

Tranquilizing racks at sand trap chambers

Tranquilizing racks (TRs) are a common structural measure at the inlet of sand trap chambers to slow down and homogenize the flow within the settling zone and hence increase the trapping efficiency. TRs are often arranged as a series of two to three racks with vertical bars. Depending on the clear bar spacing of upstream water intake racks, the TR bar clearance is typically a few centimeters up to a few decimeters, while the streamwise distance between the racks is several decimeters (Fig. 1). However, although TRs have been installed at sand traps for more than 100 years, no comprehensive guidelines for their design are found in literature.



Fig. 1: Three rows of TRs with vertical, v-shaped bars at HPP Susasca (Source: VAW)

The aim of this Bachelor's thesis is a comprehensive literature study on the design of TRs at sand traps and an estimation of the head losses induced by the different TR designs. The head loss estimate shall be compared to recent measurements at prototype TRs (VAW, 2023). The findings shall result in a design guideline for TRs, also considering operational aspects, for practical application.

Contact: Reto Keller
Teaching Assistance, HIA B 57.1
044/633 34 08, keller@vaw.baug.ethz.ch

Remarks: Communication and report may also be possible in German (depending on supervisor);
Group work possible; topic can be distributed more than once