CHAPTER 7

PERSONNEL

TABLE

INTRODUCTION

Each agency is responsible for developing a plan which will provide for sufficient staffing or subcontracting necessary to carry out the long term operation and maintenance programs. The most important factor influencing the amount of staffing required for a sewage collection system agency is the size of the collection system to be operated and maintained. Another key factor which affects the staffing requirements is the type and availability of sewer maintenance equipment. Other important factors include age of the system, condition of the system, types of waste being transported, and population growth rates. The first concern of any collection system agency should be to have adequate staffing to meet the portion of the work load that is constant.

The personnel required to maintain and operate the sanitary sewer collection system should be included on an organizational chart showing their title. Each position on the organizational chart should have a job description on file with the agency along with the minimum qualifications necessary to fill each position.

CREW REQUIREMENTS

The number of people assigned to a crew and the skills required of them are determined by the agency supervisors based on the type of work to be done (inspection, repair, cleaning), number of people available, total number of crews required for each agency system, work backlog, performance standards or criteria, and projected or anticipated emergencies. The crews must be able to handle normal workloads and most emergencies. Scheduling is accomplished by setting priorities and transferring personnel between crews as necessary. Periodic analysis of system maintenance requirements will indicate if expansion or

reduction of the work force is necessary, or if crew reassignments, overtime, and changes in schedules and procedures are needed.

Most crews will consist of two to four people. At least three people must be present during any underground work or inspection. At least two people must be present during pump station maintenance. All crews should be equipped with first aid kits, portable gas detectors, and traffic safety control devices such as barricades and signs.

Good planning and scheduling of routine maintenance and inspections can reduce the number of unscheduled repairs and emergency situations. Assignment of responsibilities according to the functions common to each work crew is recommended to help attain efficiency. For example, if closed circuit television is frequently used to inspect sewers, it may be worthwhile to organize a specially trained crew for that type of work. For some types of work it will be more cost-effective to contract out the work. Work involving the use of modern power cleaning equipment, or expensive excavating machinery are examples of work tasks that may be done more efficiently with an outside contractor.

A summary is given below of typical crew sizes for several sewer system operation and maintenance tasks. Actual crew sizes will depend on the safety requirements for specific tasks, the depth and diameter of the sewers being maintained, and the location of the maintenance task. It is important to remember that when certain crews are not busy, they can be used to help other crews with larger operations or to participate in system inspection or other tasks. In smaller collection systems, one group of people may be responsible for doing all of the operation and maintenance tasks.

CREW TYPE	NUMBER OF WORKERS REQUIRED	NOTES
Emergency service request crew	2	When not clearing emergency stoppages, crew can be used for inspection, repair, map checking, etc.
Balling crew	3	More workers required if work takes place in heavy traffic or in large sewers.
Bucket machine crew	3	
High velocity cleaning crew	2	
Power rodding crew	2	
Closed circuit television crew	3	If television inspections will be done frequently, one crew should be specially trained in this operation.

CREW TYPE	NUMBER OF WORKERS REQUIRED	NOTES
Smoke testing crew	3-5	This crew is rarely required on a full-time basis.
Chemical application crew	2-3	This crew is rarely required on a full-time basis. This crew requires specialized training.
Repair crew	3-6	This crew is responsible for routine repairs. If not on a full-time basis, available existing crews can perform these duties.
Construction crew	3-6	This crew performs new construction or extensive replacement. Often several crews are combined to complete the work more quickly.
Inspection crew	2-3	Use available existing crews for part-time inspection programs.
Flushing crew	2	

It is extremely important to remember that at least three workers are required whenever it is necessary to enter a manhole. This allows for two workers to be topside at the manhole tending the safety line while one is in the manhole. The two workers topside must have sufficient strength to pull the third worker out of the manhole in an emergency.

OTHER STAFFING REQUIREMENTS

Other staffing requirements for a collection system agency include the following:

1. A superintendent or chief engineer who is in charge of dispatching and organizing emergency crews, as well as the overall system operation including development of annual budgets.

2. A general foreman who is responsible for the rest of the crews, such as cleaning, repairs, inspection, etc. The general foreman should also be designated as the safety officer.

3. An office manager and secretary who are responsible for general bookkeeping, permits, record keeping, general information, payroll, billings, and trouble calls.

This is only an example of a typical agency's staff. Staffing requirements may vary according to system size and other previously discussed factors. Typical staff requirements for wastewater collection system serving agencies with populations between 5,000 and 150,000 are shown in Table 7-1.

PERSONNEL TRAINING

General

A prime responsibility of every supervisor is to see that all workers are properly technically trained to do the work and to recognize all hazards involved. Supervisors must motivate workers to use safe procedures and must also provide the leadership and discipline needed to make a good work force.

The personnel should be trained in all areas of sewer system operation and maintenance applicable to performing the job requirements outlined in their job description. The various training programs may include:

1. General safety.
2. Methods used to inspect the sewer system.
3. Proper equipment use and maintenance.
4. Sewer system repair and maintenance methods.
5. Public relations.

Personnel training can be achieved "on-the-job", by studying available references, by attending formal training sessions, or by attending seminars or workshops.

On The Job

Because, to date, there has been little offered in the field of formal courses for training collection system workers, much of the training given has been "on-the-job" training. There is no doubt that this type of training is effective to a degree. However, it is limited in that the training given is restricted to local conditions and the experience of the staff providing the training. The instructor should make a special effort to broaden the scope of any on-the-job training sessions.

Reference Material

Another valuable source of training is available through articles or national trade magazines, reference books, and manuals. They can provide detailed information on operations and maintenance procedures, suggestions for more efficient operations, or results from specific emergency response programs in other communities. A partial listing of references in the area of collection system operation and maintenance is included as Appendix A to this manual.

TABLE 7-1. TYPICAL STAFF REQUIREMENTS FOR WASTEWATER COLLECTION SYSTEMS.

Occupational Title	Population Size											
	5,000		10,000		25,000		50,000		100,000		150,000	
	a	b	a	b	a	b	a	b	a	b	a	b
Superintendent	1	5	1	10	1	20	1	40	1	40	1	40
Asst. Superintendent											1	40
Maintenance Supervisor							1	40	2	80	2	80
Foreman	1	15	1	20	1	20	1	40	1	40	2	80
Maintenance Man II	1	15	1	20	1	20	1	40	1	40	2	80
Maintenance Man I			1	20	2	60	3	120	5	200	8	320
Mason II							1	40	1	40	2	80
Mason I	1	15							1	40	1	40
Maintenance equipment operator					1	40	2	80	3	120	5	200
Construction equipment operator	1	15	1	20	1	20	1	40	1	40	2	80
Auto equipment operator									1	40	1	40
Photo inspection technician									1	40	1	40
Laborer	1	15	1	20	2	40	2	80	5	200	6	240
Dispatcher							1	40	2	80	2	80
Clerk typist							1	20	1	20	2	80
Stock clerk							1	40	1	40	1	40
Sewer maintenance staff	6	80	6	110	9	220	16	620	27	1060	39	1560
Maintenance mechanic II[c]												
Maintenance mechanic I[d]												
Maintenance mechanic helper[d]												
Construction inspector[e]												
Construction inspector supervisor[f]												
Total staff												

[a] Estimated number of personnel.
[b] Estimated total man-hours per week.
[c] Multiply the number of pumping stations maintained by 2.67 to approximate number of personnel needed.
[d] Multiply number of pumping station visits per week by 2.67 to approximate number of personnel needed.
[e] Multiply estimated construction site visits per week by 2.67 to approximate number of personnel needed.
[f] Determined by the number of construction inspections employed and developed on a judgmental basis.

Reference: Namour, Clie, "Manpower Requirements for Wastewater Collection Systems in Cities and Towns up to 150,000 in Population." U.S. EPA, Office of Water Populations, Washington, D.C. (1973).

Formal Training

Recently, through the efforts of local and state water pollution control associations, the Water Pollution Control Federation, and the United States Environmental Protection Agency, attempts are being made to make formal training available to all collection system workers, and to those who would like to prepare for jobs within the field.

Formal training can also be given in the form of seminars and workshops sponsored by professional organizations and schools. Typically, experienced collection system workers are asked to make presentations at seminars so their knowledge can be shared with others. These seminars and workshops can make employees more competent in their jobs and can add interest to the work. Discussions with other collection system personnel at these programs often will provide a different perspective and insight into solving common operational problems.

Informal Training

A supervisor should participate in whatever training is currently available. This includes meeting with work crews to learn about any problems that exist with materials and equipment being used. Meetings with equipment and material vendors can provide information on new material and equipment available. Informal staff meetings can also be held so all workers can share their knowledge with the other workers.