THE RELATIONSHIP BETWEEN THE MAINTENANCE OF INFRASTRUCTURE ABOVE AND BELOW THE GROUND

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SUMMARY

A specific problem in Rotterdam and other Dutch towns and cities are the relatively poor subsoil conditions. This causes newly laid pavement, sewerages, cables, pipes and mains to sink relatively quickly and unevenly. This means that frequent maintenance is necessary.
This paper deals with the way in which the maintenance of the road surfacing can be integrated with that of the underground utilities and what has been achieved so far in a metropolitan area such as Rotterdam. It is not so much a question of finding technical solutions but more of an organizational problem.

Sewerage, gas, water, electricity, telephone and district heating are the most commonly occurring public utilities in Rotterdam. In order to minimise cost and inconvenience, it is necessary to avoid repeatedly breaking up the road in order for renewing or repairing one or other of the public utilities.
The co-ordination and integration of activities related to road surfacing and underground infrastructure is usually a complicated process in urban areas with a large number of participants each of whom is responsible for the installation and maintenance of his own facility.

The following organizational measures can be taken to ensure that activities related to roadwork and underground utilities are carried out as efficiently as possible:
a. make one authority responsible for the co-ordination of work on the road and on the underground utilities;
b. make each participant drawing up a longterm maintenance programme for his own facility;
c. create structured consultation with the public utility companies and other participants involved in order to integrate the maintenance plans (what, where and why);
d. agree and enforce clear rules of the game for the planning and construction of integrated projects;
e. provide good and timely information to residents, shopkeepers and businesses.
In the paper the measures mentioned above are worked out. Attention is paid to the effect of retrenchment policy in the period of 1982 up to 1986.

1. INTRODUCTION

In The Netherlands the network of public utilities is usually positioned underground; in the built-up area concentrated under the public road. See figure. In Rotterdam the most commonly occurring utilities are sewerage, gas, water, electricity, telephone and district heating. The subsoil of the Rotterdam area and other western parts of The Netherlands is relatively weak. This causes rather large settlement to occur due to (road)building activities. Therefore newly laid pavements and mains are subsiding quickly and unevenly. Because of this phenomenon frequent maintenance activities are necessary. In this report the integration of the road maintenance with the work on each utility network is dealt with. The aim is to minimize cost and inconvenience. To achieve this result many problems have to be solved, in particular difficulties of an organizational nature.



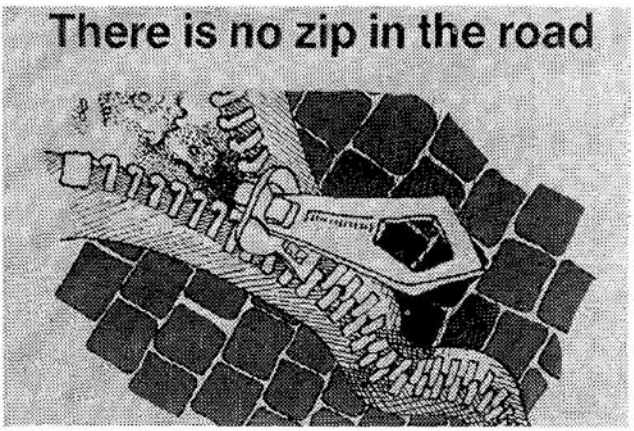
2. DEFINITION OF THE PROBLEM

When there is no co-ordination of maintenance activities for the pavement and for the underlaying mains at all, breaking up the road will occur frequently. This leads to loss of capital for in our case the municipality and to nuisance for road users and neighbours.

The co-ordination and integration of activities related to road surfacing and underground infrastructure is usually a complicated process, especially in urban areas with a

maintenance of his own facility.

The solution to this complex problem begins with a simple observation: there is no zip in the road.



For the solution of this problem five steps are to be taken, that are described in the coming chapters.

3. THE TASK OF CO-ORDINATION

Right from the beginning of this century, Rotterdam was in the unique situation of having one authority, the Public Works department, responsible for the task of co-ordinating activities related to the road and the subterranean infrastructure. This is the first step of five towards solving the problem of integrating all activities. In order to achieve integration - i.e. simultaneous realization of infrastructure above and below the ground - it is essential for the co-ordination of these activities to be carried out by one authority.
This should preferably be the road maintenance authority (this is clarified further on in this paper).

This is not, however, a guarantee of integration. The history of Rotterdam demonstrates this.
Due to the Second World War, Rotterdam was faced with an enormous backlog regarding the maintenance of the road and the mains networks below it. When, after the war, the public utility companies at last had materials at their disposal to replace, repair and extend the mains networks, the result was that the road in the city had to be broken up, closed again, broken up again etc. in innumerable places. This situation was the factor which led to endeavours to integrate these activities. Once the road has been opened up, let all the utility companies carry out necessary activities as quickly as possible and then close up the road again for a long period of time. This was the ideal they were endeavouring to attain but it was 1967 before the Public Works department

4. MAINTENANCE POLICY

Integrated execution of activities connected with the pavement and subsoil can only be achieved if the co-ordinating authority has at its disposal the maintenance plans of all the participants. In order to draw up these plans it is essential for all participants to formulate and crystallize their maintenance policy, culminating in long-term maintenance programmes.
And this is the second step in the organization problem.
Integration necessitates the formulation of a maintenance policy for roads, sewerage, cables and pipes, culminating in long-term maintenance programmes. The most important party here is the road maintenance authority.
If the maintenance policy for roads is unavailable, unclear or inconsistent, little will come of integration.
This particularly applies to the Rotterdam situation with a relatively poor subsoil conditions.

The development of road maintenance policy in Rotterdam is as follows:

After the war, all attention initially had to be directed to the rebuilding of the city and port. From 1950 the economy grew rapidly and population explosion took place.
New residential districts rose from the ground and had to be provided with streets and link roads to the rest of the city. The area covered by roads grew at top speed during that period. A clear maintenance policy for existing roads did not really exist. As a result of these developments, road maintenance in the old residential areas which had subsided was neglected.

It was only when the growth situation had more or less stabilized that a maintenance policy was developed which was aimed - from around 1967 - at these old districts of the city. For the first time, not only the pavement was renewed but at the same time the complete underground infrastructure too.
This important form of integrated maintenance was known as "street renewal". On the basis of long-term programmes drawn up by all the public utility companies involved, sections of the city were designated for this form of maintenance.
In this way, approximately 6 km2 of street renewal was carried out during the period between 1967 and 1980 as the result of a clearly formulated maintenance policy that was characterized by maximum integration.

5. CONSULTATION STRUCTURE AND PLANNING PROCEDURE

Let us return to the problem of organization and go into it in further detail.
The formulation of a maintenance policy and drawing up maintenance programmes is not in

itself sufficient.
With so many participants, it is necessary to create a structured consultation situation and to apply strict and clear planning procedures. The third and fourth steps are therefore:
- create a structured consultation situation
- apply a strict and clear planning procedure.

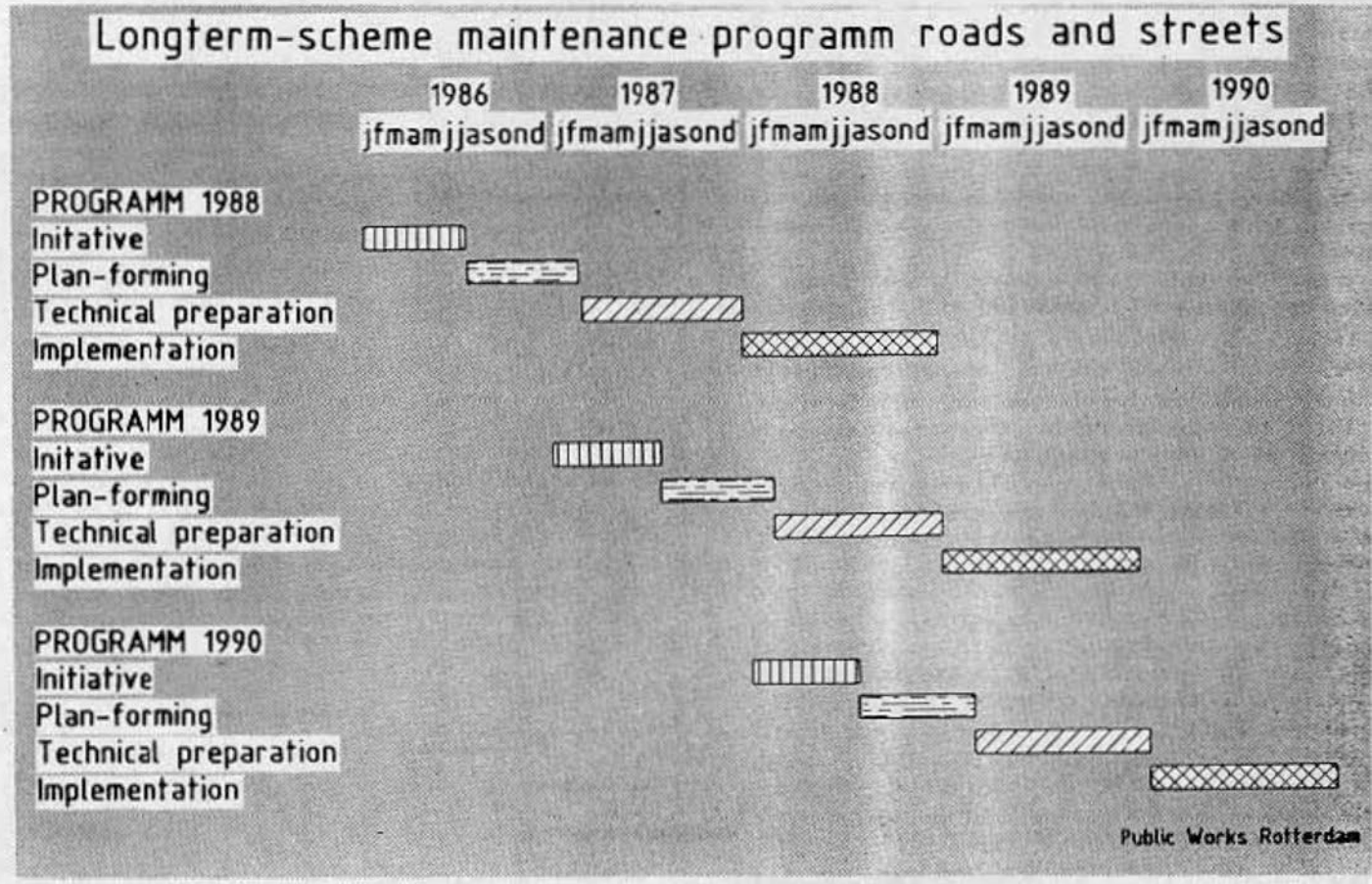
First a few words about the structured consultation situation.
In Rotterdam we call it the Long-Term-Planning Consultation. This consultation entails listing the necessary, medium-long term maintenance work for roads, sewerage, cables and pipes and these activities are synchronized so as to achieve maximum integration.
The synchrorization is also aimed at avoiding the destruction of assets in those sections which do not yet need renewing. The Long-Term Planning Corsultation is chaired by the co-ordinatirg authority, in Rotterdam this is the Road Maintenance department.
The followirg are represented at this consultation:
the road and sewerage maintenance authority, the parks and landscaping authority, the waterworks authority, the municipal power company, the traffic authority, the town planning department, the real estate corporation, the public transport company and the telephone company.

The products of the Long-Term-Planning Consultation are of course of a general nature:
long-term maintenance programmes in which projects are of course not yet worked out in detail. For this detailing a clear procedure is applied which is related to the fourth step: the application of a clear planning procedure.

The following stages can be distinguished in this procedure:
- the initiative stage;
- the plan-forming stage;
- the technical preparation stage;
- implementation.

At the initiative stage - and the initiator is usually the road maintenance authority - the project is passed on to the public utilit companies, the Public Transport company, the traffic authority and the Town Planning department for further detailing. The reactions of these parties are then processed and the final list of requirements can be drawn up. This ends the initiative stage.

In the next stage - plan-forming - the first plan is made and a first cost estimation can be made on the basis of the definitive plan. This stage ends with official approval, not for just one project of course but a collection of projects: these form the annual maintenance programme.
In the third stage - technical preparation - the drawings are made, the final cost estimation takes place, the specifications ar made and the work is then put out to tender.
In the case of large-scale projects, the initiative stage, plan-forming and preparatic take about 1.5 to 2 years, depending on the degree of complexity. The period of execution varies between 6 months and 2 years.



programme and its different stages, as described above, are shown in the scheme on the former page. This whole process is monitored of course by the co-ordinating authority. In the case of Rotterdam this is - as already mentioned - the road maintenance authority.

6. INFORMATION AND SERVICE

Prior to the execution stage, residents, shopkeepers, businesses and other interested parties are informed of this by means of announcements in local papers and a so-called "residents' letter". Good information at the the right time is the fifth and final step in solving the organizational problem. If something is announced and clearly explained well in time, the people who will be inconvenienced by it tend to react more mildly. When the work on the road is actually in progress, the authorities and the public utility companies should also be aware of the fact that great importance is attached to the service aspect.
In our situation this is of major importance.

7. POLICY MAY CHANGE

The foregoing shows the importance of a maintenance policy, resulting in maintenance programmes on a long-term base.
However, policy may change and sometimes changes can be very drastic.
In the period from 1982 up to 1986 extensive retrenchment operations took place, in order to balance the books in Rotterdam as much as possible. In this operation the maintenance of sewerage, roads and streets certainly has not been overlooked.

Giving an impression:
on pavement maintenance approximately 16 millions Dutch guilders were economized with respect to the original budget of 44 millions Dutch guilders.
On sewerage renewal approximately 6 millions Dutch guilders were economized with respect to the original budget of 13 millions Dutch guilders.

The retrenchment on sewerage maintenance results in a considerable decrease of sewerage renewal on a yearly base.
The retrenchment on street renewal has been reached by using cheaper pavement maintenance as a substitute without activities in the underground infrastructure.

It is clear that such retrenchments reduce the possibility of integrated realization of works. Moreover, on behalf of such considerable reductions of budgets, one will put expressly more priorities, which also reduces the possibility of integrated realization of works.

The above causes an increase of costs for sewerage renewal in particular.
For, when executing singular sewerage renewal, again anyway, however, at the expence of the sewerage maintainer.

Policy may change, and in November 1986 the Council of Mayor and Aldermen of Rotterdam, based on management-statements delivered by Public Works department dealing with maintenance of sewerage and pavement, decided to raise again the maintenance budget for roads for the coming four years with an amount of 24 millions Dutch guilders. The delivery of these management-statements has shown the importance of an advising technical service, such as Public Works.

8. RECAPITULATION

The co-ordination and integration of activit related to pavement and mains is a question good organization. Especially in Rotterdam w its relatively poor subsoil.
The following measures have been taken to ensure that roadwork and utility-work is carried out as efficiently as possible:

1. in Rotterdam one authority has the responsibility for the co-ordination of work on the pavement and on mains. This i the Road Maintenance department;
2. long-term maintenance programmes for the pavement and each of the utilities are provided;
3. structured consultation takes place with the public utility companies involved in regard to the maintenance plans (what, where and why);
4. a clear planning procedure for the preparation and implementation of the projects is enforced;
5. in Rotterdam much attention is paid to th provision of good, timely information to residents, shopkeepers and businesses.

These measures are recommendable for other towns or cities with similar circumstances.