

# Research on guidelines for extension of life-span of manhole type pumping stations (Nagano prefecture, Sewerage system organization of Nagano Prefecture)

Year of Research

2011・2012

Appropriate stock management

**(Purpose)**

With sufficient consideration on financial conditions of local governments, study of preparation methods to make efficient maintenance plan of manhole type pumping stations (hereinafter referred to as “MP”) reflecting conventional maintenance works. Making a guideline for supporting preparation of workable plans to extend life-span of MP in mid-and-long term.

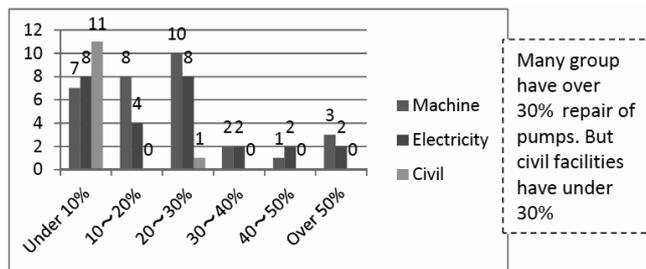
**(Results)**

**(1) Drawing up efficient maintenance plans and countermeasures against corrosion of MP**

① An efficient maintenance plans and countermeasures against corrosion of MP based on the results of the research conducted in winter in 2011 were reviewed by adding the results of a water quality survey and measurement of density of hydrogen sulfide which were carried out in next summer. A conversion factor of formula to estimate of density of hydrogen sulfide from BOD was set for the winter survey and applied to the results of the summer survey. As a result of that, the estimation was almost close to the actual measured density. This proves that the conversion factor can be applied throughout the year. Given these facts, an appropriate frequency to maintain MP according to the estimated density of hydrogen sulfide.

**(2) Making a guideline for the extension of life-span of MP**

- ① Actual state of replacement of the parts for MP by hearing from manufacturers about how to replace parts and maintain.
- ② A guideline was made by getting local governments to fill out questionnaires regarding frequencies methods of inspection, methods of repair and parts replacement. (Fig.1)
- ③ In order to conduct systematic maintenance, objective and unified inspection records need to be accumulated. The following items were taken into account;



**Fig.1 Results of questionnaires**

**Table.1 Example of methods of soundness evaluation**

Target	Point of decision	Contents of decision	result	Soundness
Pump	Casing	Corrosion and damage Hypofunction below; ・ A wear by corrosion occurs, and it causes decline of capacity of pumping up ・ A wear by corrosion occurs, and it causes abnormal oscillation and poor strength		
	Impeller	Oscillation Hypofunction below; ・ A wear by corrosion occurs, and it causes decline of capacity of pumping up ・ A wear by corrosion occurs, and it causes abnormal oscillation and poor strength		
	Attach/remo ve device	Corrosion and damage Hypofunction below; ・ A wear by corrosion occurs, and it causes decline of capacity of pumping up ・ A wear by corrosion occurs, and it causes abnormal oscillation and poor strength		
	Motors	Working state Hypofunction below; ・ Abnormal sound, heat, oscillation and noise occur, and it cannot revise		
	Cables	Passing time Hypofunction below; ・ An excess of survice life occurs, and it causes decline of capacity		
Agitati or	Agitator	Working state Hypofunction below; ・ Abnormal sound, heat, oscillation and noise occur, and it cannot revise		
Conveying pipe	Conveying pipe	Conveying pipe Hypofunction below; ・ A wear by corrosion occurs, and it causes decline of capacity of pumping up ・ A wear by corrosion occurs, and it causes abnormal oscillation and poor strength		
Class of decision		5 : No problem 3 : No problem on function, but progress of degradation 1 : Cannot work	4 : No problem on function, but symptom of degradation 2 : Difficult to function and difficult to repair	

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Key words

Manhole type pumping station, Plan for the extension of facility life, Inspection, Research, Maintenance