EKOTON INDUSTRIAL GROUP

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TECHNOLOGIES AND EQUIPMENT

CASE STUDY:

PRODUCTION AND SETTING UP OF A MUNICIPAL SLUDGE DEWATERING FACILITY

INITIAL DATA:

BASIC EQUIPMENT	Multidisc screw press
OBJECT	Municipal Wastewater Treatment Plant
LOCATION	Biskupiec, Poland
SLUDGE TYPE	Municipal sludge (surplus activated sludge)
TYPE OF WORK	Reconstruction of the old sludge dewatering facility based on the belt filter press

AIM OF WORK:

The studied municipal wastewater treatment plant is located in Biskupiec, Warmian-Masurian voivodship, Poland. It serves Biskupiec city and Rukławki village. Inlet wastewater consists of household, industrial sewage from nearby meat plants and rainwater. The average capacity is 1 450 m3/d, with the maximum of 1 725 m^3/d.

After mechanical and biological treatment, an excess sludge with humidity of approximately 99.7 99.8% is generated in amount of approximately 360 m^3/d, which is then gravitationally thickened to a dry solids content of 1.0 - 2.0% in an amount of approximately 60 - 120 m^3/d. Earlier, the sludge was dewatered on the belt filter press and then utilized partially for agriculture needs as well as distributed to the sludge plots.

The necessity of reconstruction was caused by poor dewatering process efficiency which affected in high humidity of dewatered cake (approx. 10 %). Additionally, existed belt filter press capacity of approx. 60 m^3/d was insufficient to process the entire amount of sludge even beside the fact it was operating with high accident rate.

As the company with rich experience in municipal sludge dewatering technology, EKOTON IG was able to offer an appropriate solution and accepted this project for work.

PROGRESS OF WORK:

To get acquainted with the case, laboratory and pilot studies were carried out. First of all, flocculation tests were conducted and the optimal process parameters were obtained. Further pilot scale tests allowed to find the optimal dewatering process parameters in real conditions. The results were analyzed and necessary calculations were done which gave EKOTON constructors opportunity to fit and design the best appropriate dewatering technology.

After the old dewatering complex was removed, the new equipment were installed with respect to all client and labor protection requirements. Then it was commissioned and all technological parameters were adjusted to meet the best dewatering efficiency for this kind of sludge.

RESULTS AND CONCLUSIONS:

Parameter	Value
Average WWTP capacity	1450 m^3/d
Sludge dewatering facility capacity	120-150 m^3/d or 1,9 tDS/d (135 kgDS/h)
Average DS content in sludge	1,5 %
Average DS content in dewatered cake	15-17 %
TSS in filtrate	60-260 mg/l
Flocculant dosage	9,3 kg/tDS
Manual control time (for 8 h working shift)	20 min on adjustment + 30 min on overall maintenance (can be carried out during nonstop equipment operation)
Availability (as a metric of overall equipment efficiency)	90-97%

The reconstruction of the sludge dewatering facility at Municipal Wastewater Treatment Plant in Biskupiec allowed to increase its capacity from 60 to 120-150 m^3/d.

Despite of extremely low dry solid content in initial sludge caused by its specific composition and poor thickening process efficiency, installed equipment managed to obtain dewatered cake of transportable consistence and allows ta save expenses on further transportation and utilization due to its quantity reduction. The new technology allows to obtain higher dry solids content in cake (up to 17 %) and cleaner filtrate (60-260 mgTSS/l) with fully automatic and reliable operation of EKOTON equipment even in such complicated case, when average dry solids content in inlet sludge is only 1,5 %.

Moreover, implemented technology leads to additional operating costs decreasing due to water, electricity and reagent consumption reduction.

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