

TEMPORAL PUMP OPERATION

Annex 5

付属資料5: 水産局ハッチェリーポンプ
運転マニュアル

MANUAL

June 2013

INTRODUCTION

Fisheries Department's hatchery faces a serious problem in supplying of quality seawater to reared marine species. Everyday salinity of rearing seawater varies regularly between 23-25 and 35-37 ppt. It was not known when the problem had started but so far the rearing seawater frequently changes its salinity in corresponding to tidal cycle, not to rain fall. By periodical monitoring, it was found that the salinity dropped below 25 ppt during a period from the lowest tide to about 2 hours before the highest tide. This lower end will be lethal to some animals. To avoid physiological problems among the animals, it had better to stop supplying of seawater during the low salinity period. It is of course needed to trace and solve the problem in the current water intake system, especially in the seawater introduction system.

PROCEDURE

This is a temporal measure against the current problem.

Step1 Get a tide chart

To manage the quality of seawater, tides of Port Vila harbor must be known.

Step2 Learn how to use a refract-meter

A refract meter is used for measuring salinity of seawater. Adjust 0 before use (=Calibration). Clean thoroughly after every measurement with freshwater.

Step3 Learn the present seawater systems

The present seawater intake/supply system must be well understood.

Step 4 Pump operation for a stop

At 1 hour before the lowest tide

- 1) Close the main water delivery valve to fill up the elevated seawater storage tanks with strong strength seawater (Pic1). When the tanks become full, the water will overflow (Pic2,3). If salinity of the delivered seawater had been dropped below 30ppt, skip this step. In that case, the pump should be stopped as soon as possible.



Pic1 The main valve (w/ blue handle) is located outside the pump house.



Pic2 4" drain pipe from the elevated water storage tanks appears in the center of this picture taken at the water discharge pit.



Pic3 Discharge of overflowed water. Now the tanks at the top of the pump house become full.

- 2) Turn off the power switch for PUMP-1 (Pic4). Immediately close the stop-valve of the pump (Pic5).



Pic4 This power switch is located on the control panel.



Pic5 Close the stop valve for the seawater intake pump.



Pic6 Do not remove the plastic cover to protect the pump from drips of seawater.

- 3) Open the main valve again (Pic7) to supply a small seawater to tanks (Pic8) for maintaining the water level.



Pic7 Adjust delivery of rearing seawater by seeing water flows at the inlets of the tanks.



Pic8 Flow rates depend on weather.



Pic9 For example, seawater can be supplied for more than 3-hours at this flow-rate. If water supplies at the normal flow-rate, the storage tanks become empty within 1 hour.

Let seawater run until the storage tanks become empty.

Step 5 Pump operation for a restart

At 2 hour before the highest tide

- 1) Restart the pump while backwash the sand filter (Pic10-12).



Pic10 Select the backwashing mode in the sand filter controller.



Pic11 Fully open the stop valve for the pump.



Pic12 Turn on the switch for the pump.

- 2) For replacing seawater in the water intake pit, backwash the sand filter then check salinity of newly introduced fresh seawater (Pic13 &14).



Pic13 Wash the filter material for a while (more than 10 minutes). Discharge muddy water into drainage.



Pic14 Check salinity of the seawater at the sand filter drain pipe.

If salinity is,

less than 27 ppt: Stop the pump and wait for another half an hour. Then repeat the same procedure.

27-29 ppt: Flow slowly until salinity recovers over 29 ppt.

More than 29 ppt: Go back to normal operation with proper flow rates.

NEVER fill up the empty tank with low salinity seawater.

Step 6 Pump operation for the night

Pump can be run after working hours by reducing water flow-rate.

- 1) Before go back home, just fully open some inlet valves for the tank that has no animals. For example the R-1 fiber glass tank is now available (Pic18). No need to adjust other inlet valves. The following day just close the valve to raise other inlet flows.



Pic18 The main valve (w/ blue handle) is located outside the pump house.