

A new method for passing substrate over weirs

Tom Jacobsen, SediCon AS

Email corresponding author: tom@sedicon.no

ABSTRACT: Research conducted at NTNU in the 1990s focused on sedimentation and the development of sediment removal techniques based on the hydrosuction principle. This research initiative has led to the creation of various sediment handling technologies that are now utilized in over 30 countries within the hydropower and offshore industries. As a result, significant knowledge and expertise have been accumulated over the years in the field of sediment handling, encompassing functional solutions, hydraulic design, and material selection. Many of these technologies rely on gravity and have minimal moving parts, making them potentially applicable in river environments.

Among the latest advancements is the boulder excluder, a pipe structure that effectively transports sediments of various sizes from a brook intake (pond) to a lower downstream level, utilizing gravity as the driving force. The boulder excluder initiates its operation when the water level surpasses a certain threshold, typically during flood conditions, and ceases once the water level recedes. Remarkably, this technology operates without the need for any movable parts or human intervention and can function effectively even with very low head differences.

Consequently, it is highly plausible that this technology is well-suited for transferring different types of sediments or substrates from one location to another, particularly in rivers, for instance, bypassing artificial weirs in regulated river systems. Sediment transfer occurs through a fixed siphon, commonly implemented using a robust and durable HDPE-pipe, which activates during floods, drawing incoming sediments from an upstream pool to a lower downstream level. Additionally, this technology could potentially be employed to remove undesirable fine sediments from artificial pools, thereby providing an added benefit or parallel effect.