

Newsflash 1

Section: sectie sewage treatment No 1

Experiments on the prevention and removal of scale using “*Scalewatcher*TM”

1 The end user

At the sewage treatment works in city “A”, Japan, Holland Industrial’s *Scalewatcher*TM was fitted to the outlet piping of the absorption cooling circulation tank as one stage in the scale prevention process for the circulation piping of the absorption cooling tower, and a “Scale adhesion prevention and removal test” was carried out. The importer has been carrying out tests at various facilities over a period of approximately 2 years, and success has been achieved in the prevention and removal of silica, calcium and other minerals, *Scalewatcher* is also widely recognised world-wide, and has achieved a marvellous sales record since its release in 1988. This test is based on the results of these earlier researches.

2. The Experiment

At the sewage treatment works in city “A”, sulphur oxides and nitrogen oxides generated by the incinerator are processed by nozzle injection, with caustic soda solution being circulated in the absorption-cooling tower. Scale adhesion within the circulation piping in these processes gives rise to operational problems. With this in mind, test were carried out to investigate the effectiveness of the scale adhesion prevention provided by *Scalewatcher*TM

- Test location : Sewage treatment works, city “A”. (Incinerator/absorption cooling tower) photo NR. 1
- Test term : 20th December 1995 ~ 17th April 1996
- Test operators : Nippon Health Industries Co. Ltd. Chemical Services Commercial

2a Outline of the test

A cable coil is wound around the outside of the pipe (11 turns) and an inductive molecular mixing phenomenon is generated by frequency modulation, while at the same time the alternating magnetic field is constantly changed: the prevention of adhesion of calcium mineral scale etc. on the coiled current side and the gradual softening of already-hardened scale is tested.

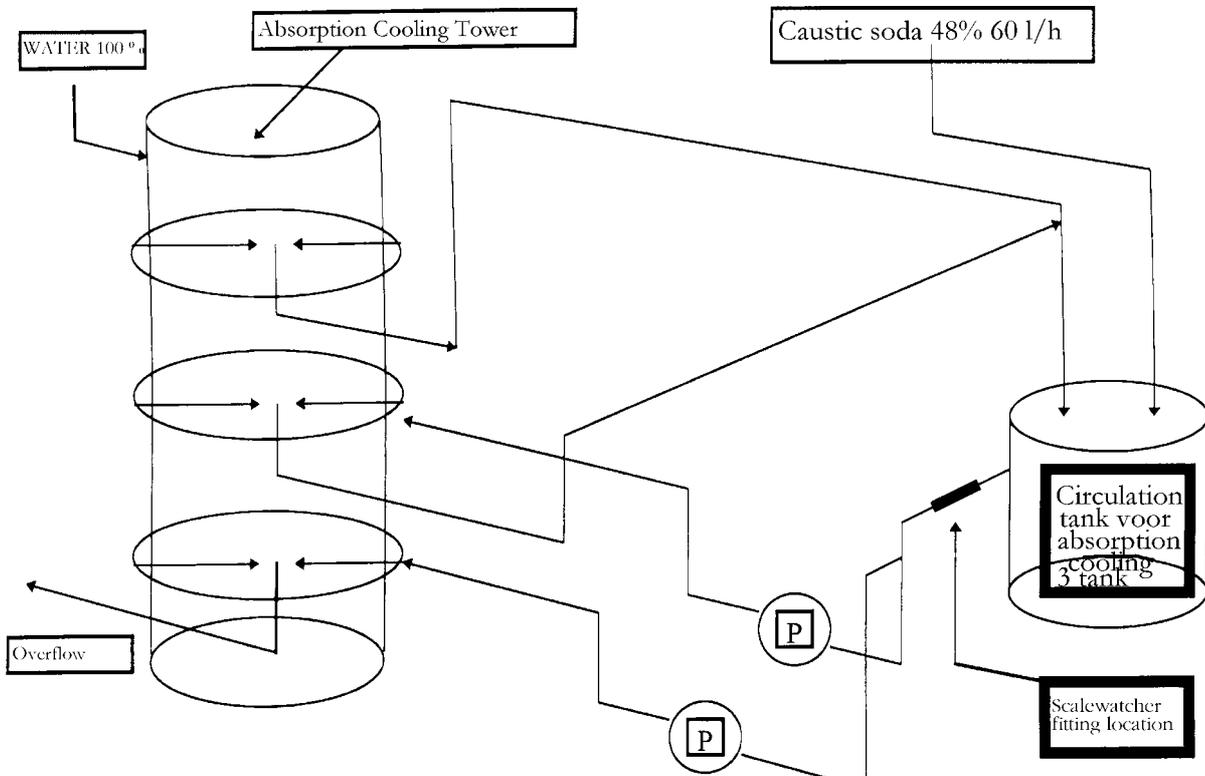
The *Scalewatcher*TM was fitted to the absorption-cooling tower of the incinerator and the absorption cooling tower circulation piping, and its effectiveness measured. The circulation flow of the absorption-cooling tower is shown in fig 1, and the *Scalewatcher*TM installation in photo 2.

2b Equipment

- *Scalewatcher*TM unit (type3 [SM-DM4B], Power supply: 100 VAC, power consumption 6W)
- Signal cable : (Standard cable: Handles pipe temperatures to 100° C.)

2c Test method

Cable coils were fixed on the outlet pipe of the absorption-cooling tower circulation pump and an electric current was passed from the *Scalewatcher*TM unit when pump operation started. The scale adhesion status was checked twice, after two months and four months approximately, with the pipe removed. In addition, the outlet pressure and the electric current value of the pump were recorded approximately once every ten days, in order to check the effectiveness without having to remove the fixed piping.



2d Working procedure

The working procedure was shown in Table 1.

The location of the *Scalewatcher*TM and the circulation water data are shown in Table 2.

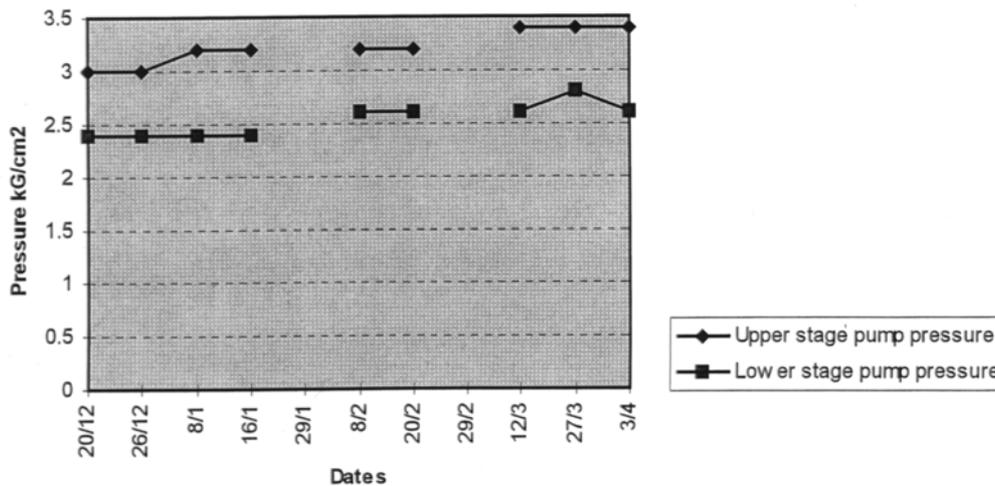
Table 1 : Working procedure

	Dec 95	Jan 96	Feb 96	Mar 96	Apr 96
Scalewatcher setup	■				
Incinerator working periods	■	■	■	■	■
Incinerator idle periods	■	■	■		■
Checks of condition within fixed piping	■		■		■
Checks of pump meter value	■	■	■	■	■
Report writing					■
Scalewatcher removal					■

Table 2 : Location of SCALEWATCHER and circulating water data

Setup location		Caustic soda tank outlet
Circulating water	Water	100 (m ³ / H)
	NaOH	60 (48% NaOH · l/H)
	Flow amount	1668 (l/H)
	Temperature	Approximately 60 ° C
Pipe structure		100 φ piping, 50 φ piping, nozzle - all SUS316

Table 3: Comparison of pump meter readings



5. Inspections

1 Normal status **Scalewatcher**TM not fitted

Approximately 3 months after chemical washing and cleaning of the pipes, around 10 mm of scale ranging from white to light brown in colour had formed in the 100 Ø piping.

In the 50 Ø piping, spray nozzle and vicinity, the piping was completely blocked (photos 3 and 4).

2 Two months and four months after fitting the **Scalewatcher**TM

Both two months and four months after cleaning, no scale had formed in the 50 Ø piping and 100 Ø piping spray nozzle and vicinity, and a thin film of 0,3 mm or less had formed. This is the scale prevention effect of the **Scalewatcher**TM (photos 7 and 8).

At two months after cleaning just over 10 fragments of scale had collected at one of 5 locations in the middle nozzle of the absorption cooling tower circulation piping, the fragments “ size being in the region of 5 x 10 x 3 mm”.

This was thought to be scale, which had adhered to the pipe wall despite the cleaning: having thinned and peeled off due to the effect of the **Scalewatcher**TM it had collected at the nozzle. This can also be considered an effect of the **Scalewatcher**TM.

3 Circulating water pH.

During the period of approximately two months from 20th December 1995, when **Scalewatcher**[™] was fitted, to 29th February 1996, the circulation water pH was made 5.6 by the quantity of caustic soda supplied in normal status.

During the following period of around two months, from 1st March to 17th April 1996, conditions much more favourable to the formation of scale were created by increasing the supplied quantity of caustic soda to a level higher than normal and raising the pH of the circulation water. The effect of the **Scalewatcher**[™] was again tested.

However, even when the pH was raised to create conditions wherein scale easily, scale formation was absent due the effectiveness of the **Scalewatcher**[™]

4 Circulation pump outlet pressure/ electric current value (photos 5 and 6)

The outlet pressure and electric current values showed no substantial change, both two months and four months after fitting **Scalewatcher**[™] (see Table 3).

3 Conclusion

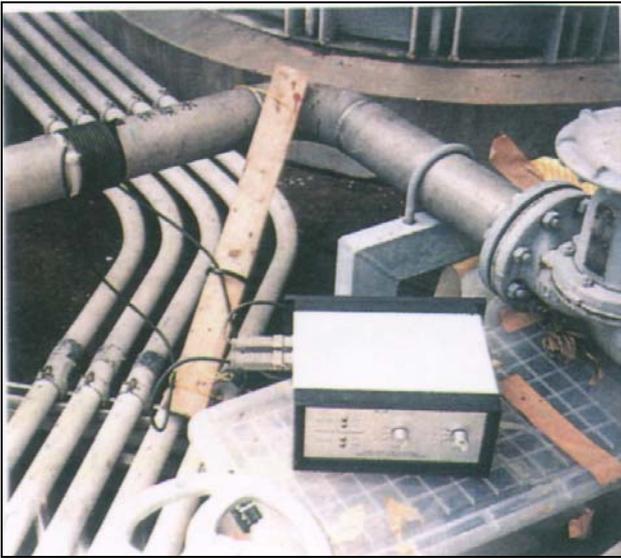
Fitting the **Scalewatcher**[™] ensures the prevention and removal of scale in cooling tower circulation piping, without friction or shocks to the piping and with a mere 6 W power consumption. This not only solves the piping scale problem but also reduces the considerable necessitated, till now, by four monthly pipe cleaning (including chemical washing), and means a reduction in expenses can be expected.



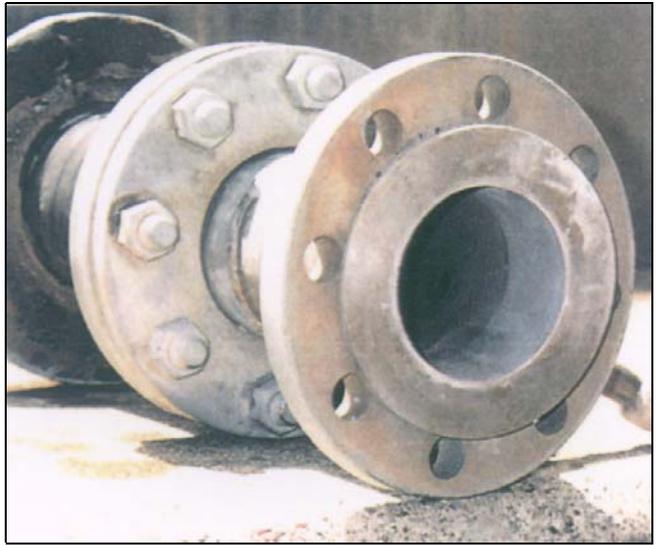
nr 1



nr. 4



nr 2



nr. 5



nr. 3



nr. 6