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SHORT COURSE ON SOLID WASTES  
COLLECTION AND DISPOSAL

EM/Wastes Course/B3

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ORIGINAL IN FRENCH

EXTRACTS FROM THE REPORT ON

"PRELIMINARY STUDY ON THE COLLECTION AND DISPOSAL  
OF URBAN SOLID WASTES IN THE CITY OF DAMASCUS"

by

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## PRESENT SITUATION OF CLEANSING SERVICES

The characteristic of the present refuse collection system in Damascus is the lack of subdivision between the domestic waste collection service and the street cleansing service.

Actually, the present organization provides only for the street cleansing service. It is therefore allowed to throw domestic refuse in the streets and the cleansing service collects it with the street sweepings.

People are officially allowed to put domestic refuse in the streets from 9 p.m. to 6 a.m; but this arrangement is not always complied with so that wastes are continually put on the pavement at any time of day.

TABLE : Damascus population growth from 1923 to the present time, and estimated population growth up to 1984 :

Year	Population	Year	Population
1923	172 846	1951	245 237
1924	178 362	1952	372 708
1925	179 533	1953	383 239
1926	180 778	1954	395 124
1927	180 879	1955	408 774
1928	182 054	1956	423 932
1929	1 92 176	1957	439 695
1930	197 453	1958	454 603
1931	201 151	1959	475 399
1932	202 422	1960	529 963*
1933	220 687	-	-
1934	229 567	1965	660 431**
-	-	-	-
1945	296 425	1970	823 019**
1946	303 952	-	-
1947	310 246	1975	1 025 631**
1948	317 251	-	-
1949	325 070	1980	1 278 123**
1950	335 060	-	-
		1984	1 524 186**

\* September 1960 census

\*\*According to the estimated 4.5% increase.

The refuse collected by dustmen is transported by means of two container trucks up to the collecting centres where it is put on motor vehicles which take it to the final dumping ground outside the city.

1. Sweeping of streets and public squares

The street cleansing service is more important than is usually considered necessary and sufficient, because it has also to provide for the collection and transportation of domestic refuse left on the pavements.

1.229 workers are attached to this service, 900 of whom are actually employed in street cleansing operations.<sup>1</sup>

Considering that the population totals 600 000 inhabitants, it appears that this service is performed by approximately two workers per 1000 inhabitants. It may be said that as compared to Amman<sup>2</sup> and Jerusalem (Jordan) where the service is performed by 1.5 workers<sup>2</sup> per 1000 inhabitants, in Beirut there are 2.3 workers per 1000 inhabitants.<sup>3</sup>

TABLE: Personnel attached to the street cleansing services in some towns of the Eastern Mediterranean :

Towns	Countries	Inhabitants served	Cleansing Personnel	Personnel per 1000 inhabitants
Amman	Jordan	300 000	436	1.5
Beirut	Lebanon	600 000	1 400	2.3
Damascus	Syria	600 000	1 229	2.0
Jerusalem	Jordan	66 000	101	1.5

1

S. SZABO, R.F. DAVIES: Interim report on the system of refuse collection and disposal; Municipality of Damascus, Syrian Arab Republic (13-8-1965)

2

F.W. POPEL : A preliminary study of wastes disposal in two municipal areas of Jordan and in UNRWA camps; World Health Organization, Regional Office for the Eastern Mediterranean (November 1965), Document EM/ES/81.

3

"L'Orient" (Beirut daily newspaper); Tuesday, 14 December 1965, p.6.

As to the organization of street cleansing, Damascus city is divided into 10 areas, each one headed by an inspector who supervises a certain number of teams; these teams include 15 to 20 workers and one team leader. There is also a head inspector for day rounds and one for night rounds, all being placed under the authority of a general director.

The cleansing operations are performed in several rounds. Night round (main work) from midnight to 8 a.m.; day round (light work) from 8 a.m. to 4 p.m.; subsidiary day round (light work) from 4 p.m. to midnight in the main streets only.

The night round (from midnight to 8 a.m.) involves the hardest work because it is supposed to collect most of the domestic wastes which are precisely put on the pavements between 9 p.m. and 6 a.m.

The day round (from 8 a.m. to 4 p.m.) collects the refuse left in the streets after the passage of the night round owing to the cars parked along the pavement, or inevitably thrown away by inhabitants even at the time when it is prohibited to do so. The round also collects the wastes produced by shop cleansing and left on the pavement at the time of their opening.

The subsidiary round (from 4 p.m. to 12 p.m.) is performed by personnel in limited number and only in the main streets which consequently enjoy a continuous service during 24 hours.

The workers on duty are provided with trucks carrying two dustbins (N.324) which they push by hand or with three-wheeled vehicles transporting the refuse collected to the nearest collecting centre.

At present, there are five collecting centres; one of them is located in the centre of the town and the other four on the outskirts, roughly in the northern, southern, eastern and north-eastern areas. The collecting centre located in the middle of the town is the only one to be covered, the other four being in the open air.

The refuse brought to these collecting centres is put on the ground; later on a special team of workers loads it by hand on motor vehicles or trucks which are driven to the dumping ground at about 12 km from the town.

According to such system, the refuse collected on public ways is to be transported by means of hand-pushed trucks for very long distances sometimes exceeding 1 km and it is to be assumed that the duration of such transportation and return is often longer than the time actually necessary to the workers to sweep the streets. It is precisely in order to reduce the time lost in transportation that the workers themselves overload trucks with a quantity of material sometimes amounting up to three times the normal content of the dustbins.

2. Elimination of residues

The refuse is simply loaded by hand without compression and transported from the five centres on motor vehicles with or without trailer. It is so taken to the final dumping ground at about 12 km from the town, in an almost desert area.

The vehicles are unloaded and the refuse left in heaps; these heaps are several metres high and show the wheel-tracks left by the vehicles.

The whole dump is slowly burnt and continuously fed by new quantities of rubbish daily tipped on the pre-existing heap.

Numerous outsiders freely come to the dumping ground and pick up the not yet burnt refuse, recuperating some objects and anything likely to be of commercial value, which will probably be sold later on and used again.

## RECOMMENDATIONS

In 1965, by request of the Government of the Syrian Arab Republic, WHO sent an expert to Damascus, to investigate the local systems for the collection and disposal of urban solid wastes, and to formulate the necessary recommendations for a better organization and management of the related services.

This report is the result of that survey, on the basis of which it seemed desirable to summarize some observations and formulate a few recommendations to be submitted to the attention of the services concerned:

1. At the present time the method used in Damascus City for the collection and disposal of solid wastes, as well as its results, can be considered as satisfactory. Damascus has in fact the aspect of a clean town, even cleaner than other towns with similar characteristics.
2. Despite these satisfactory results, the system now adopted by the Municipality for the said collection and disposal presents some disadvantages for the organization as well as the health aspect.
3. At the present time, the collection and disposal of domestic and public refuse is done by the street cleansing service only. The inhabitants place their refuse on the pavement outside the houses and this is later on collected with the street refuse.
4. The main disadvantage of this situation derives from the organization: there is no separation between the service collecting domestic wastes and the one in charge of street cleansing.
5. It should therefore be first recommended to separate these two services; two different organizations should be established, each of them with the equipment required for the fulfilment of its functions.
6. The service for the collection of domestic wastes could be organized in the new parts of the town on a collective basis with one dustbin for each building. These dustbins would be placed near the entrance in order to be easily accessible to the inhabitants as well as to the town refuse collectors.
7. In this case, the collection should take place every other day instead of every day.
8. The capacity of the collective dustbins should be sufficient to contain the waste produced in the building during the time-lapse between two collections. It would also be advisable to have a reserve capacity in prevision of possible interruptions of the service on festive days or due to any other reason. The capacity of the dustbins should be calculated on the basis of an 8 litre volume per inhabitant with the possibility in the future to double the number of dustbins for a capacity of 16 litres per inhabitant. This must be envisaged in order to face the double phenomenon of the increase in the amount of waste per inhabitant, which is

most likely to happen in the future, and the reduction of its specific weight.

9. The dustbins should be of standard shape and dimension. The Municipality will have to decide whether the purchase of these dustbins should be left to individuals or if they would give them free of charge to the population.

10. For the buildings still to be erected, the local construction regulations could prescribe that they be provided with the necessary equipment for waste collection and disposal (well located premises for dustbins; sufficient number of dustbins). It would be advisable to consider the opportuneness or better still the necessity to prescribe that new buildings be provided with refuse-chutes directly connecting the different flats with the dustbins placed downstairs in a room intended for this purpose.

11. Since in the old parts of the town it is not possible to apply the collective dustbin system, the collection of domestic refuse should be performed by means of bags. This system should gradually be replaced by the other one every time a modern building is erected in the place of old houses.

12. In old districts, where the bag system would be resorted to, the collection should necessarily take place every day.

13. The bags should be made of water-proof material, with a closing device and their dimensions be such as to allow when full - their transport by one man.

14. The domestic waste collection service could be provided with a sufficient number of motor vehicles, preferably of the compression type, for the emptying of bags and dustbins.

15. The public ways cleansing service should function independently, but simultaneously with the domestic waste collection. It could be done by night and day teams the hours being set up in such a way that the main streets can enjoy a practically continuous service.

16. Each worker would have a truck carrying two dustbins of an 80 litre capacity each and would be responsible for sweeping the area to which he has been assigned.

17. The street cleansing service should have a sufficient number of motor vehicles preferably of the compression type to collect wastes all along the streets, according to a pre-established routine, directly from the dustbins left by the personnel in charge of street cleansing.

18. Such procedure would permit a complete elimination of the collecting centres now existing in different areas of the town; if maintained in the new organization of the service, these would be a useless intermediate phase of operations and would involve an increase in working hours, manpower and cost of servicing.

19. For the collection of domestic refuse as well as for street cleansing, there should be a sufficient number of motor vehicles for taking and transporting the refuse, thus avoiding as much as possible its handling by workers; the swiftness of the operation is indeed very important with regard to the cost. It would be advisable to provide a sufficient number of reserve vehicles, which for a modern service in a big town, should be of at least one reserve vehicle for every four in service; this would make it possible to proceed to all necessary substitutions for a periodic check up, or in case of breakdowns and accidents. By means of an efficient and adequate maintenance of the vehicles in service these could be kept much longer in good condition.

20. The best type of vehicles to be used for collecting domestic waste as well as for street cleansing would be the compression type. Old vehicles should of course be gradually replaced by new ones as soon as found unfit for service.

21. The re-organization of the service according to the above-mentioned indications involves by necessity a careful preliminary study to be performed by specialists. The economic operation of the service is essentially subjected to its good organization with a view to obtain a maximum advantage at minimum expense. A good organization is in turn subjected to the long and sound experience gained in this field by the people who will have to perform this task.

22. The study of details necessarily involves the knowledge of some basic data such as for instance: improvement and widening of streets; their subdivision in categories; distribution of houses along these streets and number of inhabitants living there, etc.

The number of motor vehicles and personnel necessary for the two aforesaid services cannot be given with precision before this detailed and accurate survey is completed - in other words, only after a rather long period of time.

23. To provide useful elements for the study prior to the re-organization of the services, it would be advisable to establish a pilot trial in some part of the town in order to obtain, on the actual situation locally prevailing, some data indispensable even to an expert in the matter. The Media area could for instance be selected for this purpose since some of its streets show the characteristics of an old town and others are very modern. With motor vehicles it would be possible to organize in such an area a separate service of domestic waste collection and street cleansing;



the collection of domestic refuse being performed according to the double system of collective dustbins (modern streets) and of bags (old streets).

24. It should be advisable that the two new services be placed under a commonhead who should be given the opportunity of getting a basic knowledge and experience in management of services by visits and stays in other towns where institutions and offices function satisfactorily and are organized according to and in line with the above-mentioned indications.

The Government of the Syrian Arab Republic could ask the Regional Office of the World Health Organization a one year fellowship for study and travel to be awarded to the person envisaged as head of these services. This person should preferably be a technician and if possible, an engineer.

25. On the basis of information given in Damascus, it would seem that the problem of the re-organization and installation of services for the collection and disposal of urban solid wastes and the elimination of sewage is also felt in other big towns of the country although the consultant could not observe personally the situation on the spot.

26. The possibility and necessity of extending the study proposed for Damascus city to all other important towns of the Syrian Arab Republic should therefore be envisaged in order to elaborate a general national plan for the re-organization of these services.

27. Together with the problem of the organization of services for the collection and disposal of urban solid wastes stands another one consisting of the correct elimination of sewage which now causes a serious pollution of watercourses just outside Damascus.

Serious hygiene motives induce us to recommend an early study of the problem of correct sewage elimination.

28. Such a study necessitates a considerable quantity of persons and means, and especially the intervention of experts qualified in the various sectors of this field.

29. Besides, the organization of services for the disposal of urban solid wastes and sewage is an essential condition to any national programme of urban industrial and social development.

30. For this reason, the Government of the Syrian Arab Republic could deem it necessary to give a certain priority to the implementation of works for the setting up of these services.

31. If this condition is fulfilled, the Government of the Syrian Arab Republic could envisage the opportuneness of presenting to the United Nations Special Fund a request for a technical study to be performed with a view to elaborate a construction and investment programme for the establishment of an urban solid wastes and sewage collection and disposal in the main towns of the country.

32. The request to the United Nations Special Fund will be accompanied by a detailed study on the prevailing conditions as well as by a comprehensive technical and financial programme of the project presented in the request.

For the preparation of this request, the Government of the Syrian Arab Republic could envisage the possibility of asking the World Health Organization to send a group of qualified experts with a view to submit the text of the request in the best appropriate terms and following the proper lines. The Government of the Syrian Arab Republic could later on transmit the request to the United Nations Special Fund.

33. In conclusion:

- the social, economic, urban and industrial development greatly depends on the sound organization of the solid and liquid wastes disposal in the main urban centres;
- this organization can only be obtained on the basis of a very careful study which necessarily calls for the intervention of technicians well qualified and experienced in the different sectors of the operations.
- if the Government of the Syrian Arab Republic deems it necessary to give priority to the work to be performed for this organization, it could be opportune to submit to the United Nations Special Fund a request for the development of the study and the establishment of a building and investment programme;
- the request to the United Nations Special Fund could be prepared in collaboration with the World Health Organization Regional Office which will send to the country a group of experts in charge of wording the text of the request.