

NEW DESIGN GUIDELINE FOR FINAL SETTLING TANKS

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INTRODUCTION

Due to overloading, some settling tanks at activated sludge treatment plants lose large quantities of sludge with their effluent. To improve the functioning of overloaded tanks and to obtain adjusted design criteria, an extensive field-study on the performance of final settling tanks was recently carried out. In addition, DHV has set up experiments combining aeration and sedimentation in one basin and in a continuous process.

SCOPE OF INVESTIGATION

- Forty-eight experiments at circular tanks, diameter 25 m, bottom slope 1 : 12, side water depth 1.5-2.0 m, central feed, peripheral effluent.
- Twenty-seven experiments at rectangular tanks, sludge removal by sludge suction-pipes and by chain scrapers.

The experiments were executed on various types of activated sludge wastewater treatment plants and concerned:

- variations in the hydraulic load and return sludge capacity;
- variations in the sludge concentration in the aeration tank;
- variations in the sludge settling characteristics.

RESULTS

The experiments have yielded comprehensive information on the interaction processes between the aeration tank and the final settling tank. At rain weather flow, a considerable quantity of sludge from the aeration tank can be stored in the settling tank (Figures 1 and 2). The main results are presented in Figure 3. The SOLID-FLUX theory and the WRC-guideline have been shown to be unreliable as design methods for final settling tanks. The ATV-guideline provides a basis for overdesign.

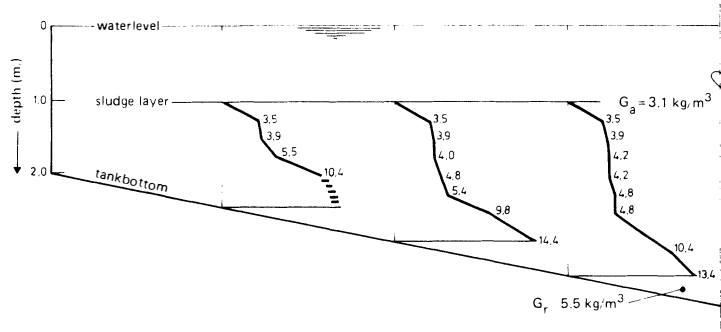


Fig. 1. Solids profile in circular tank, STp Oss (G in kg/m^3)

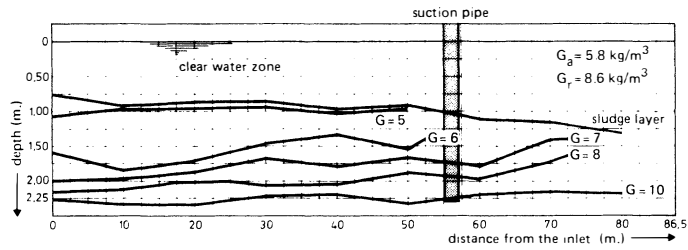


Fig. 2. Solids profile in rectangular tank, STP Breda (G in kg/m^3)

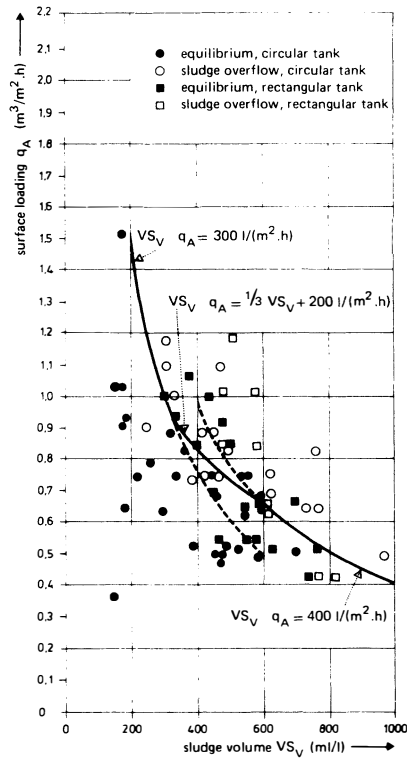
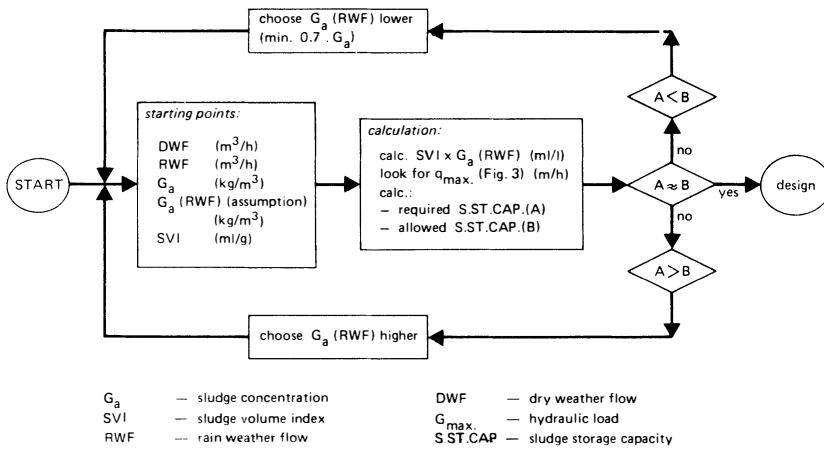


Fig. 3. Main results of the experiments

SCHEME DESIGN PROCESS



DESIGN GUIDELINE

The new design guideline for dimensioning the settling tank(s), based on an iterative process, is shown in the scheme. The maximum hydraulic load of the tank(s) at rain weather flow, is given in Figure 3.