



WATSAN : status of O&M in urban areas

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DEVELOPMENT OF WATER supply and sanitation systems is essential for the health of the community — a vital factor for increasing national productivity and wealth. About 25.7 per cent of India's population, i.e. 217 million people were living in urban areas in 1991. According to demographic projections, the country's population will increase to around 300 million by the year 2001. The CPHEEO estimates that 82 per cent of the total urban population has been provided with a water supply and about 34 per cent of the total urban population has been covered with sanitation.

Status of WSS

With increasing urbanization the per capita investment costs are rising. The current estimates of CPHEEO for water supply range between Rs. 1000 to 2000 per capita. Similarly, costs for sewerage range between Rs. 1500 to 2000 per capita. The O&M per capita cost varies from system to system. The average annual investment on O&M of water supply and sanitation systems may be about Rs. 23870 million (for a population of 217 million at Rs. 110 per capita). To achieve the benefits for which these investments are made, the water supply and sanitation systems must function continuously, efficiently and to full capacity, in conformity with acceptable standards of quantity and quality.

However, inspite of the large investments and major technology inputs provided for construction and installation of water supply and sanitation systems, several urban water and sanitation systems (WSS) have been found to be performing inefficiently. Poor maintenance has affected the reliability of the service and been a prime cause for failure to achieve the objectives for which large investments are made. Often these investments become unproductive due to negligence of O&M, which leads either to premature failure before their projected life span or inefficient operation requiring further investments to replace or rebuild the system components. Such a situation results in poor and unreliable service and high O&M costs.

Breakdown of equipment as a result of poor O&M is not the only cause affecting the reliability of the service delivery. Inadequate planning, inaccurate designs and defective construction/installation are amongst the other factors which affect reliability. Besides, when the technology adopted is not relevant to local conditions, it becomes difficult to operate and maintain the systems efficiently. Often, an erratic power supply and power interruptions affect the reliability of WSS.

The defective performance of most WSS is mainly on account of failure to recognize the importance of a well organised O&M and consequent lack of attention to O&M. Equipment inventory and updated infrastructure maps are not available. Routine operations and effective preventive maintenance procedures are not systematically documented. Quite often, the required skilled staff, tools and spares are not available for preventive maintenance. At present there is no organised method for evaluation and control of performance of the WSS.

Most systems are overstaffed. In spite of overstaffing and a highly efficient management, the quality and quantity standards are not met due to lack of "hands on" skill amongst the operating staff. The defective installation/construction coupled with inefficient operations and insufficient maintenance has also resulted in very high leakage levels (as high as 49 per cent in some cities). High leakage rates coupled with low tariffs and high subsidies are affecting the financial performance of several WSS.

Management of WSS generally receives relatively lower priority. Lack of funds coupled with lack of enthusiasm among the O&M staff to keep the systems in working condition, lack of training and lack of motivation among the staff may be the reasons for the present status of the WSS.

Status of selected urban WSS

The status of urban WSS in India has been assessed on the basis of data furnished by the agencies in charge of these systems. The WHO guide contains a list of management indicators to enable evaluation and decision making to achieve an efficient O&M. These indicators are modified to suit the prevailing conditions and formats have been prepared to collect the data relevant for assessing the status of the systems. CPHEEO has circulated these formats to the O&M agencies in several States and requested them to furnish the data on O&M of WSS. (The data received from the various agencies is presented in Annexure A).

Status of O&M of water supply systems

The O&M of water supply systems of four cities (Indore, Thane, Bangalore and Hyderabad) were covered by the author, along with another consultant, in a WHO sponsored study for the Government of India. Presented on the next page are the constraints in O&M of water supply systems which emerged after analysis of the data and information collected for the study:

- Most of the systems suffer from high leakage rates and result in Unaccounted for Water (UFW) of about 20 to 50 per cent.
- The storage capacity of most of the reservoirs is getting reduced due to heavy sitting.
- Though most of the sources are free from pollution, they are becoming susceptible to pollution due to emerging changes in the land use pattern of the catchment areas.
- Procedures for a systematic sanitary survey of the water supply sources are either lacking or are not followed.
- Updated maps of reservoirs, pumping stations, pipelines and distribution system are not readily available.
- There is an absence of updated records of the assets and historic record of equipment.
- In most of the WTPs, the alum/chemical dosers, chlorination equipment, rate of flow indicators and head gauges are not functional.
- In spite of a well equipped laboratory at the WTPs, the required tests for control of chemical dosing or control of water quality are performed infrequently.
- Instruments such as flow meters, pressure gauges, level indicators and electrical measuring instruments in WTPs and on pipelines are not working in several systems.
- Regular testing and calibration of instruments by competent and trained service agencies is lacking and enough spares are not maintained to ensure that these instruments are functional.
- There is an incomplete/inaccurate record of consumers such as number of connections, quantity consumed, bills collected etc.
- Inaccurate/malfunctioning of consumer meters and non availability of reliable meter repair facilities is commonplace.
- Inability to produce an authentic record of water produced, sold and billed and particularly the absence of reliable metering results in an inability to assess the quantum of UFW.
- Systematic material management and stores inventory procedures are not practiced.
- Incomplete and inaccurate revenue billing and accounting procedures lead to ineffective monitoring of the recovery performance.
- The consumer complaints cover a wide range of issues such as inadequate supply/pressure of water, irregular supply timings, leakages/chokages, pollution, staff misdeeds, excessive billing and meters not working. Though the consumer complaints cells are well organized, there is no systematic way of monitoring the redressal of complaints and consumer satisfaction.
- The organizational setup of most systems is complex with diverse work cultures, service conditions, job nomenclatures, reporting relationships, scales of pay

etc. There is a possibility that some of them are over-staffed. Job descriptions and responsibilities for O&M staff are not well documented.

- Except in some organizations where comprehensive training plans are being implemented, there is no systematic assessment of training requirements on the basis of job descriptions and responsibilities. Moreover, there are no specific training programmes to improve the performance skills of the hands-on O&M personnel.

O&M status of sewerage systems

The performance of the sewerage systems is affected by frequent clogging, siltation, corrosion, erosion and deterioration leading to reduction in capacity of the sewers. The common problems are:

- Excessive grit is leading to siltation of sewers.
- Lack of systematic preventive sewer cleaning procedures leads to frequent sewer blockages.
- Abuse of sanitary sewers by connecting rain water leading to blockages and overflows.
- Corrosion of sewers due to uncontrolled discharge of industrial effluents.
- Absence of segregation of solid waste, especially in hotels and hospitals.
- Lack of sewer cleaning equipment.
- Absence of safety procedures and equipment.

O&M status of sewage treatment plants (STP) and sewage pumping stations

NEERI has carried out a performance evaluation (1994) of about 20 STPs spread all over the country. The problems in O&M of STPs as noted in the above study are summarized below:

- i) The methods of treatment adopted do not have a bearing on local conditions such as climate, availability of equipment and skilled O&M personnel.
- ii) The sewage pumping stations have often resulted in surcharged conditions of the sewers due to backing up of the sewage up-stream of the SPS.
- iii) At most of the plants manual cleaning of the screens is practiced. Even where mechanical screen removal devices are provided, they are generally found to be non functional.
- iv) In the majority of STPs, a reliable system of measuring the plant inflow is absent, or where provided is defunct and found to be non functional, leading to unequal distribution of plant inflows among the various units.
- v) Though the primary clarifiers are functioning satisfactorily, some plants are hydraulically overloaded.
- vi) Most of the plants using any secondary process are not able to produce treated effluent of acceptable quality due to one or more units being out of order, hydraulic and organic overloading, inadequate oxygenation, poor operating conditions, improper desludging, frequent power interruptions etc.

- vii) Disposal of treated effluent and dewatered sludge is unsatisfactory and gas recovered from digestion units is not used because of leaks (mostly due to corrosion) in digestors and gas collection domes.
- viii) Maintenance is taken up mostly after breakdowns and is not undertaken as preventive maintenance — a situation which is further aggravated by lack of relevant information and records of the plants.
- ix) The facilities for laboratory control are either non-existent or under-utilised.
- x) Most of the plants are overstaffed with an acute shortage of hands-on operating staff, thus leading to lack of technical skill and knowledge.
- xi) In most of the plants, neither is safety equipment available nor are any safety procedures followed.
- xii) A major constraint in effective O&M of STPs is lack of adequate resources.

Financial performance

Only a few agencies in charge of O&M of WSS are able to achieve a good financial performance. Often, the agencies are unable to levy tariff to generate sufficient revenues to cover its operating expenses, debt services, depreciation, cost of capital works etc. Some agencies are incurring losses, mainly because they have low tariff rates which are not reviewed/revised in spite of increases in the staff and power costs. Separate financial statements are not maintained for O&M of WSS in several organisations.

Status of organization

Most of the systems have a good organizational setup. The technical and financial performance of these institutions is gradually improving, especially in organizations implementing externally aided projects. The culture of commitment to work is slowly percolating to the middle and lower levels of management.

Some of the systems, however, are complex, with different work cultures, job nomenclatures, reporting relationships, scales of pay etc.

Besides, the systems are often overstaffed. Staff whose performance is poor are not penalized — a practice which assures them security of employment whereas good work by competent staff often goes unrecognized.

Moreover, career advancement/promotions are given only by following seniority in several organisations. Some of the organizations lack sufficient autonomy to run the systems efficiently and profitably. In some instances responsibility for WSS has been found to rest with multiple agencies, often with overlapping of responsibility for O&M.

In most of the organizations, there are no opportunities to plan for a sustained training program. Training efforts are often ad-hoc and sporadic. Instead of stress being placed on attending training courses necessary for the individual, the topics and venues of training are often the criteria for attending training programmes. No records are available to show the numbers trained, subject or period of training.

Conclusion

Information on the O&M of Water and Sanitation Systems, such as service levels, service coverage, leakage levels, staff productivity and operation and revenue costs is not readily available with most agencies now in charge of O&M. There is a need for building up a good Management Information System (MIS).

There is also an urgent need for evolving a strategy and action plan to address the problems in O&M and ensure sustainability of the urban water supply and sanitation systems. Management of unaccounted water by reducing the physical and revenue losses, reducing O&M costs, community participation, full cost recovery, cost sharing arrangements and institutional strengthening are some of the issues to be addressed while evolving such a strategy.

References

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