

STREET-CLEANING PROBLEMS AND PRACTICES

Charles E. Day,

City Engineer, Evansville

The problem of keeping our cities and towns clean is far more complex and baffling than most of our citizens realize. Many of our city officials do not truly realize its magnitude: they are aware that so many street sweepers, truck drivers, and white wings are on the payroll; but without investigation they naturally assume that the best possible job is being done.

Many of us have visited other cities and, noticing the unmistakable cleanliness, have wished that our own city might be as clean and healthful looking. A clean city cannot escape favorable notice and comment. It attracts business enterprise and buying consumers. But cleanliness does not just happen, due possibly to a favorable climate or geographic location, or to the fact that the city is or is not a commercial center. Worthwhile results require a study of local conditions, institution of a well-laid plan, and constant attention to the operation of the plan.

Fundamentally, most streets are kept just as clean as the citizens desire or demand. But the citizens do not clean the streets. They litter them and then complain to the local government if adequate measures are not taken properly to remove all refuse promptly. One factor governing any program is the frequency of cleaning. Conditions controlling this are:

- a. The character of the citizen population.
- b. The use to which certain districts or zones are placed.
- c. Money budgeted for street cleaning.

A thorough study of a community should be directed toward determining the factors that hinder street-cleaning operations. These might be listed as follows:

- a. Night parking.
- b. Rough street pavements.
- c. Inclement weather.
- d. Topography.
- e. Character of district.
- f. Traffic conditions, parking restrictions and facilities.
- g. Ordinances and their enforcement.
- h. Co-operation of refuse collectors, either city or private.
- i. Personnel.
- j. Organization.
- k. Equipment.

METHODS

The next problem to be tackled is that of the methods to be employed and the equipment to be used. The manual methods of today are very little different from the first methods used;

yet they play an important part in the cleaning activities. The two types of hand sweeping are "Beat Patrol" and "Gang Sweeping".

Beat Patrol. This consists of the establishment of beats, patrolled by street cleaners commonly called "white wings". Their implements consist chiefly of the push cart, broom, and shovel. This method is used to advantage in the following instances:

- a. To supplement cleaning by other methods.
- b. To "spot clean" specific areas, such as markets and commercial areas.
- c. To clean all the business or retail districts.
- d. To clean alleys where motorized equipment cannot function efficiently.

Surveys show that the efficiency of this method is determined by the stroke of the broom, the practice of hitting the broom on the pavement at the end of each stroke, sweeping against the wind, and many other little factors. Never permit just any laborer to take up his duties without first giving him some instructions.

Advantages of the beat patrol are that

- a. The system is flexible.
- b. Sidewalks and park strips can be cleaned.
- c. Heavy-traffic streets can be readily cleaned.
- d. Pavements with bad surfaces can be cleaned.
- e. Labor is employed in times of unemployment.
- f. The equipment cost is low.

Disadvantages are that

- a. The labor cost per mile is high.
- b. Adequate supervision is difficult.
- c. Cleaning in heavy traffic is dangerous.

Gang Sweeping. This practice consists of several men who sweep the dirt into piles in the gutter where it is then picked up by shovelers and loaded into trucks or wagons. A gang may consist of from 4 to 6 sweepers, two loaders, and one truck. Surveys show that this method is less efficient than the single man beat patrol chiefly because of the tendency of the workmen to converse and of the fact that the gang is only as fast as the slowest man.

Advantages of gang sweeping are that

- a. Park strips, sidewalks, and rough surfaces can be cleaned.
- b. Heavy accumulations of dirt can be removed.
- c. It is well adapted to alley cleaning.
- d. Supervision is easier and more effective.

Disadvantages of this method are that

- a. The cost per mile is high.
- b. Hand sweeping raises dust.
- c. Piles of dirt in gutters may be scattered by the wind.
- d. Efficiency is very low.

Hose Flushing. This method simply involves the use of fire hose to loosen the dirt on the pavement and wash it to the gutter and into the inlets. Very few cities use this method today and then only for specific reasons where other methods have proved inadequate. A crew for this work consists of two men, one for the nozzle and one for the hydrant. A third or fourth man may be necessary if much hose is laid out on the pavement.

Advantages of this method are that

- a. Very dirty and narrow streets can be cleaned.
- b. All dust and dirt are removed.
- c. Good cleaning around obstacles can be effected.

Disadvantages are that

- a. Considerable splashing occurs.
- b. The work is strenuous.
- c. Cost of replacing hose is excessive.
- d. Hydrants are subject to damage.
- e. The sewers and inlets receive a large amount of dirt.

Machine Cleaning. The two types of machines for cleaning the streets are the sweeper and the flusher. Most cities of any size at all have adopted the use of the motorized pick-up sweeper. This sweeper is made in two sizes, each of which may be used to advantage depending upon the districts to be cleaned. In machine sweeping the usual practice is to work at night, usually starting at one or two o'clock. Since most machine sweeping is confined to the gutters and the adjacent 7 to 9 feet of the pavement, it is impossible to clean effectively without ordinances prohibiting all-night parking.

Operating practices that affect the cost per mile are:

- a. The skill of the operator.
- b. The practice of driving the sweeper to the dump to unload, or supplementing it with a truck.
- c. The types of pavement surfaces that determine the life of the broom.

Experience has positively shown that the sweeper should never be driven to the dumps to unload, but rather should be followed by a truck with one laborer to pick up the deposits in the gutter and take them to the dump. The sweeper is too expensive and its operation and operator's time too valuable for it to be taken out of service to the dump.

The maintenance of the two brooms on the sweeper is a very costly item. Many cities lack experienced broom-makers and the necessary equipment for making their own brooms and are

therefore compelled to obtain these from the factory. Considerable saving could be realized if the cities made these brooms in their own shops. The life of the large broom is from 7 to 10 eight-hour days, and that of the gutter broom from ten to fourteen days. The use of split hickory in the main broom and wire in the gutter broom is recommended.

Advantages of machine sweeping are that

- a. This method is inexpensive.
- b. It is complete in itself from sweeping to pick-up.
- c. The machines clean thoroughly and rapidly.
- d. The operation causes no nuisance.
- e. The dirt is kept out of inlets.
- f. Leaves can be collected as part of the regular operation.
- g. The method is easily supervised.

The disadvantages are that

- a. Parking strips cannot be cleaned.
- b. Very rough pavements cannot be cleaned.
- c. Wet and muddy surfaces cannot be cleaned.
- d. It cannot be employed in freezing weather.
- e. Experienced operators and mechanics are sometimes unobtainable.

Machine Flushing. Machine flushing consists of directing a stream of water under pressure onto the street surface in order to flush the dirt to the gutter and possibly into the inlets. The machine for this purpose consists of a 1,000- to 3,000-gallon tank with pump, mounted on a truck. The pumps force the water from the tank through nozzles on the front and sides of the truck. The area of the street flushed varies widely. Some cities clean the entire pavement; others only the area adjacent to the gutters. Narrow pavements, up to 22 feet wide, can be flushed from curb to curb in one operation. Wider pavements may be quickly flushed by using two flushers, which also make maximum use of the volume of water to push the dirt to the gutters.

The practice of flushing prevails in all large cities, where it is used chiefly in the commercial and market areas. However, since the use of water does a more thorough job than any other, its adoption is recommended in certain districts in conjunction with patrol or gang sweeping that can collect the dirt from the gutters. Given an adequate water supply, this method is very economical, thorough, and fast. By using the equipment two shifts per day, the important districts can be cleaned several times weekly and residential sections at least once weekly, with only a small amount of equipment. Especially during hot, dry, summer months citizens appreciate flushed streets, when cleanness and freshness are possible from no other method.

DISPOSAL OF SWEEPINGS

The disposal of sweepings does not usually present a problem, since every city has low areas that need to be filled. However, there should be a distinction made between pick-ups of garbage in market areas, paper in commercial areas, and the usual street sweepings composed of 40 to 57 per cent of dirt and non-combustible material. All trucks transporting sweepings to the dumps should be covered to prevent the dirt and refuse being blown about the streets.

A STREET CLEANING PLAN

It is certainly the responsibility of the person in charge of cleaning operations first to formulate a plan for cleaning the streets rather than just putting so many laborers and machines to work for so many hours per day. Since haphazard practices are probably more prevalent in this field than in any other, I will list the points that should be investigated and fitted into the picture of a good system.

A. Determine Method to Employ. This can be done by finding the answers to such questions as:

- a. How much refuse must be removed?
- b. Should sidewalks and park strips be cleaned?
- c. Is the surface of the pavement suitable for motor sweeping or motor flushing?
- d. Is the street normally free of parked cars?
- e. Can the element of noise be disregarded?
- f. Are there permanent curbs and gutters?
- g. Is the sewer system capable of carrying off the street refuse?
- h. Is the gutter grade sufficient to give adequate velocity to carry the refuse to the inlets?
- i. Can the refuse be removed from inlets and catch basins as easily as from the street surface?

If each of these questions is answered, a general review of the results will easily determine the method to employ or whether any method at all should be used, as in the case of small communities.

B. Determine Frequency of Cleaning. Here again this may be already determined by the budget, but a well-laid plan will aid in obtaining an increase to care for a better system. A survey of 97 cities showed that 85 per cent cleaned the market areas daily and that a majority cleaned the arterial streets and residential areas once or twice weekly. In this determination the following questions might be asked:

- a. How clean do the citizens and legislative body demand the streets be kept?
- b. What kind of refuse predominates?
- c. How much refuse accumulates daily?

Investigate streets separately and then study them as a whole and as districts.

C. Determine the Time of Cleaning. It is important to know what time of day or night each street can best be cleaned and, when daily cleanings are not made, just what day of the week is more suitable to certain streets than to others. Ask yourself such questions as:

- a. At what time are the fewest cars parked on the streets?
- b. At what time is the traffic the lightest?
- c. Are there objections to night or early morning cleaning?
- d. In market areas, at what time are the fewest shoppers and vehicles present?

D. Determine the Routes. Obviously this is a very important but most laborious task. It is largely the process of trial and error based upon a lot of study. Suggestions for preparing routes are these:

- a. Select starting and stopping points as near the garage as possible.
- b. Eliminate all travel without cleaning.
- c. Make routes compact.
- d. Allow for time to travel from garage to starting point and return.
- e. Complete the cleaning of a street or section as soon after it is started as possible when two trips along the street are necessary.

After trial routes have been put in operation and corrections made, adhere strictly to them and caution the foreman against branching off and upsetting the schedules. Periodic checks should be made on the routes and schedules to determine the quality of the work and adherence to the plan. The mere fact that complaints are not registered by the citizens does not mean that the best job is being done. We all know that improvements can be made in everything and that faults do not go unnoticed.

Much of the work of keeping the streets clean can be lessened by ordinances preventing littering, providing waste-paper baskets for the public to use, publicity by billboard advertising, control of scavengers and handbill distributors, and annual or semi-annual clean-up campaigns. Certainly at this time, if the task has not been taken over by the local defense committees, the cleaning officials should urge all persons to save waste paper, which comprises the larger portion of litter in commercial areas. We would all be surprised to learn the value of the paper hauled to the dumps each year.

There are other phases of street cleaning, such as cleaning of catch-basins, removal of leaves, and removal of snow and ice, which present different problems that must be solved separately.

FINANCING THE STREET-CLEANING PROGRAM

The two most popular plans for financing this city function are (a) the usual property tax, and (b) the gasoline tax.

This public service can be justly paid out of the return of gas tax since it maintains streets and highways. It might be possible under this second plan to get the council to vote an increased budget for improvements in the street cleaning, since the cost is not assessed directly against the property.

Since every method of street cleaning has been discussed and the high or low cost of each mentioned, perhaps a comparison of average costs should be made.

| <i>Method</i> | <i>Average Costs</i> |
|-------------------------------------|----------------------|
| Beat Patrol —sweeping only | \$2.64 per mile |
| Beat Patrol —including disposal | 3.93 “ “ |
| Gang Sweeping —sweeping only | 3.84 “ “ |
| Gang Sweeping —including disposal | 5.38 “ “ |
| Machine Sweeping—sweeping only | 1.59 “ “ |
| Machine Sweeping—including disposal | 2.49 “ “ |
| Flushing | 1.49 “ “ |

The average yearly cost per capita for street cleaning is 37 cents. The average cost, per mile of paved street, is \$264.00.

Accurate records of performance and costs will help improve efficiency and form a background for sound requests for improvements through additional funds for labor and equipment.

THE DESIGN AND OPERATION OF A MUNICIPAL SWIMMING POOL

Paul W. Reed,

Sanitary Engineer, Indiana State Board of Health, Indianapolis

The swimming pool is a newcomer to the field of engineering. The first swimming pool in the United States was opened in 1901. The past decade has witnessed the construction of quite a large number.

Many of the swimming pools designed and constructed in recent years were the result of long-range planning. Generally speaking, however, well-designed pools are in the minority.

Immediately we ask, “Why did this happen?” The only answer is that the designing engineer was not familiar with the needs nor was he granted the time or funds with which to make a study to determine the needs. Usually the city council authorized the construction of a pool—an engineer was retained to design the structure—and the newspapers began to clamor for visible results. Thus, with the pressure on, the engineer turned to standard design features with all their inherent faults and soon presented the town with a set of plans and specifications. I should like to discuss some of these faults together with certain other general features of this topic.