Overview of Survey on Co-benefits Approach to Wastewater Treatment in Indonesian Fish Processing Industry

(1) Objective of the survey

The purpose of this survey is to reduce water pollution in public water through the introduction of competitive technologies of wastewater treatment from Japan to treat wastewater in fish processing industry in Indonesia. This project also aims to help prevent global warming by reducing greenhouse gases (GHGs) from untreated and discharged wastewater and introducing wastewater treatment technologies that consume less energy than conventional ones. Furthermore, these technologies are disseminated through capacity building during the survey process.

(2) Details of the survey

1) 1st phase (FY2011-2014)

- FY2011: Survey the situation facing fish processing industry and laws and regulations in Indonesia
- FY2012: Select factories to be used for a verification survey, search co-benefits technologies of wastewater treatment that Japanese companies have, and select technologies to be introduced
- FY2013: Install pilot plants to be used for the verification survey and operate them on a trial basis
- FY2014: Fully operate pilot plants for the verification survey, analyze results of measurement and evaluate effects of the introduction

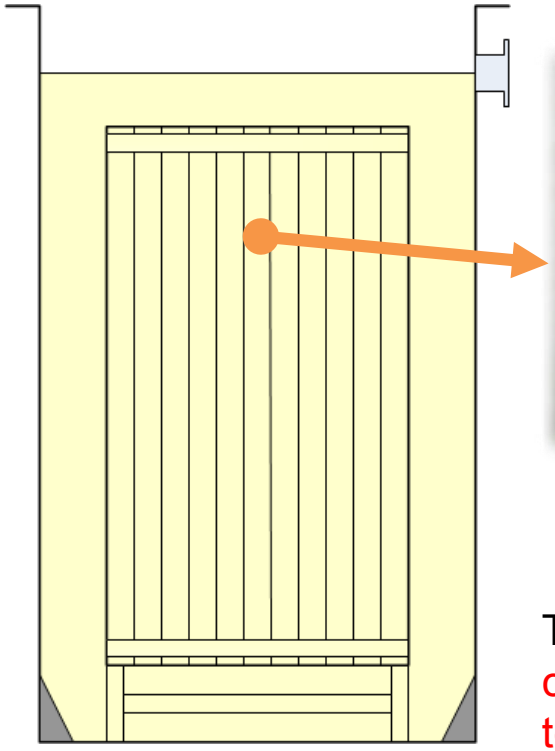
2) 2nd phase (since FY2015)

To achieve higher co-benefit effects, wastewater treatment technologies introduced in the first phase are improved (introduction of anaerobic treatment) and the verification survey of wastewater treatment is carried out at several fish processing plants.

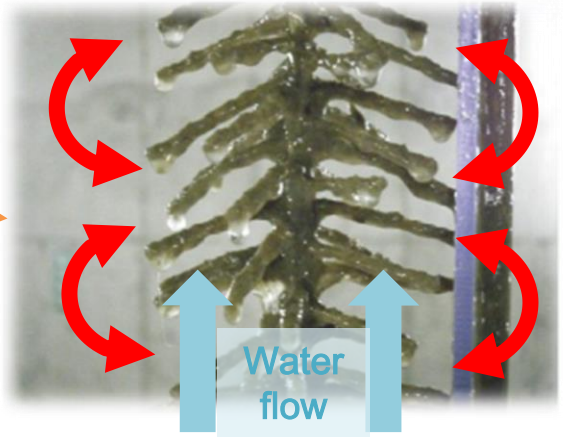
1. Wastewater treatment technologies used for verification survey

(1) Characteristic of swim bed contact aeration

- A characteristic of a swim bed contact aeration treatment is that relatively large microorganisms are attached at fringe installed inside a reaction tank and they are immobilized in the tank, so that sludge retention time (SRT) can be kept longer and oil can be decomposed.



Swim bed tank



Swim bed (fringe)

Swim bed installed inside a tank

The fringe vibrates up and down by the use of water and continuous cycle of microorganisms being peeled off and attached to the fringe is repeated, resulting in higher concentration of sludge in the tank. Microorganisms that decompose oil propagate, helping treat wastewater.

- As the fringe moves with microorganism, conventional problems such as clogging and simultaneous peel off are unlikely to happen compared with ordinary fixed bed.

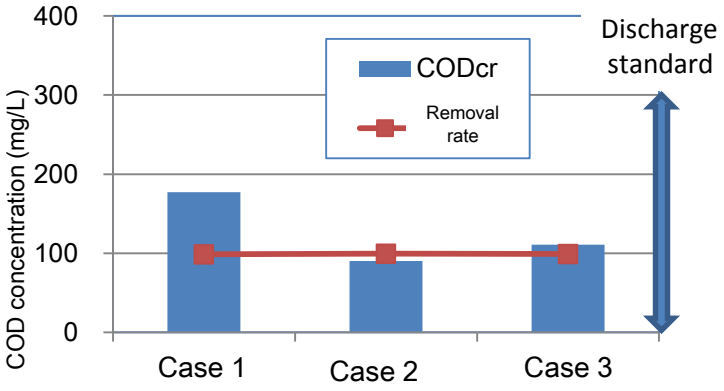
2. Results of the Verification Survey

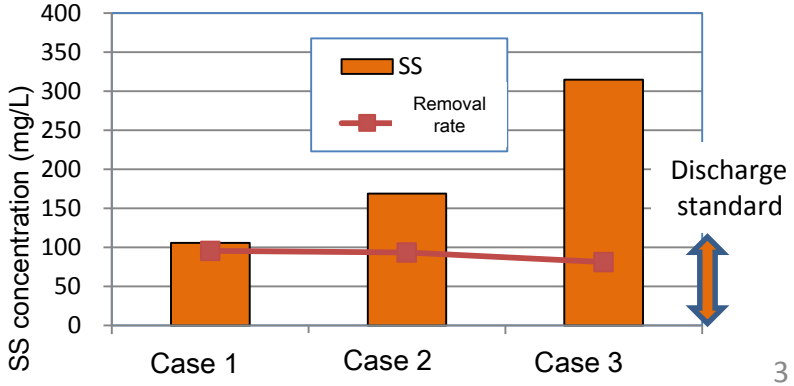
(1) Quality of treated water and removal rate as a result of wastewater treatment

- Removal rate of CODcr was higher than 98% in all cases, with quality of treated water meeting the discharge standard.
- High removal rate of SS was shown in Case 1, but lower removal rates were shown in Cases 2 and 3.

		Case 1	Case 2	Case 3
CODcr	Before treatment	13,970	13,564	13,496
	After treatment	177	90	111
	Removal rate	98.7	99.3	99.2
SS	Before treatment	2,673	2,673	2,345
	After treatment	106	169	315
	Removal rate	95.6	93.5	81.3

Note: Experiment operations were carried out under both a design value and an energy-saving mode. Operation under the design value is shown in Case 1, an aeration control mode and an intermittent operation mode are Cases 2 and 3 respectively.

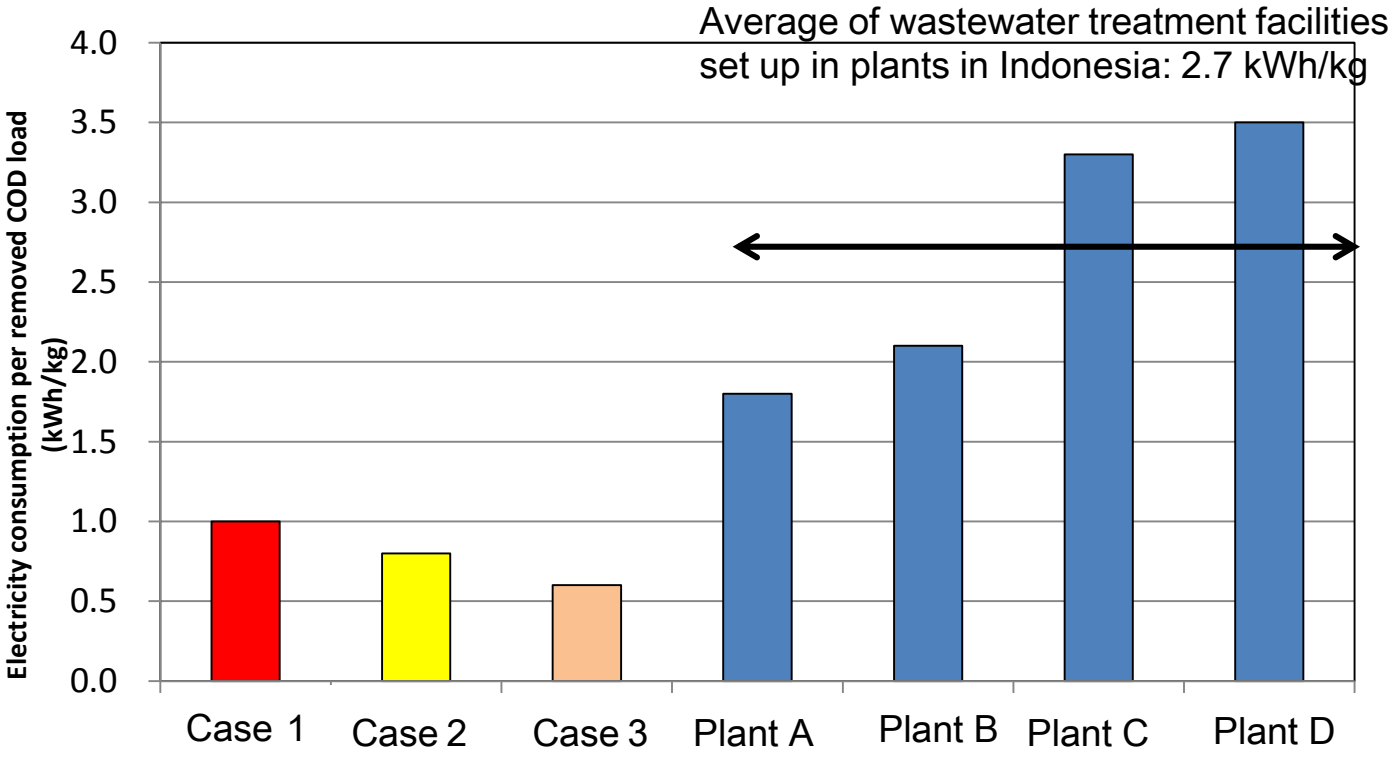




2. Results of verification survey

(2) Energy consumption

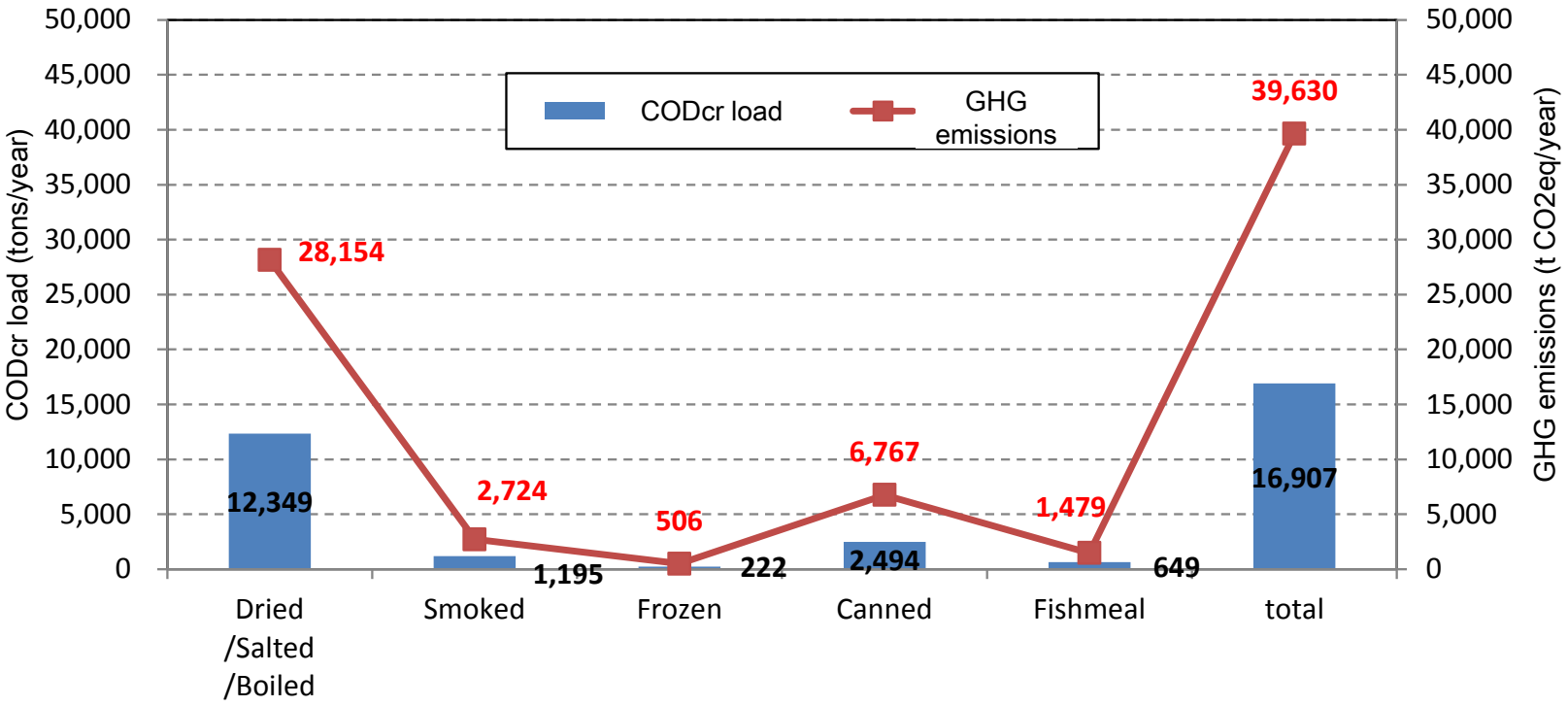
- Energy consumption for Case 1 (electricity consumption per removed COD) was about one-third of the average of activate sludge process used at plants in Indonesia, where industrial wastewater is treated.
- Although energy consumption was even less in Cases 2 and 3, we concluded that the ideal method was in Case 1 from the result of water quality.



3. Potential effects on the introduction of co-benefits approach to wastewater treatment

(1) Estimates of the current COD loads and GHG emissions

- COD loads and GHG emission were estimated based on the production, amount of wastewater and the number of wastewater treatment facilities introduced in fish processing plants in Indonesia. The graph below shows the estimated COD loads and GHG emissions in each industry (each type of processed fishery products).
- Organic matter loading equivalent to domestic wastewater for about 700,000 people arises from fishery processing plants.



3. Potential effects on the introduction of co-benefits approach to wastewater treatment

(2) Reduction of the current COD loads and GHG emissions

●COD loads and GHG emissions are estimated in the following three technologies: current method; activated sludge treatment (as a reference technology); and the co-benefits approach to wastewater treatment.

● COD loads and GHG emissions are estimated to be able to reduce by 97% and 79%, respectively, if the co-benefits approach to wastewater treatment is installed.