



Integrated Water Resources Management – Model Region Mongolia –



MoMo Fact Sheet

SBR pilot plant on the central waste water treatment plant in Darkhan City

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Background

Several factors, such as global warming and intensive mining activities, have a significant impact on the availability of water resources in Mongolia. However, surface waters are important resources for human water supply as well as for animal husbandry, especially on the countryside.

Focusing on the development of a reliable treatment process with subsequent disinfection under the extreme climatic conditions in Mongolia, a pilot plant being based on the sequencing batch reactor (SBR) treatment process has been designed, constructed, and commissioned at the site of Darkhan Central Wastewater Treatment Plant (WWTP).

Based on the results and experience derived from the two-year operation of the SBR pilot plant, a new central WWTP for Darkhan is being designed by p2m berlin.

Sequencing Batch Reactor (SBR) Pilot Plant

The SBR technology is a process designed to operate with discontinuous fill and draw regimes. The technology is now well developed and established. Large plants with up to 950,000 m³/d capacity have been built. In contrast to conventional continuous flow reactors it combines all necessary biological steps for biological nutrient removal in one reactor. The reactor is operating in cycles featuring the following phases:

- Fill
- React
- Settle
- Decant

The main advantage of the SBR process is its high flexibility due to the variability of the different steps of the SBR cycle. Depending on varying surrounding conditions like inflow, influent concentration, or temperature the process can be adjusted by changing cycle times and filling volume, hence sludge loading.

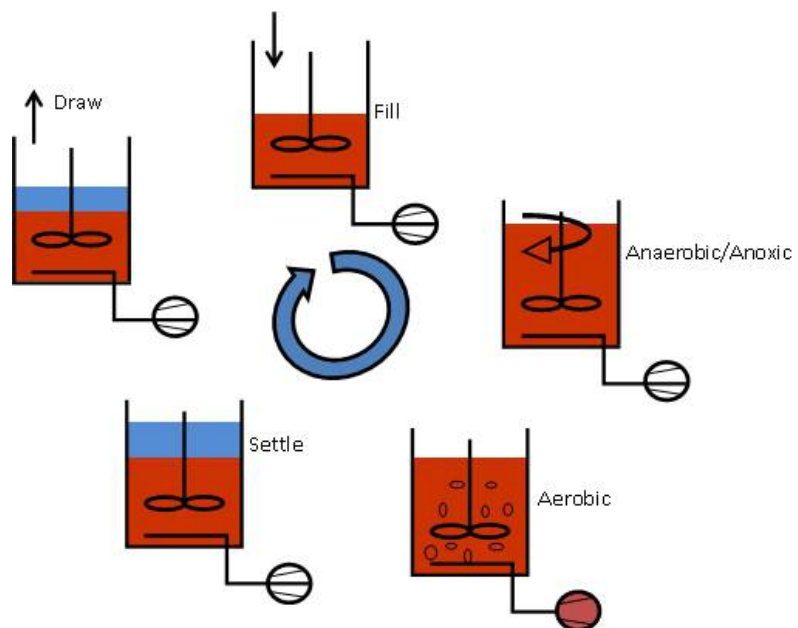


Fig. 1: Illustration of the SBR principle

This enables an always well adapted

process to reach the targeted effluent concentration.

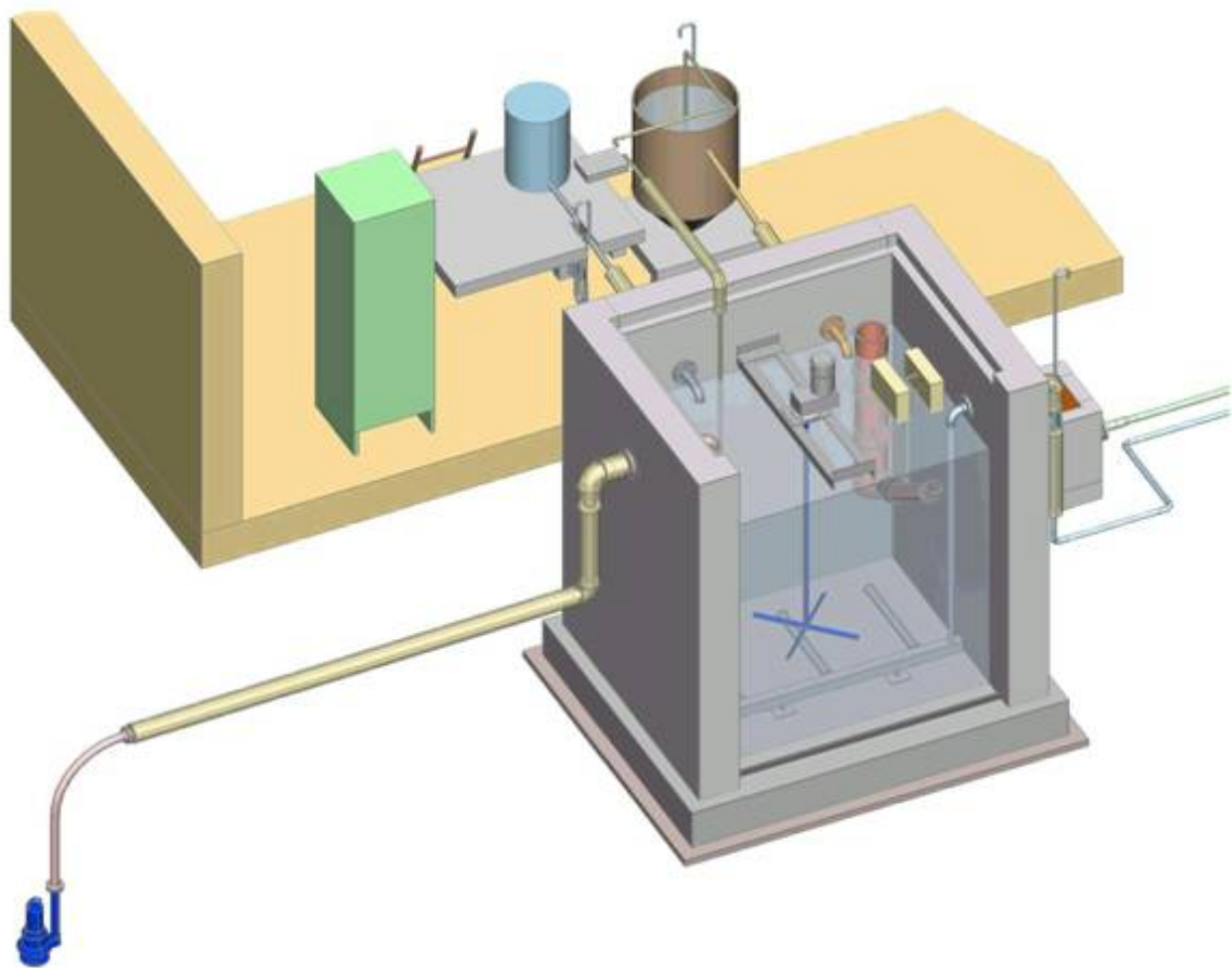


Fig. 2: Design of the SBR system in Darkhan

The SBR pilot plant at Darkhan Central WWTP was commissioned in August 2011. It consists of a 6-m³-aeration/sedimentation tank with an excess sludge thickener and process water reception from sludge treatment. It is fully automated and controlled by a programmable logic controller (PLC). The SBR is fed with water coming directly from the distribution chamber of the primary clarifiers at Darkhan Central WWTP.

The online measurements and monitoring of the parameters and process operation on the SBR-Pilot plant is realised and serviced by Fraunhofer AST in Ilmenau in cooperation with p2m berlin and the local project partner USAG Darkhan.



Fig. 3: Monitoring and control unit



Fig. 4: Online monitoring display

Pilot Operation: Objectives and Preliminary Results

The objective of the two-year operation period of the pilot plant is the adaptation of this flexible technology to the varying sewage loads under extreme climatic conditions, therefore achieving better treatment results than the existing activated sludge process at Darkhan WWTP. The treatment process is being optimised focusing on low concentrations of suspended solids in the treated effluent in preparation of the future disinfection and reuse of the effluent.

The results of the trial operation will be implemented in the basic design of a future large scale WWTP substituting the existing treatment plant. Taking into account the aforementioned advantages, it is expected that a large-scale SBR-based WWTP in Darkhan can deliver year-round

- stable and sufficient nutrient elimination
- stable and low effluent solids concentration
- reduced energy demand
- effluent quality suitable for non-chlorine disinfection (e.g., UV disinfection, ozonation, membrane filtration)

Since its commissioning, the pilot SBR has been a point of interest for a lot of visitors, e.g., the Mongolian Minister for Nature, Environment and Tourism, Mr. Gansukh.

Key Data

Location:	Darkhan, Mongolia 49°30'31"N, 105°55'34.5"E
Manufacturer:	p2m berlin GmbH
Type of pilot measure:	SBR waste water treatment system
Capacity of the pilot plant:	20 m ³ /d
Capacity of Darkhan Central WWTP:	50,000 m ³ /d

Project Partners & Contact Information



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