Fish migration system constructed from used car tires

fish passage engineer - PhD - Răzvan Voicu

There are many concrete pipes through which various rivers flow, generally with low flow, which does not allow the fish to reach the river springs. Often the water passing through these concrete pipes has a small height that does not allow the fish to move. Or between the downstream end of the concrete tube and the riverbed there is a level difference so that the fish do not reach inside the tube. Various flexi baffles systems have been developed that have facilitated more or less the movement of fish through these tubes. This solution will use used tires to support migratory fish. Several tens of tires are purchased from the used tire depots (especially from the same company, with the same diameter and roughly chipped). The tires are also purchased depending on the diameter of the concrete tube (or other material). Generally they will have a smaller diameter than the concrete tube. The inner diameter of the tire is approximately 40cm. Thus his tire will cut in half resulting in two semicircles. In both semicircles, on the two surfaces that are fixed by the metal rim, two surfaces of various shapes (triangular, rectangular, etc.) are cut by symmetrically. From the surfaces that are fixed by the metal rim, only the two surfaces of different shapes will remain that will have the role of raising the water level in their proximity but also the role of dissipators. (Figure 1). After making the triangular surfaces the tires will be fixed with the help of screws (Figure 2) in the concrete tube and will have a distance of about 20 cm between them.

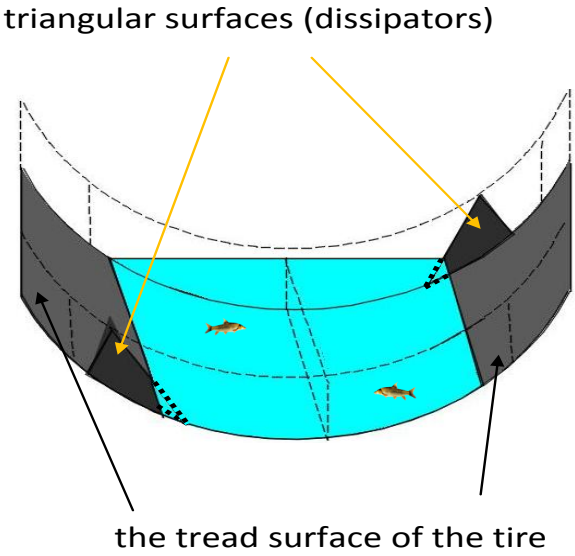

Figure 1 Positioning of the two triangular surfaces constructed in the tire- indicative scheme

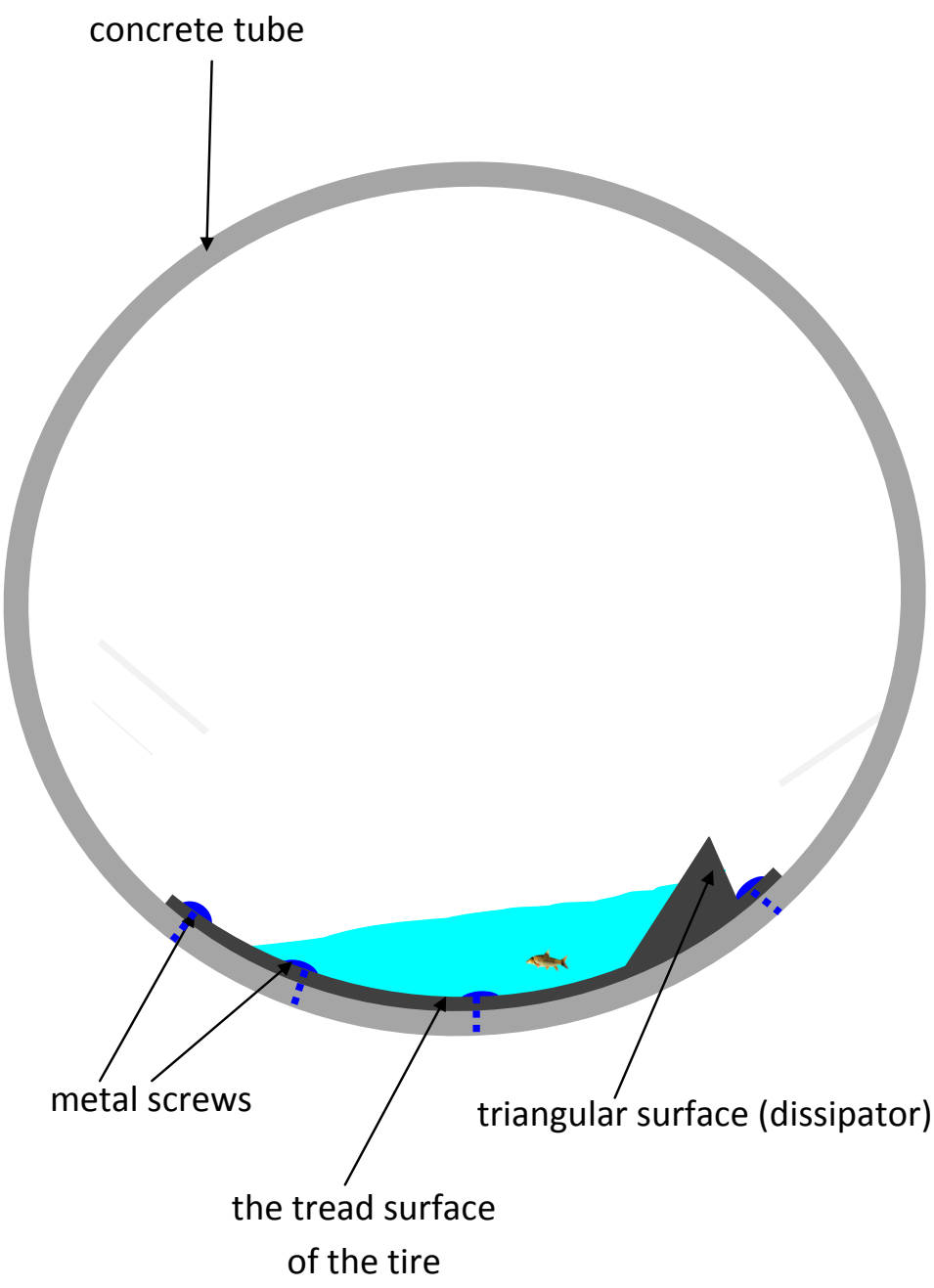

Figure 2 Positioning of the tire and the screws inside the concrete tube - indicative scheme

After the dissipators have been created the semicircle created by the tire will be fastened with screws to the concrete tube (culvert) fig. 2. If the water in the concrete tube has a fall of more than 40 cm downstream fish cannot climb and thus a system for climbing fish must be created. The system will also be made of used tires. In this case you can buy new tires. On the downstream end of the concrete tube, in the water flow area, a metal bar is fixed. From this metal bar a metal hinge is fixed and from this metal hinge a metal sheet pile is fixed. (Figure 3). From this metal sheet pile is fixed with the help of the half tire screws of which only the tread surface and two symmetrical rectangular surfaces remained. (Figure 3). All these halves of tires will be fixed to each other until they reach the watercourse (fig. 5). The downstream end of the system can be moved up or down depending on the slope that is intended to be in the fish migration system. The downstream end of the metal sheet pile will rest on a rectangular concrete plate (Figure 5). If you want to change the slope: dig into the gutter to increase the slope or put a concrete slab to reduce the slope.

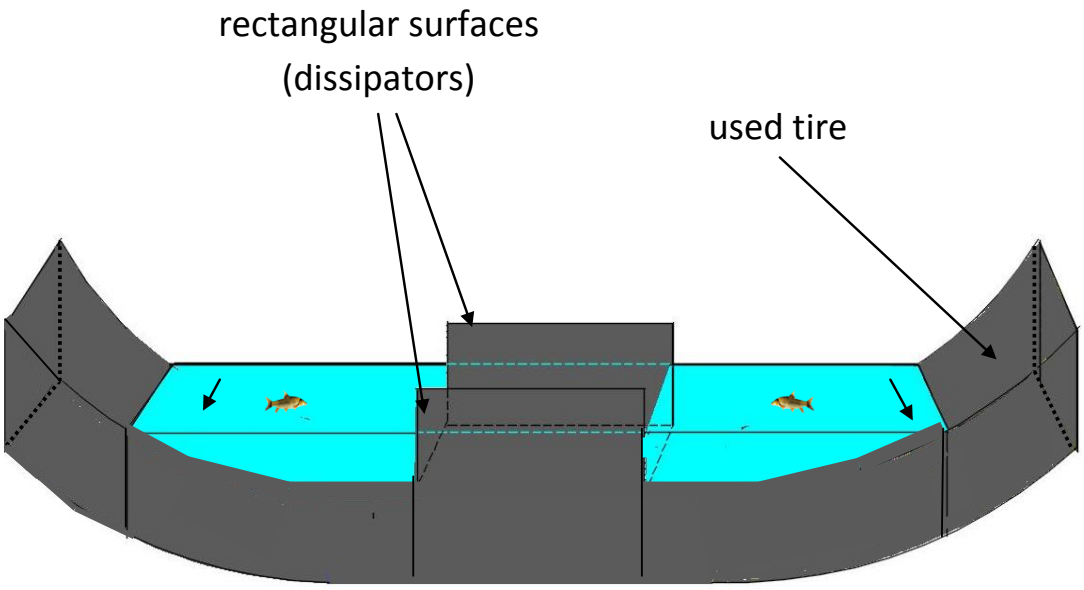

Figure 3 Positioning of the two rectangular surfaces (dissipators) constructed in the tire positioned on the movable metal sheet pile located on an inclined plane - indicative scheme

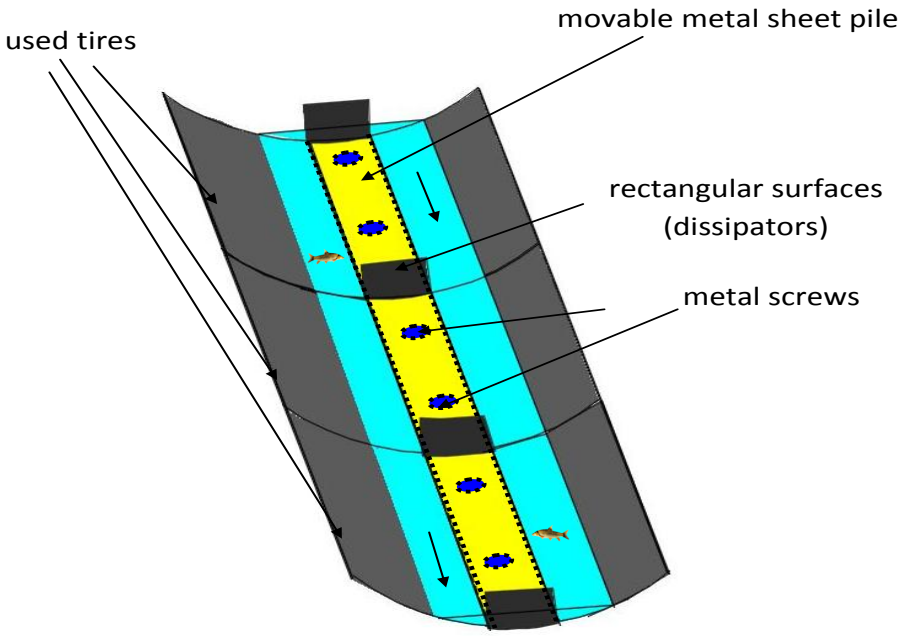

Figure 4 Positioning of the metal screws on the movable metal sheet pile- indicative scheme

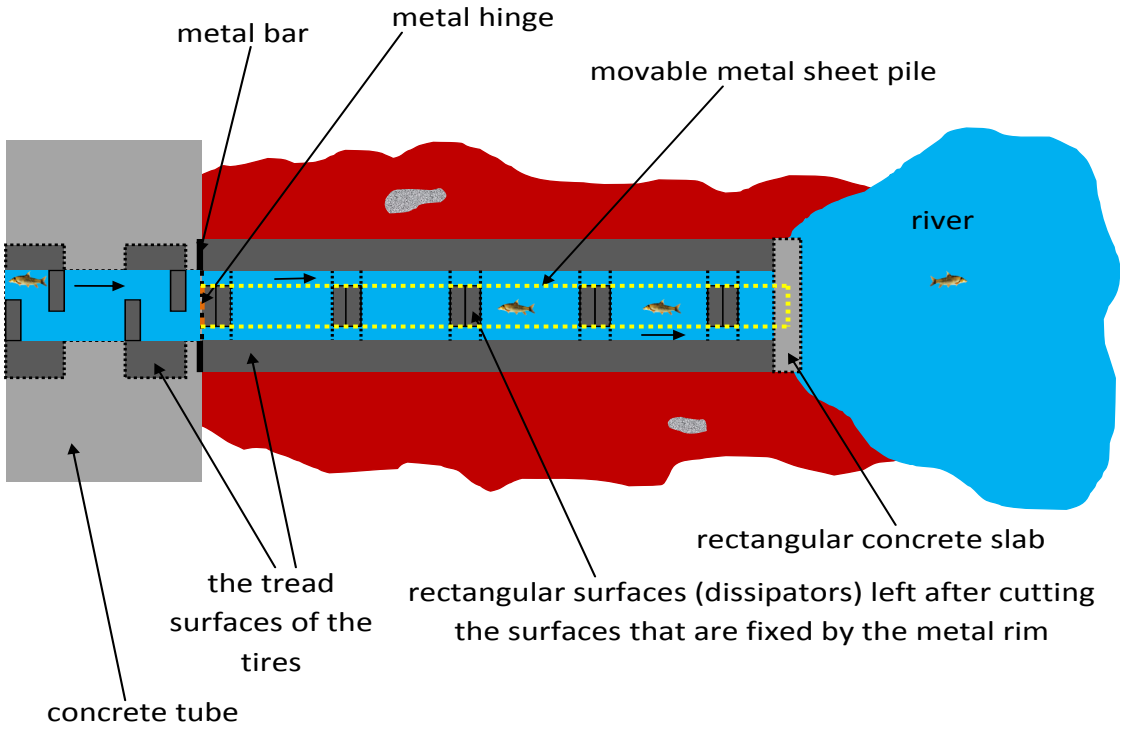

Figure 5 General scheme of the system - indicative scheme

Conclusions

The presented system (metal sheet pile) that helps the fish climb into the concrete tube can also help the fish climb over a spillway threshold. In the spillway a semicircular crenel is created that has a direct connection with the fish migration system or part of the river flow upstream of the spillway is redirected into the system by means of concrete or metal sheet piles. The price of this hinging system up to the concrete tube and then into the concrete tube is much lower than all other existing systems. This system can afford any country even if it is poor which is a considerable advantage. The metal sheet pile with variable geometry on which the worn tires are fastened by screws can be detached during the winter or for any repairs. Flexi Baffles systems are cheaper than conventional systems but can be stolen shortly after installation. Old tires are not stolen by anyone and they are also free and in case of deterioration you can always find others for free. Systems with rectangular (metal sheet pile) and triangular surfaces can be used separately or together depending on the case studies. If there are no major floods or anthropogenic damage, the system can operate for several years without changing any component.

November 2019
Bucharest