Non-physical losses

These are generally higher than the physical leakage from the distribution system. The main components of the non-physical losses are;

- meter under-registration caused by oversized meters and inaccurate recording at low flows
- meters not working (poor quality, worn out, broken or deliberately damaged)
- theft and waste of water from illegal connections or from by-passed meters
- waste of water from consumers on flat rate tariff.

In addition, there is widespread loss of revenue, influenced by the dubious practice of meter reading, billing, and revenue collection all being performed by the same employee. This leads to mis-reading, mis-billing or non-billing, and withholding of collected revenue. Some com-

panies are trying to overcome this factor by imposing stricter controls and supervision on the meter readers.

Physical losses and detection techniques

Discussions with the delegates established that physical losses are of secondary importance to non-physical losses. In common with distribution systems worldwide physical losses in Vietnam are from leakage in the distribution system, from joints, flanges, gaskets, valve spindles, and ferrule connections on service pipes. Leakage in Vietnam is particularly influenced by:

- poor quality materials and fittings (one company used thin walled steel pipe previously used as an oil pipeline)
- poor main-laying practice
- shallow cover and damage from traffic vibration
- damage caused during road-building, from subsidence, and from bombing during the war.

Leakage control policy in all companies is passive, i.e. only visible leaks are repaired. However, one company, Haiphong, has introduced pilot areas to demonstrate district metering, a methodology for monitoring night flows into a discrete area. Delegates were shown alternative control methodologies, emphasising the benefit of monitoring flows into small districts to detect invisible leakage and using simple sounding sticks to locate individual leaks. However, delegates felt that most leaks appeared at the surface and regular sounding is unnecessary. Flow metering principles, particularly the benefits of temporary insertion turbine meters for checking production and bulk meters, were also illustrated and discussed. Most companies had no means of accurately measuring production or consumption due to lack of production meters to measure flows into the distribution system, and inadequate or inaccurate consumer meters.

Immediate action plans

It was accepted by all delegates that the main source of water loss is from illegal connections or illegal use, and from consumer meter under-registration. The points to address in an immediate action plan are therefore:

- to ensure that all consumers are metered, removing the flat rate tariff, which does not encourage wise use of water
- to stop illegal use by introducing more rigorous investigation of illegal connections, damaged and bypassed meters, and by ensuring fines are imposed - sometimes by public "shaming" through the media)

Secondary actions would include the replacement of non-working meters, and a meter purchasing policy which ensures that only meters which can accurately measure low flows are used - the Chinese meters used by most companies are grossly inaccurate.

One company is entering a joint venture with a French meter manufacturer to produce a low-cost locally made meter, other companies are using meters imported from Thailand. Checking or installing production meters to enable more accurate water loss figures to be calculated was also a priority.

Some companies are also introducing organisational changes to improve the accountability of the meter readers. It was agreed, however, that most institutional and organisational changes would be part of a longer term strategy.

Case studies

Water loss reduction programmes are being carried out in Hanoi and Haiphong, and these were used to give delegates guidelines for formulating their own programmes. Of particular significance in the Hanoi programme is a public awareness campaign, which has heightened the perception of the community to the value of clean water and the damage caused by waste. The problem of non-physical losses has been recognised by the authorities, and taken up by the community, represented by the Hanoi Peoples' Committee. In Hanoi, water loss is increasing (currently 160,000 cubic metres/day) while the source is being depleted - the groundwater level is dropping by 1.0m/year. Only 32 per cent of total production is billed. The 68 per cent of water lost comprises 43 per cent non-billed, 20 per cent leakage, and 5 per cent for the water company's own use. The volume of billed water is decreasing (28 per cent at the end of May 1994), despite the repair of 1000 leaks/year and disconnection of 2000 illegal connections/year. It is therefore assumed that the rate of increase of illegal connections is greater than the rate of leak repair. Consumer studies are seen as an immediate requirement to identify or address consumer waste, illegal connections, tariff charges, and consumer contracts (only 50 per cent of Hanoi's 200,000 consumers have contracts for revenue payment). Solutions are linked to:

- improvements to the billing system, and meter reading/collection procedures
- changes to metering policy (one tap dripping at 0.4 l/minute wastes 600 l/day) to install better meters
- payment for the meters. If the company pays for the meter the payback on savings per consumer of 18 cubic metres/month would be less than four months.

Physical losses are also being addressed in Hanoi. One person has been nominated to lead a leak detection team. Sounding sticks have been issued, and staff are being trained in their use, and in the use of other leak detection equipment. An estimated 10-20 per cent water saving was made during a "Water Week", a cost saving of US\$50000.. However, people are slow to change their habits, and campaigns should continue, supported by changes to the tariff and billing systems, which at present give no incentive to save water. To further support the programme, and to emphasise the importance of institu-

tional and organisational changes, the Hanoi water sector was reorganised in early 1994 into a new company - Hanoi Water Business Company, whose business aims are to have 100 per cent of consumers registered, 100 per cent meter installation, not less than 85 per cent of production collected as revenue, tariff fully enforced, and a 24 hour service level.

At Haiphong Water Company, pilot studies are being carried out in three sub-districts. The studies have demonstrated the importance of institutional support - the company receives a Government subsidy, but has also changed its management structure - it now has a supportive and enthusiastic Director, whose philosophy is to reduce water loss, increase capacity, and improve management. Whilst recognising that the company must continue to supply its consumers the only way to reduce losses is to progressively install new consumer meters and to monitor and control the flow into and out of the network via small "management zones". Increased level of service and increased revenue would follow.

Like the Hanoi study, the Haiphong study also emphasises the importance of raising public awareness, with strong institutional support from the local authorities, the Peoples' Committees, and the police. Losses in the

pilot area, after pipework rehabilitation, have been reduced to 20 per cent. Payment is now collected from 99 per cent of consumers, who pay their bills at a central office 5-10 days after being billed.

Conclusions

During the workshops delegates gave the impression that now that the Government had initiated a "wind of change" they wished to be empowered to activate action plans. The workshops concentrated on the programmes to reduce non-physical losses, because in most companies this is where the majority of losses occur. However, although the time for the introduction of advanced technology is still some years away, there are a number of techniques, like district metering, and some technologies, like flowmeters, insertion meters, and equipment for listening for leak noise, which were of interest to the delegates, and which are wholly appropriate to the Vietnam water industry.

The workshops highlighted the key steps for action to progress sustainable solutions. The use of local Peoples' Committees to lead public awareness campaigns and to enforce new practices is one of the strengths which can be developed.