Managing today's municipal systems using tomorrow's methods

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The recent emergency situation in the water system in Israel, which was brought about by the infiltration of tainted water into the national water grid, has awakened a new/old issue, which raises the following questions:

In the event of an emergency situation, what is the possibility that the local councils would have sufficient, if any, means to organize an alternative water supply for the population within an acceptable time frame?

Which source would we have at our immediate disposal that could supply sufficient quantities of running water?

It is widely known that in order to receive the necessary information to make these vital decisions regarding the characteristics of the team and equipment required to take care of problems in an emergency situation, there is a need to establish a central computerized information system, that, at the outset, would allow ready access to such information, and which would be updated according to changing situations.

Such information would include reports on vital issues such as history of breakdowns, service dates and maintenance, the elements involved and their location.

The availability and proper use of such information would enable rapid response and efficient operation in the event of an emergency situation.

On the subject of water additives, such as chlorine or fluoride, the existence of an information center would be an important tool in the pinpointing of problems in the water supply of each town and city, and also within the sources of water supply systems of each region.

Technical/financial aspects

Management of a water pipe framework: Stage 1

The map of a water system includes a breakdown of the primary and secondary framework of pipes, without having access to specific outlet points such as valves or taps used by the fire brigade. In simple terms: the movement of water in "macro".

Management of a water pipe framework: Stage 2

This entails the necessity to coordinate a complex system of laying new and conjunct pipe systems alongside an existing system, whilst eliminating to a minimum road works etc. and a significant reduction for the use of pumps.

Descriptive maps including all the necessary information, enabling the production of detailed reports from the simplest to the most complex systems.

The provision of this information would allow the production of graphs, which would include the following:

- The name of framework, its characteristics (high/low pressure, demands of supply)
- Which year the line began operation and when it was last checked.
- Valve operated or main or secondary line.
- Its length
- Its width
- If the valve is normally open or normally closed.
- If the valve is operational/non-operational.
- Access points (to first or secondary pipe)
- Its width at outset point
- Type of hydrant

The provision of this information should be in form of graphs combined with instruction on normal operational standards that would include constant and ongoing maintenance to the system, whilst paying constant attention to the annual programs both financially and technically, which are calculated on a realistic footing. In addition, every statistic generated should be used to the maximum, to create an overriding set of statistics for the entire framework of the municipality.

Passing on of this information to the relevant bodies should include details of the existing system as far as the needs to dig, and should include any one time payments in compensation for anticipated damage to various infrastructures coming under the responsibility of the local council, and payments for short term damages (repairs and burst pipes) and long term damages.

In addition, the transfer of reliable and updated information to the various planning offices allows for reliable and rapid planning, reduction in costs (the section of cost allowing for the unexpected can be removed in advance).

The availability to absorb computerized information and its speed allows for professional, reliable cooperation between the various bodies, to every party involved in the upkeep of existing water

infrastructures and in the planning and building of new infrastructures.

All these bodies, both individually and as groups, would contribute substantially to the improvement in managing the city and its frameworks and the quality of the environment for its population.

In the light of the many attempts to produce a common infrastructure, we were enlightened to discover that there exists a significant disparity in the standards between the various local councils in their information gathering systems and in their specifications for their infrastructure system. In order to guarantee that the project be carried out to a professional level and acceptable engineering standard, there is a definite need for early examination of the statistics generated by existing infrastructures operated by the local council.

In the archives of most local councils, there are programs that are available for examination. However the information provided is mostly partial, and lacking in consistency.

As a result, there is a problem with implementing these programs in field conditions where there is often a difference between theory and practice- tables outlining codes of practice from the local council.

The local council archives do not act as a reliable indicator of the statistics generated in the field and there exists a need to generate statistics founded on information generated in the field and authenticated by quantity surveyors - operations which will guarantee the foundation of infrastructural archives and the creation of a source of complete and reliable information.

Gathering statistics in the field

This method guarantees a high level of reliability in the level of statistics and their merit. The procedure of assembling information is carried out in three stages:

1. Gathering information from programs and background information- before mapping out the area and infrastructure - based on photographic maps belonging to the local council.
2. Gathering information in the field.
3. Calculations based on the information using pre–determined factors generated by the archives.
4. Gathering of statistics both in the field and through the archives:

Control boxes are placed in the field and programmed to operate according to the statistics generated in the field and stored in the local council's archives. It should be stressed that in these programs we have to relate to the mapping out of the infrastructure in new neighborhoods, by transferring the information to the local council by means of a computer program "AS –MADE".

Statistics relating to the infrastructure will be compiled within the program housed in the local council and will be included in an information pool established by planning engineers in the private section.

All the statistics generated within the various projects will be absorbed using a fixed standard. The standard to be developed will increase the need for production of site maps of a high standard.

Technical stipulations regarding methods of gathering computerized information.

Source of the material are from maps "AS-MADE". This source has a few problematic points in its absorption of material and later in its processing.

The material relating to infrastructure in the "AS-MADE" maps is often incomplete.

- Statistics generated by "AS-MADE" are not geographically compatible- they have no coordinates. Accordingly comparisons to the information, in this case, are liable to be a general comparison only.
- The backgrounds which appear on these maps (areas of definition and /or buildings and other objects) are not displayed clearly enough and are often inaccurate.
- Measurements (scale) on "AS-MADE" maps are liable to be inconsistent. To emphasize this, there are many cases that the length measurements (numbered) are incompatible with the scale written on the map. In some maps there is an overlap between one map and the other, and there are often variations in the information displayed on the two maps.
- Every function demands a date to be placed on the map. Similarly, there are many problems in downloading information from these maps, in other words, there could be problems in correlation of information.
- There is no "index" map with "AS-MADE".

Regarding the maps themselves, there is a lack of information which "bridges" the information between the various valves and their topographical surroundings (Measurements which are liable to cause problems relating to the geographical situation of the valves).

In the light of the points raised there is a need to emphasize that it is not possible to gather information to the highest level of geographical accuracy of infrastructures.

The following has to be considered:

In the cases of overlapping between information displayed on the map and between the new photogrammatic level to which the framework has been added, the user is obliged to use his own discretion regarding the statistics.

Each street requires its own preparatory work- before absorption-in order to make certain that the continuity and the overlap between the various "AS-MADE" maps have included the particular street.

It is impossible to make geographical comparisons (for example in cases of coordination of infrastructure) between statistics relating to water and other sets of statistics (for example sewage, lighting etc.)

Naturally, the question arises: If and when to invest the necessary sums to set up the infrastructure project?

In order to arrive at a decision to set up the project and on the method of information gathering that the municipality will opt for, it is necessary to ascertain what is being aimed for:

1. If the data available is to be only used as a basis for discussion.
   pipeline infrastructure at Stage 1 only.
2. If the data available is to be only used as a means of coordinating the framework-pipeline infrastructure at Stage 2.
3. If the data available is to be only used as a major factor in calculations and worked with as a major basis in our planning philosophy.