System with folding resistant plastic baffles and horizontal movable sheet piles for metal or concrete tubes

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From the factory concrete pipes supporting various bridges over smaller or larger rivers must have certain characteristics that allow different migratory species of fish to pass upstream of these bridges through these culverts. The system is designed for circular but also rectangular tubes. Thus, inside the concrete tube, some rectangular-shaped surfaces are drilled, in which the rectangular surfaces of resistant plastic that will be fixed by means of metal arches (fig. 1 a - horizontal section and b) - cross section).

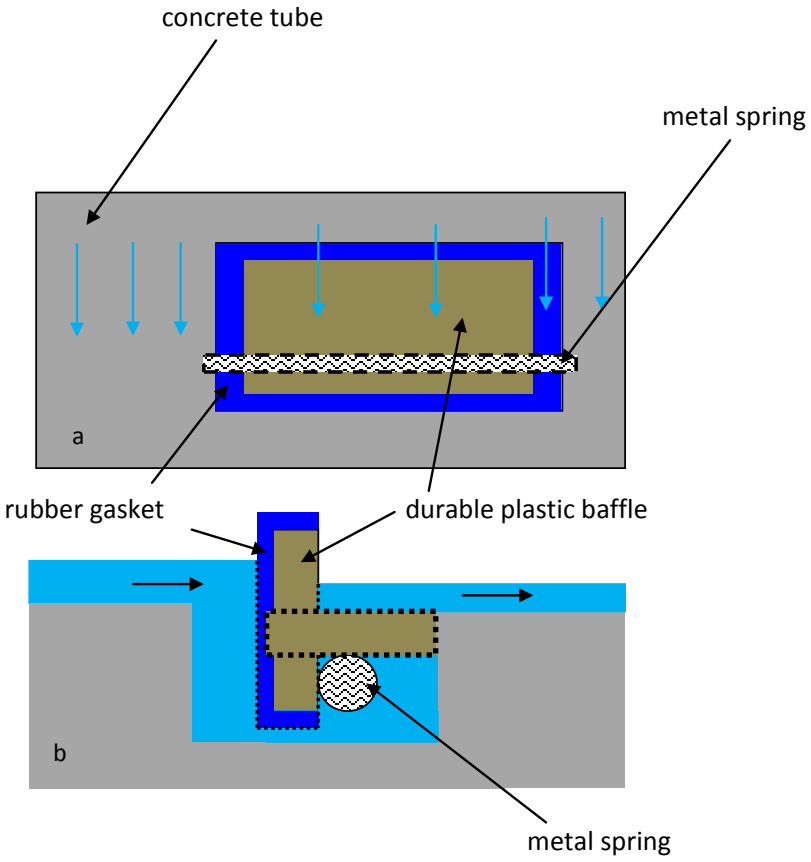

Figure 1 a and b Positioning of the folding baffle and metal arch inside the surface builded in the circular (rectangular) concrete tube.

The metal arch is fixed in the vertical walls of the section made in the rectangular tube. When pressed on the plastic baffle it reaches the upright position and when pressed again it plastic baffle reaches the horizontal position the horizontal position using a locking system (double metal clamps).

Restoring the longitudinal connectivity between the downstream end of the concrete or metal tube and the watercourse

There are many concrete pipes that support various bridges over the watercourses but have destroyed the longitudinal connectivity of those watercourses. There are many cases when the distance between the downstream end of the concrete tube and the watercourse is about one meter or more. The tube cannot be replaced by another tube with a larger diameter because many have recently been put into operation or there are insufficient funds for this. How do we solve the problem?

A frame (metal support) is made of metallic sheet piles of parallelepiped shape. On the vertical sheet piles of the metal frame, two rectangular surfaces of width 10cm are fixed perpendicularly, length as long as the metallic sheet piles of the metal frame and thickness one centimeter for each other (fig.2). The movable semicircular sheet piles (with variable geometry) will each be inserted between the horizontal surfaces after the metal frame has been fastened under the concrete tube. The distance between the semicircular moving sheet piles is about 10 cm. After folding (sliding) and optimum fixing for the fish climb, between the movable sheet piles, the triangular (prismatic) surfaces of resistant rubber are fixed, even in the middle area, that support the fish in their climb to the concrete tube (fig. 3).

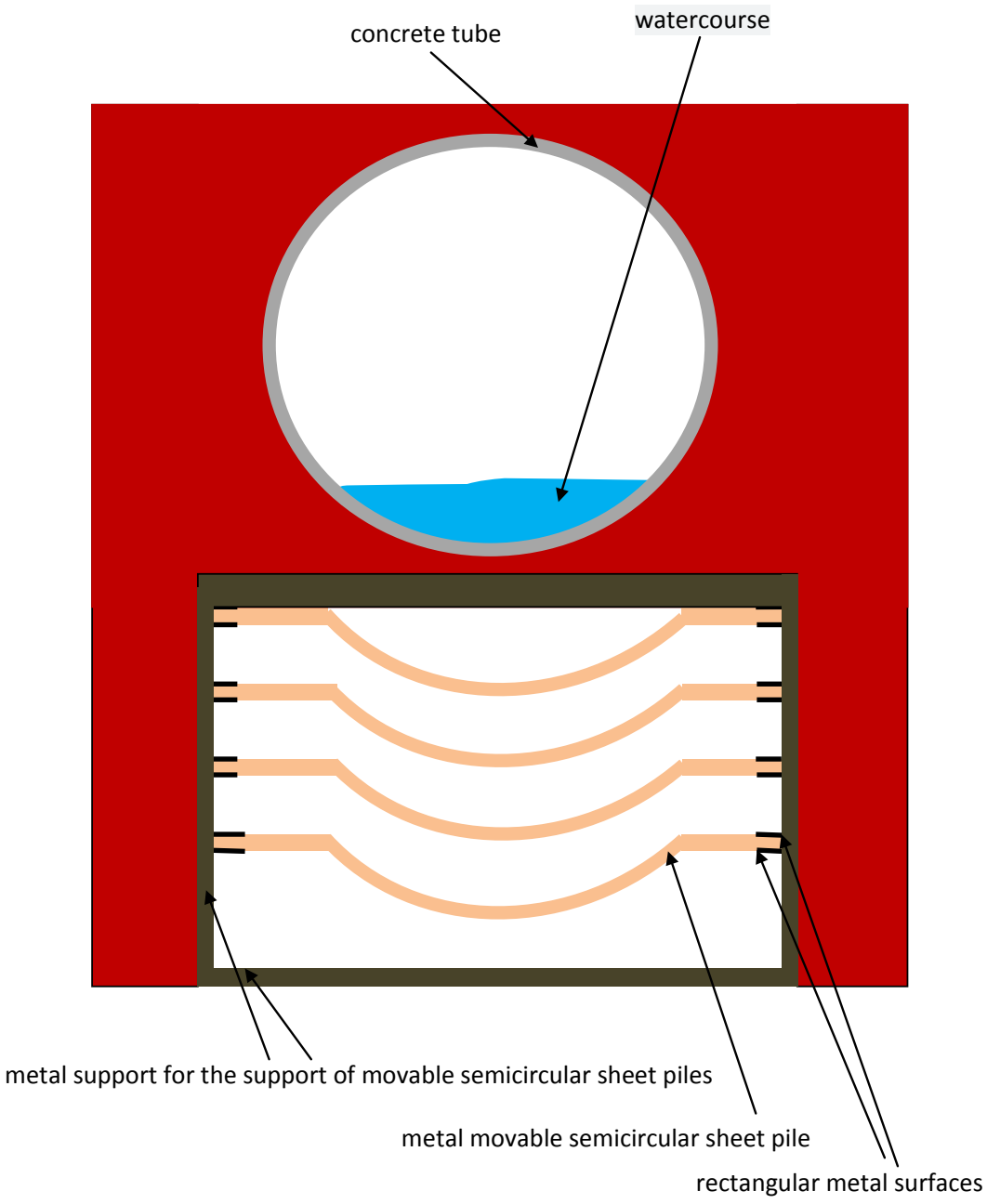

Figure 2 Positioning of movable semicircular sheet piles inside the metal frame

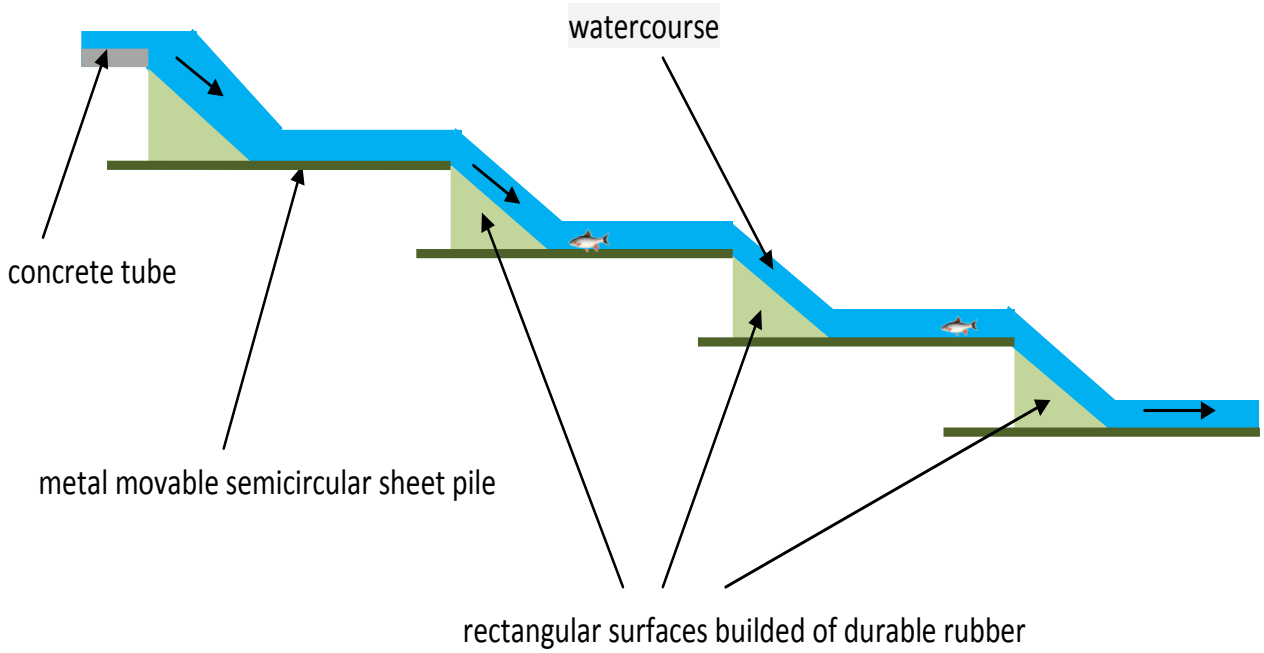

Figure 3 Positioning of rectangular (prismatic) rubber surfaces

Between the last movable semicircular sheet pile (closest to the watercourse) and the watercourse, it is a distance of about 10 cm (fig. 4).

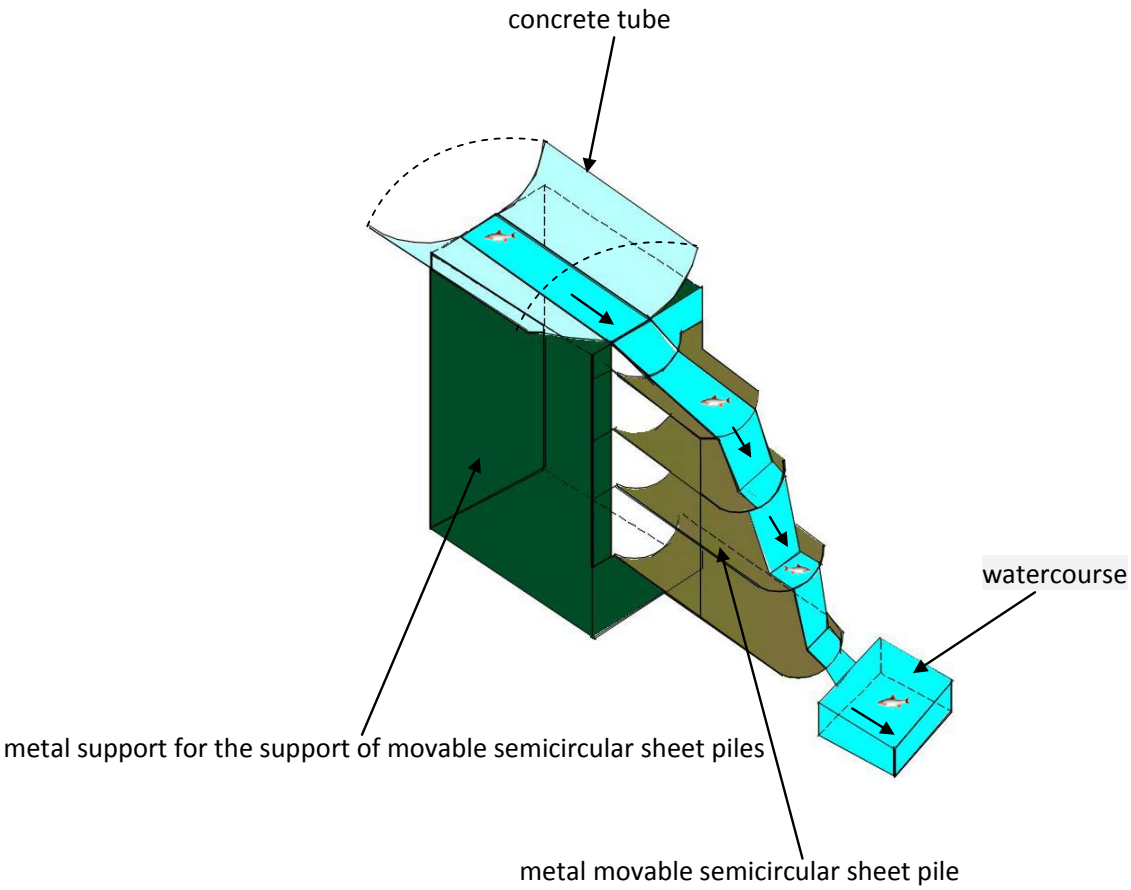

Figure 4 General scheme of the system with movable semicircular sheet piles (with variable geometry)

Conclusions

The two proposed systems (movable baffles and movable semicircular levers) can be used separately or together. The ones with baffles with variable geometry will be used there a water level should be raised in concrete or metal tubes and the one with movable semicircular sheet piles where there is a difference between the downstream end of the concrete tube and the watercourse is at least 40 cm. The two systems do not affect the structure of the metal or concrete tube at all and if there are no migratory fish species or it is winter both baffles and mobile semicircular pallets fold and everything is as if they did not exist but they exist and can be placed in function when needed. There are many concrete or metal tubes that cannot be replaced with others that allow fish to migrate so a possible solution is to use this innovative system.

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