HYDROCONNECT
GmbH

HYDROCONNECT
Hydro Power Screw

Double Rotating Hydro Power Screw
with integrated fish lift
to facilitate passage up and down in flowing water

ALBRECHT
fishLift
INSIDE

HYDROCONNECT
Hydro Power Screw

Eco friendly, space saving combi-system as well as economical way to fulfill the EU Water Directive.

Many small owners of ‘water rights’ under the EU Water Directive as well as the larger energy providers in the EU, struggle in order to fulfil these guidelines. If you are also affected by these (EU Water Directive) then we have an appropriate alternative for you.

The HYDROCONNECT combi-system makes it possible for the first time to plan more simply and cost effectively for re-designing/revitalising existing power stations. The construction of a fish lift already has existed as a requirement for some time, but one cannot consider most of today’s systems as being able to let fish pass through.

Since 2000 the EU requires that certain ecological and chemical improvements for EU waters be made. On top of that the EU Water Directive has set down requirements that fish are able to pass in both directions in these EU waters by 2021 (2027).

Starting in 2011 the HYDROCONNECT technicians network began looking into this and quickly realised that the fish lifts being used would not make it possible to fulfil the EU Water Directive requirements (fish passage standards).

Your Advantages

- No risk of injury to the fish
- High efficiency through seamless construction (up to 70% electrical)
- For the first time 100% energy recovery from usage of remaining water
- Application suitable for tight spaces e.g. gorges
- No underwater mounting
- Disposal costs low through rough rake cleaning
- Eco friendly system
- Seamless construction means no water loss

Plant Operation

The Hydro Power Screw with its double rotating cylinders is based on the Archimedes Screw principle.

There is an outer sheath with a worm spiral containing the down flowing dam water and an inner fish lift that is an Archimedes principle counter rotating shaft transporting water to the upper head waters.

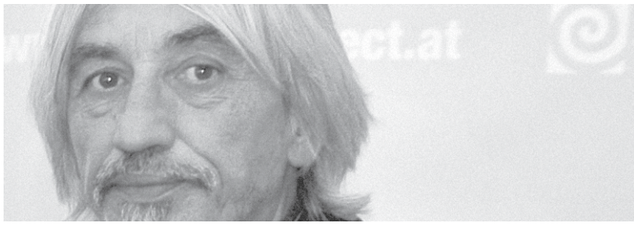
The first fish lift providing power generation.

Power generation is made possible by a torque drum with a sealed fixed casing, which is seamlessly welded to form flanges The plant is mounted at the outer sheath by means of a patented outrigger.

The current of water exiting the dam together with the central tube current leads fish wanting to reach the upper level to the inner fish lift. As soon as they swim into the entrance, which reaches down as far as the river bed, the worm gear gently takes them upwards in the constantly filling water. The fish end up at the upper level via a slide which lets them them out at the top.

The transported water at this upper level is ready for re-use by the plant e.g. the water is ready again for fish to make their way down.

Walter Albrecht, inventor of the HYDROCONNECT Hydro Power Screw



“Based on my many years of experience in the smaller hydro power sector where I am well versed with the technical, economical, and environmental circumstances, it is clear that anyone looking for alternative solutions cannot ignore the Turning Tube Hydro Power Screw.”

Area of Application

- Substitute for conventional fish ladders/lifts help
- Combination of turbine types (simultaneously Fish Lift)
- Water raising works for irrigation and/or power station storage
- Diversion power station as machine for remaining water
- Existing dam steps (aggregate construction)
- Power plant with running river flow for fish ascent and descent

Steel construction for water use

- Welded steel construction
- Screw flanges seamlessly welded
- High amount of stability
- Longevity
- Seamless
- Generous corrosion protection

Intake Gate

- Steel door to close off flow/regulate water volume
- When power outage occurs, it self closes

Fish chute gully

- Gully for fish individuals rising to quiet waters
- Minimal slope
- Foldable

HYDROCONNECT GmbH

Housing/Covering

- If it necessitates, a waterproof building of wood, glass, stone, concrete, etc.

Generator Works

- Generator
- Gearing
- Break

Fish Ladder descending

- for fish safety the screw flanges are formed curved at the entrance area

Belt Capstan

- Long lasting maintenance free mounting via flat belt (Aramid or Fibreglass)
- Rust free running surfaces

Seals

- Rubber seals in upper water (lower water) areas
- long life
- simple to exchange

Maintenance Gangway

- Gangway for cleaning and maintaining plant

Controls

- The counter and intake volume can be controlled both manually and by regulating probe

Earthworks

- Built from concrete or steel possible

Lifting gear

- for servicing

Fish Ladder ascending (Inner double screw patented)

- Special double screw (patented) form to produce the central lock current
- river bed connection

The Fish Descent

“Fish need a human solution to overcome unnatural obstacles“

For the first time from a fish ecology viewpoint, research has been conducted on the theme of fish going downstream in cooperation with the University of Natural Resources Vienna (BOKU).

By creating a lock e.g. a guiding current, it is possible for fish to get into the entrance in a pre-determined direction e.g. into the pre-determined transport system.

This technology has been patented using protective EU patents (double flange construction including the special outrigger).

Accompanying research on the Hydro Power Screw with integrated fish lift BOKU 2012 - 2014

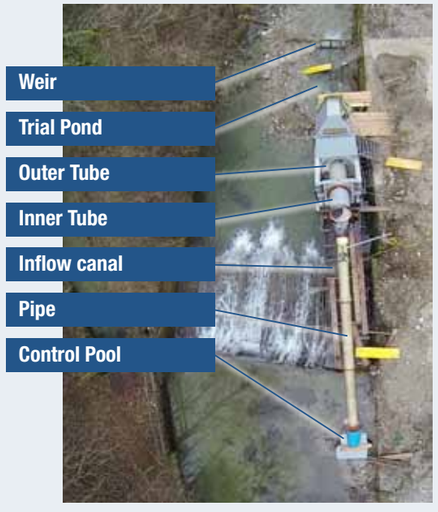
Environmental Fish Monitoring

December 2011 until March 2012 several tests
Free ascent choice for the first phase - 17 adult and juvenile fish plus one Bullhead (during this time the shut-off door at the bottom of the screw with an artificially created test pond was fully open).

Detail test March 2012
A total of 372 individuals from the 4 main fish species of Trout, Rainbow Trout, Bullheads and Grayling, were introduced (fish length varying from 3 - 48 cms = juveniles to adults individuals of all 4 kinds)
151 ascended in total via the central tube. Of these 15 were Grayling, 107 were River Trout, 9 Bullheads, and 20 Rainbow Trout of all ages.

December 2013 - Extended Ascent Test with an enlarged group of fish species
(Chub, Barbel, Nase, Roach, Pike, and Danube Salmon)
33 introduced
25 ascended of all kinds

March 2014 Fish descent test
Introduced 140 fish (23 Bullhead, 88 River / Rainbow Trout)
20 Bullhead, 59 River and 17 Rainbow Trout descended within a day



Conclusion - Summary IHG/BOKU:
- Ascent registered through the complete test period
- Reliability as set out in the FAH for fish ecology principles and from the river Jeßnitz
- The Hydro power screw (Hydroconnect) is well suited for fish descent
- No danger of injury to fish ascending (going upstream) or descending (going downstream)
- Positive results from pre-testing with multiple fish species concerning fish ascent

Project Sequence

1. Feasibility (analysis and evaluation)
2. Rough concept / proposal
3. Quotation
4. Detail concept / Technical planning
5. Financing / Subsidies advice
6. Permissions / Certification / Insurance
7. Environmental advice / Eco integration (lobbying)
8. Collating all technical materials with detailed milestone
9. Delivery, assembly, test-run
10. Instruction
11. Maintenance, service, poss. updates

modular, reliable, modern

Electrical plant installation / Automation

Excerpt from the control and plant technology

- Integrated quality Siemens products
- Modular adjustment for optimised adaptability particular to each plant configuration
- State of the art technology
- Optimal performance
- High efficiency
- Touch panel operation and visualisation
- Reduced voltage supply for controls and gearing enabling controlled shut-down due to mains failure

Usage of permanently energised generators.

- Low weight and volume
- Considerably lower noise produced than an asynchronous generator
- More effective under part load operational range

Alternative for plant with lesser performance capabilities there are power inverter combinations also available from the company Lti.
Advantages

- Simple and compact
- For smaller plants with lower technological needs
- Keener pricing

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ALBRECHT fishLift INSIDE

MITGLIED VON Kleinwasserkraft Österreich