

Curriculum Vitae

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Research within the Sewer Processes & Network Group (SPN Group) at Aalborg University, Denmark

A common denominator for the research is the focus on experimental studies in the laboratory, pilot scale setups and the field. The obtained knowledge is combined and applied in computer models that subsequently are validated by field studies.

In-sewer processes: The objective of the research is to develop and improve fundamental knowledge on sewer processes in order to develop and optimize methods for the integrated design and operation of sewer, treatment and environment. The core of the research is microbial, chemical and physical processes in sewers and their application in wastewater process engineering.

Key topics studied are:

- Biodegradability of sewer sediments and the potential impact of resuspended sewer sediments on receiving waters and treatment plants.
- Aerobic transformation of organic matter at oxygen non-limited as well as oxygen limited conditions.
- Anoxic transformations of organic matter and the reduction of nitrate and the subsequent formation/reduction of nitrite.
- Anaerobic transformation of organic matter including hydrolysis and fermentation of organic matter as well as the formation of hydrogen sulfide.
- Hydrogen sulfide related processes including oxidation and water-gas transfer.

Development of a sewer process model. The knowledge gained in the fundamental studies on in-sewer processes are combined and applied in a model that simulates microbial/chemical processes. The processes relate to different fractions of organic matter, hydrogen sulfide, oxygen, nitrate, nitrite and sulfate. The process model is programmed into a simulation tool that can simulate critical parts of sewer systems. The model is tested and validated on field studies.

Exfiltration from sewers: The objective is to establish a conceptual understanding of the mechanisms and processes governing exfiltration from leaky sewers.

Treatment plant processes. Oxidation of ammonia into nitrite at high ammonia concentrations and the subsequent reduction of nitrate into free nitrogen have been studied. A number of case studies have furthermore been performed on e.g. the transformations of organic matter in mechanical wastewater treatment and on the fermentation and phosphorous uptake in activated sludge.

Main financial support: The National Environmental Protection Agency (Danish EPA); EU 5th Framework Programme: CARE-S (Computer Aided Rehabilitation of Sewer networks); Aalborg Municipality; private institutions and firms: Emschergenossenschaft (Germany), and C.P. Kelco (Denmark).

Planning and administrative tasks and experience in education and research

Director of the study board for Chemical Engineering, Environmental Engineering and Biotechnology at Aalborg University since year 2002.

Secretary of The Water Pollution Committee of The Society of Danish Engineers since year 2000.

Teaching within environmental engineering at Aalborg University since year 1995. Conduction of intensive courses in sewer process engineering in Denmark, South America and Asia.

Member of the Scientific Committee of the 4th Sewer Processes and Networks Conference. Member of the Organizing Committee of the 10th International Conference on Urban Drainage.

Reviewer of Water Science & Technology and Water Research.

Work Package leader within EU 5th Framework Programme: CARE-S (Computer Aided Rehabilitation of Sewer networks).

Publications

54 scientific publications, primarily in international journals and proceedings from international conferences.

A number of reports and statements as consultant for Danish clients.