

Fishway — design, function and how we can use biomedical engineering to improve it

Jan Błotnicki
Institute of Environmental Engineering
Wrocław University of Environmental and Life Sciences
Wrocław, Poland

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Abstract

A flowing river is not just clean water. In addition to the ichthyofauna inhabiting it and developing vegetation, the energy of the flowing water transports various types of debris. In addition to bedloads, which include, among others, stones, gravel and sand, and suspended sediment, created by smaller granulometric fractions, dissolved organic and mineral compounds, the river also transports floating debris. Rift wood is the most common type of contamination transported by water. It is divided into logs, stumps with a root bundle, shrubs and whole trees with a preserved structure of the roots and crown, and jams — mixture of various fragments of trees and shrubs. The uncontrolled transport of rift wood is observed all over the world and may pose a real threat due to hydraulic changes in river systems and the resulting risks. Floating wood is also a troublesome operational problem that can be noticed in hydrotechnical facilities — piers, hydropower plants, weirs or fish passes. Despite the increased interest in floating sediment transport since the 1970s, this issue has not been very popular with scientists so far, and the tools for numerical simulation of floating debris movement in the river are not readily available or widely used in practice. This lecture presents the current state of knowledge on wooden debris in the context of fishways. Presents possible dangers related to sediment transport in rivers, methods of prevention and protection of hydrotechnical facilities and asks a question — how we can use biomedical engineering to improve fishways.

About the presenter

Jan Błotnicki is a PhD student in the Institute of Environmental Engineering UPWr in Wrocław. His research focuses on fluid dynamics, hydraulics, particle image velocimetry and fishways. Tries to find an answer to the question *How can we improve fishpasses to make them work properly?* His great passion is filmmaking, photography and nature.