



CASE STUDY TITLE

Dutch National Standard for Fish Safety of Pumps, Archimedean Screws and Confined Water Turbines.

SUMMARY

The objective of this case study is to demonstrate how (national) standardization can be used to increase ecological water quality. This supports the achievement of the SDG's target 6.6 on protecting and restoring water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.

Stakeholders involved in the fish safety of pumps, Archimedean screws and turbines have come together to draw up an unambiguous definition of test procedures and a calculation method to establish the fish safety of the machinery.

BACKGROUND

Many fish species have an instinctive urge to migrate. During their migration, the fish are confronted with many obstacles, including pumping stations, Archimedean screws and hydroelectric plants. The urge to migrate is however so dominant that these fish seek every opportunity to continue and therefore also choose to swim into a potentially dangerous obstacle such as a pumping station or a hydroelectric plant. This means that on their journey these fish will almost certainly come into contact with one or more pumps, Archimedean screws or turbines. It is known from various studies that pumps and turbines can cause severe injury, often resulting in mortality.

In recent years increasing attention has been paid to the ecological water quality. Fish form an important part of this. In addition to improving the design of water systems, this has definitely put fish migration on the map. Therefore, studies have been carried out by various parties (water managers, pump and turbine manufacturers, ecological consultancy firms and knowledge institutions) to make pump and turbine installations safer for fish.

AT A GLANCE

COUNTRY

- Netherlands

LEVEL

- National

SDG ADDRESSED

- SDG 6 - Clean Water & Sanitation

Water managers are increasingly switching over to pumps, Archimedean screws and turbines that are safer for fish. To make the right choice it is important that the testing of these machineries has taken place in a standardized way. In the past there was no clear definition of test procedures to establish the fish safety of pumps, Archimedean screws or turbines. This meant that it was complicated for end users to compare the fish safety of these pumps or turbines with one other under practical conditions.



STRATEGY

During an information meeting on fish safety organized by an engineering consultancy firm and an international pump supplier, participants came to the conclusion that a uniform agreement on fish safety of pumps is of added value for involved stakeholders. Therefore, the Dutch standardization organization NEN organized an information meeting for the involved stakeholders where they could express their interest and the possible content of a standard for the fish safety of pumps and water turbines. Based on the outcomes of the information meeting, NEN started the standardization process for fish safety of pumps and water turbines.

NEN conducted a feasibility study, approached the involved stakeholders to guarantee acceptance of the standard and organized a kick-off meeting. During this meeting, the scope, subject and content of the standard was discussed. It was decided that the determination method for fish safety was the main subject and that pumps, Archimedean screws and turbines were the types of machinery focused on. Since the kick-off meeting, several additional experts have joined the national commission to draft the national standard. During the next two years, the experts have composed NEN 8775 Fish safety - Method for the determination of the fish safety of pumps, Archimedean screws and confined water turbines used in pumping stations and hydroelectric plants.

RESULTS & IMPACT

NEN 8775 provides an unambiguous definition of test procedures and a calculation method to establish the fish safety of pumps, Archimedean screws or water turbines. With this, it is easier for end-users to compare the fish safety of these pumps or turbines with one other under practical conditions.

CHALLENGES & LESSONS LEARNED

In reports on the subject of fish migration, the term fish-friendliness is often used. In this standard, the term fish safety has been chosen, because fish-friendliness cannot be defined in this context.

The term fish safety means the fraction of uninjured fish with respect to the total number of fish that has passed through per species and per length class.

Within the standards committee, there was more uncertainty about the use of the test and calculation method in open turbines than about their use in the other installations. Therefore, an annex was added which deals with the use of the methods in open turbines.





CHALLENGES & LESSONS LEARNED

Another annex was added which deals with the use of the calculation method for the avoidance behavior of fish. In theory, this avoidance behaviour may affect the fish safety of an open turbine. However, at the time of publication, the model has still not been tested sufficiently under practical conditions.

POTENTIAL FOR REPLICATION

Currently, NEN is investigating the possibility of further developing the national standard into a European standard. International stakeholders who also want to increase the ecological water quality already have shown their interest in the standard.

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