

Development of Movable and Installable Small to Medium Sized Container Type Package Sewage Processing System

1. Summary

■ Purpose of and Need for Research

- Sewage is social infrastructure that is fundamental to urban development and pleasant life of people but as Korean sewage businesses are mainly established around urban areas, agricultural and fishery areas including small sized eup and myon unites have been relatively excluded and as investment in fundamental facilities for improving the environment is insufficient, living environment in the rural areas had unsatisfactory supply of sewage presently.
- Currently, as the penetration of the city size sewage in Korea is 90.1%, whereas the penetration rate of sewage in agricultural and fisher regions is 50.2%(Ministry of Environment, 2011), to suitably process waste water of region where sewage is not supplied, development of technology for small size waste water purifying facilities of high efficiency is presently urgent.
- Research for development and improvement, etc. of optimal system and establishment of effective and detailed plan to promote with respect to village sewage are still currently unsatisfactory.
- The amount of sewage occurring in agricultural and fishery areas are difficult to calculate due to regional characteristics and geographical conditions and lack of government action or poor maintenance and water quality is unstable due to injection of underground water, etc. and as result, due to decrease of design load amount, processing efficiency is not satisfied in many cases.
- From perspective of construction cost and maintenance of processing plant per person, for waste water processing method, large facilities are more advantageous than small facilities, but from the perspective of the entire construction cost including pipe facilities, small size method is more advantageous.
- Therefore, in order for such small processing facilities to be more advantageous

than large facilities, a system which is low in terms of construction and maintenance costs of processing plants and high in terms of processing efficiency is required and developing suitable processing process method and establishing operating guidelines incorporating the regional characteristics of agricultural and fishery areas are needed more than anything currently.

- To process sewage occurring in small size in agricultural and fishery areas, developing and supplying simple process which can convert recognition as hated facility in harmony with the surrounding environment of the region and process method for processing sewage which can satisfy the quality of water discharged with plan are desperately required.
- Therefore, the final purpose of this research and development is early commercialization of container type MBR Package water processing system in domestic and foreign markets and to secure technology of container type MBR Package water processing system in small size sewage processing facilities such as construction sites in and out of the country (plants, bridges, tunnels, new town construction, etc.), etc.
- We plan to secure technology which can satisfy legal standards of water for scenery, water for maintenance and water for toilet in construction sites in and out of the country and small size sewage processing facilities and to develop technology to reduce sludge by 30% or higher from the existing MBR process.

■ Contents and Scope of the Research

- Develop highly efficient and condensed container type MBR Package water processing system.
 - Design and produce automated maintenance and management based container type sewage and waste water processing system
 - Develop package system with high density integration of MBR module in container
 - Develop technology to reduce sludge through efficient operation and management
 - Develop technology to reduce membrane technology through analyzing flux and particle size at the time of drug injection/non-injection
 - Solve high flux and fouling problems of package system and develop membrane regeneration technology and error technology
 - Develop a system of international container specifications so that it can be used in

foreign markets

- Design and construct test beds with size of 50ton per day or bigger and standardize operating technology
- Secure technologies to design, construct and operate container type package sewage and waste water processing facilities and secure operating technology
- Standardize reference of design, construction and operation technologies through core process optimization
- Commercialization of construction sites in and out of the country and small size sewage and waste water processing facilities
 - Propose measures commercialize technologies for customized package sewage and waste water processing and reusing processing for each use
- Especially, early commercialization of foreign construction site and small size sewage and waste water processing facilities

2. Research Results

■ Results of Research and Development

- Develop highly integrated separation membrane module improved by 150%
- Very convenient movement and export/import due to designs fit to standard container specifications
- Reusing processed water of various use through process combining with R/O facilities is possible.

Effect of reducing sludge processing cost by 30% from the existing MBR process.

■ Plans to Utilize the Results of Research and Development

- Differently from the existing construction form which requires civil construction, as the container type MBR Package sewage processing system moves a produced complete product to sites to be landed, it is easily moved and installed and as a very convenient system, it can be installed in a short period.
- Moreover, this is a sewage and waste water facility with simple operation and manipulation, durability and movability which allows reuse, process change which consumers can produce desired water quality and ability to react to processing flux with lots of changes.

- This can also be used for improving small size village sewage, short to long term temporary use facility or disaster recovery.

Source: National Digital Science Library