

Research on Sewage Plant Maintenance and Networking

Whole term

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(Purpose)

Coverage of sewage in Japan has reached nearly 70%. Percentage of maintenance cost in sewage service is now growing against construction and promotion. Its cost tends to increase due to the growth of the sewage business. In addition, reconstruction and renovation of sewage is also a serious problem in cities built in early stage.

Purpose of this research is to

- A) specify issue that all sewages have in maintenance
- B) define common solutions of cutting maintenance cost
- C) make technological manuals upon collections of the outcomes below.

This project's been studied in cooperation with a "Research on Development of Sewage Networking."

(Results)

There are two steps to cut maintenance cost of sewage plants;

- 1) Cutting maintenance cost in a single plant
- 2) Cutting maintenance cost through plants networking

Our research is almost done with 1). 2) will be examined deeply in the rest of the term.

To cut maintenance cost in a single sewage plant, the results we've got are as follows:

To analyze the maintenance cost of sewage plant, it is effective to use two methods. One is "Analysis of maintenance costs'elements", the other is "Analysis of sewage plant's weaknesses"(See Figure-1) .

- From analyzing maintenance costs'elements, we will specify reduction points such as personnel, electricity, chemical, and so on.
- From analyzing sewage plants'weaknesses, we will be able to find what kind of reconstruction or renovation is needed to improve the maintenance cost.

(Summary)

Cutting maintenance cost of a single sewage plant - There are two ways to access this theme. Considering below items generally will specify reduction elements.

Analysis of : 1-a) Elements of the maintenance costs, 1-b) Weaknesses of sewage conduction (see figure-1 to refer the process). From those two points of view, we'll see what to improve first.

1-a) Analysis of the maintenance costs'elements ; personnel, electricity, and chemicals etc. We use two analytical techniques to define what kind of elements to be reduced.

1-a-1) Quantitative analysis from cost data - to use data of maintenance cost from "sewage statistics" , and compare same size plant that needs to examine. The comparison will define which part costs more than the average.

1-a-2) Qualitative analysis from operator's sense - to take questionnaire from the operator what is possible to cut. The outcome will be the source to prioritize some deduction elements through "Analytic Hierarchy Process (AHP)".

1-b) Analysis of sewage process'weaknesses - to attempt what is to be repaired to keep sewage functions and to save maintenance costs of sewage facilities.

In this point of view, we decided to use two diagnosis by using “Functional Diagnosis of Major Sewage Treatment Equipment” :

1-b-1) “Functional Diagnosis of Treatment Process” - to investigate what caused those when index shows “poor water quality”, “too much expenditure on electricity” or other worsening points.

1-b-2) “Functional Diagnosis of Treatment Equipment” - to judge sewage plant’s facility numerically if “inspection is done properly”, “service life is over”, etc.

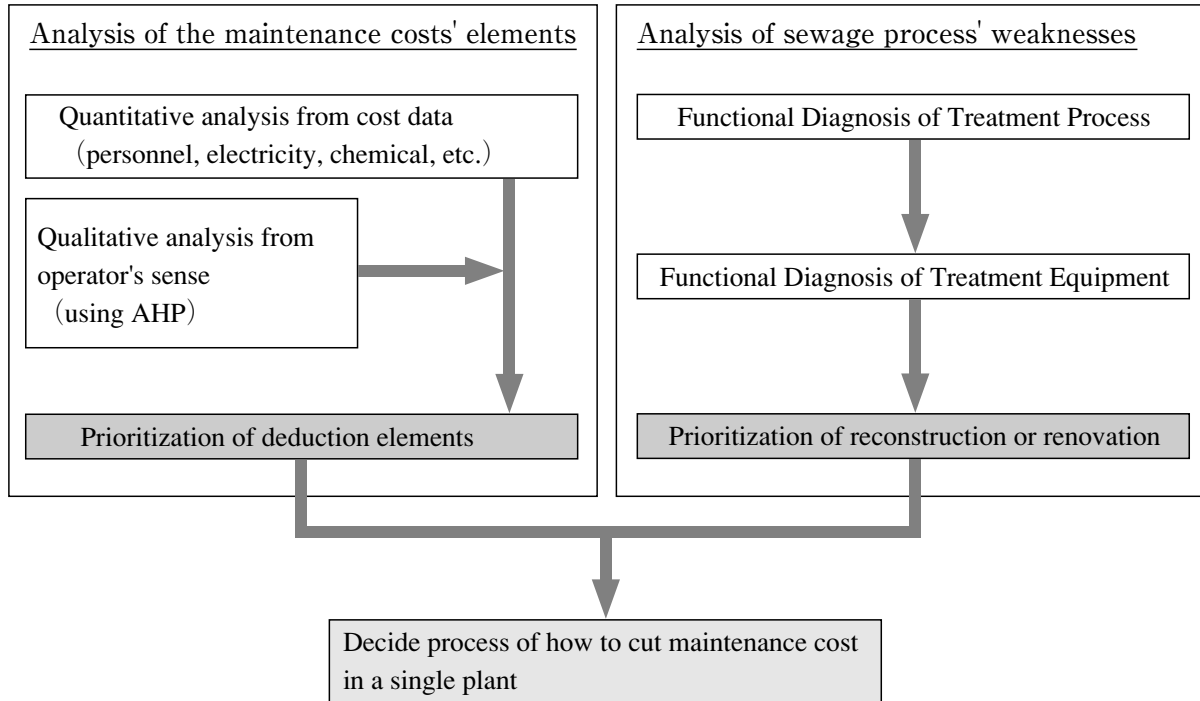


Figure-1 Diagnostic Flow Chart of Cutting Maintenance Cost in a Single Plant

Then we could specify prioritization of reconstruction or renovation for each plant with concerning the importance of the facilities.

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key words

Network, Maintenance element, Treatment process element