Vietnam - JAPAN ENVIRONMENTAL WEEK

Asian Water Environment Improvement Model Project

Project of Recycling Wastewater from Viet Nam's Textile Dyeing Factories

December 15, 2021

JTOP Co., Ltd. Sojitz Corporation

Next-Generation Environmental Purification System



Measurement: W4,800mm X L3,800mm X H2,800mm

We offer a wide range of products, from standard to custom-made and mass-produced equipment that can meet customer needs. We design, manufacture, and sell water and gas purification treatment equipment using activated carbon.



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- Test result on pilot test equipment -

Removal of Color

Colored wastewater



- TOC: 712mg/L → 276mg/L
 - ♦ Livestock drainage



- TOC: 120mg/L → 8mg/L
- ♦ Pyroligneous Acid Liquid



BOD: 4,700mg/L ⇒ 300mg/L

Removal of Odor

Industrial wastewater



- BOD:12,000mg/L**⇒680**mg/L
- ♦ Wastewater from manufacture of black sesame Phenol



Cleaning drainage



TOC: 120mg/L → 13mg/L

Removal of Toxic Materials

Odorless

Odor

less

Removal of Turbidity

♦ Factory drainage

: 14,000mg/L ⇒ 0.5mg/L

♦ Factory drainage

: 9,900mg/L → 2,600mg/L

Smell of

chemicals

Formaldehyde

Smell of

Chemicals

 Organic Chemical Plant Wastewater



1,4-dioxane : 150mg/L **→** 0.4mg/L

Cosmetic factory drainage



Extraction with *n*-hexane : 240mg/L → 3mg/L

Project of recycling wastewater from Viet Nam's textile dyeing factories

Implementation systems

JTOP Co., Ltd., Sojitz Corporation, Sojitz Viet Nam Co., Ltd.

Background

- Vietnam's textile and apparel industry is the country's mainstay industry.
- While textile factories in Viet Nam use surface water as their main source of water for their operations, Viet Nam is located at the most downstream of the two major rivers, the Mekong and the Hong. More than 60% of surface water aforementioned, originates from other neighboring countries located up-stream. In Viet Nam, excessive extraction of well water has caused land subsidence and contaminated surface water mixed up with well water, leading to groundwater contamination.
- Textile dyeing factories face difficulty meeting the standards for discharging water into the river due to inadequate understanding of the current regulations, the high cost of investing in and maintaining wastewater treatment plants and inadequate technology used during the dyeing process itself.
- In addition, since Viet Nam's textile and apparel industry is heavily dependent on water and energy, the Viet Nam Textile and Apparel Association and the World Wide Fund for Nature have proposed the recycling of wastewater as one of the solutions to address the lingering issue of sustainable water management within the industry.

Project outline

- To test our automatic regeneration activated carbon filtration system, installed to an existing treatment facility, to treat wastewater to appreciable and reusable quality and standards.
- In the study phase, the ultra-compact testing machine will be used for the local adaptability tests of the system. It is to consider further demonstration project plan and business model with the results.

Location

Socialist Republic of Viet Nam Ho Chi Minh City and surrounding areas

Outline of technology

Instead of using conventional activated carbon treatment, which is highly effective for advanced wastewater treatment but expensive due to its disposable nature, we introduce the "automatic regeneration activated carbon filtration system". This system applies our own patented technology enabling to recycle activated carbon on-site. This technology allows factories to reduce the running cost of wastewater treatment, and to reuse treated wastewater in the facility.



Expected results and business prospects

- Reduction of the environmental impact of factory effluent
- Improving productivity and contribute to the development of the industry
- Developing the local industry based on local manufacturing
- Expanding our business to other industries such as the chemical industry, etc.

Details of FS study in FY2021

- 1. Business model development
- 2. Local situation survey
 - River environment (water quality survey)
 - Status/policy of regulatory authorities (Ministry of the Environment, administrative agencies)
 - Compliance status of local factories
 - Compliance requests from buyers
- 3. Investigation of local EPC companies (local partner companies) and textile dyeing factories (candidates for demonstration projects)
- 4. Sample testing of factory wastewater using small test equipment to confirm treatment capacity

Implementation details of the demonstration and verification projects for FY2022 to FY2023

- Demonstration test: FY2022 to first half of FY2023
- 1. Demonstration test at a local textile dyeing factory to confirm local applicability of the equipment
- 2. Building relationships with local EPC companies We had business meetings with Goshu Kosan and WASOL
- Verification project: Second half of FY2023
- 1. Verification of business model
- 2. Compilation of issues and study of proposed countermeasures
- 3. Dissemination of the equipment by holding seminars, etc.

Project Implementation Structure Status of Coordination with Vietnamese Government, Cooperating Companies, etc.



Collaboration with EPC companies



The small test device has already been exported and is currently being assembled. Trial run is scheduled soon.

ODA Project in Indonesia – Wastewater recycling system



Sample test was conducted in the FS project using ultra-compact testing equipment.

Sample test using small testing equipment

Sample treatment tests of wastewater from the candidate factories for the demonstration project will be conducted using ultra-compact test equipment before the actual equipment is used for the tests in the demonstration project. Experiments on the regeneration of activated carbon will also be conducted. Demonstration tests using the actual equipment will be conducted at the factories with the best results to increase the likelihood of success of the project.

Demonstration project using actual equipment

We will conduct demonstration projects using actual equipment at local factories selected through sample tests to evaluate the operational performance of the equipment.

The JICA Project

Sample test using small testing equipment





 $\begin{array}{c} \mathsf{Raw} \to \mathsf{Treated} \\ \mathsf{Water} \end{array}$

Demonstration project using actual equipment at a local factory





Expected effects of water quality improvement after installation of the system

Water quality analysis results of raw water and treated water Analysis values from JICA's demonstration project in Indonesia

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Analysis item	Raw	Treated	Regulatory value [*]
рН	7.11	7.21	6.00 - 9.00
TSS (mg/L)	80	38	50
BOD ₅ days 20°C (mg/L)	19.07	3.20	60
COD by K ₂ Cr ₂ O ₇ (mg/L)	48.43	8.11	150
Phenol (mg/L)	0.01	< 0.005	0.50
Total chromium (mg/L)	< 0.03	< 0.03	1.00
Total nitrogen (mg/L)	9.76	7.93	8.00
Sulfide (mg/L)	< 0.01	< 0.01	0.3
Oil & Grease (mg/L)	2.5	< 2	3.00

Demonstration experiment at a local dyeing factory Researched by Bandung Institute of Technology

*Standard regulatory value of Permen-LH RI No.5 (2014)

- ◆ Problem items such as COD, etc.→ **Highly removed**
- ◆ Colored → Colorless

Treated water was within regulatory limits for all items. Result: Treated water has proven to be reusable. Raw water and treated water from JICA's demonstration project in Indonesia

Treated water



Raw water

Treated water is **Colorless and Transparent.** Activated carbon can be regenerated repeatedly.



The system we propose is expected to significantly reduce the environmental impact of the surrounding rivers because it can treat the raw water, treated by the existing wastewater treatment system, to be clear and colorless and below the regulatory limits.

We are currently looking for companies that can cooperate in small-scale experiments and/or demonstration projects for the project introduced today. If you are interested, please send an email to the contact information of Sojitz Vietnam below.

This is the end of our presentation.

Thank you very much for your kind attention.

We will contribute to the SDGs.



New way, New value

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