

StrafloMatrix™

Further refinement to the HYDROMATRIX® technology

M. Schneeberger
VA TECH HYDRO GmbH & CO
Lunzerstrasse 78
A-4031 Linz, Austria

H. Schmid
VA TECH HYDRO GmbH & CO
Lunzerstrasse 78
A-4031 Linz, Austria

Introduction

VA TECH HYDRO has recently completed the development process for another important refinement to the HYDROMATRIX® technology – the StrafloMatrix™. The unique feature of this system is the innovative integrated turbine runner-generator rotor design, where the outer edge of the turbine blade supports the generator rotor – both turn under flow as a single unit. The new configuration has significantly reduced physical dimensions in the direction of flow, allowing for applications where space is limited.

This innovation of VA TECH HYDRO represents the next generation of the HYDROMATRIX® - technology and provides project solutions of simple design and high economic feasibility. More than 100 HYDROMATRIX® turbine generator units have been sold up to now, with more than 60 already in operation. The StrafloMatrix™ concept is the progressively advanced development of the HYDROMATRIX® technology.

The principal idea behind this innovation is to combine a proven technology (the Straflo concept) with a rapidly developing new technology (the industrial use of permanent magnets) under a new hydropower concept.

While the Straflo- Technology (“**STRA**ight- **FLO**w”) was developed more than 60 years ago as a special solution of low head axial turbines for projects with restrained space, the industrial application of the permanent magnet technology is quite new to the hydropower world. Combining the benefits of these technologies with the simple, but fascinating principle of the HYDROMATRIX® concept - which main idea is to use a multitude of smaller standardized units instead of the conventional installation of a few big ones - lead to the innovation of the StrafloMatrix™ concept.

Other than the HYDROMATRIX® system, the StrafloMatrix™ technology is based on synchronous operation with permanent magnets, an advantage in applications where induction generators may not be acceptable..

The application areas of this unique turbine design are primarily existing weirs or irrigation dams, where the StrafloMatrix™ units are arranged in modules in front of or in the existing openings.

With the low investment costs for such solutions, new and presently unused hydro resources can now be efficiently utilized world wide. The StrafloMatrix™ turbine is perfectly suited for the development of hydropower without interference with natural conditions and the environment. The StrafloMatrix™ will open economically and technically feasible development possibilities at many locations worldwide.

1 The reason for the HYDROMATRIX® concept

Hydropower is the best developed and by far the most important form of renewable energy. For this reason, it plays a major role in the achievement of the Kyoto targets and the requirements contained in the European Union’s (EU) "Renewable Energy" directive.

All Countries within the EU are pushed to increase the share of renewable energy in their total mix of energy production. In contrast to other renewable sources of electricity, hydropower can supply greater portion of the electricity needs. Hydroelectric power plants and facilities can also respond instantaneously to the changing electricity demand while helping to minimize emissions of greenhouse gases and other pollutants.

Traditionally thought of as a cheap and clean source of electricity, most large hydro-electric schemes being planned today are coming up against a great deal of opposition from environmental groups and native people.

However, legal requirements, high costs and regional environmental issues restrict new dam and weir construction. VA TECH HYDRO was looking for low cost and environmentally friendly methods to generate hydroelectric power in an economically feasible way.

Worldwide there exist a large number of locations where low head dams were built just for irrigation purposes or in order to secure shipping traffic but no power stations are part of these structures.

The HYDROMATRIX[®] concept makes use of these existing dam and weir structures with no need for additional civil works and without disturbing their primary purpose.

With the HYDROMATRIX[®] technology power plant operators are enabled to tap the unused hydropower potential of numerous rivers to develop a valuable renewable energy resource.

2 The HYDROMATRIX[®] principle

The HYDROMATRIX[®] technology is based on an invention by an American engineer which has been systematically improved by VA TECH HYDRO. This opens up a new range of applications with proven turbine and generator technology.

The construction is well adaptable and on the one hand realizable in comparatively short times. On the other hand there is no need of a powerhouse, which often re-quires expensive foundation solutions at geologically difficult grounds.

The civil costs normally take a significant part of the total costs of a power station. They are quite small in case of implementing a HYDROMATRIX[®] system and therefore in many cases hydro generation becomes economically justifiable.

These essential advantages of HYDROMATRIX[®] technology enable the owner to realize ecologically beneficial hydroelectric power projects at extreme low costs.

3 Application ranges

Generally, the HYDROMATRIX[®] System may be economically applied within the following criteria ranges:

- Discharge greater that approximately 60 m³/s
- Head from 3 m to 30 m
- Draft Tube exit submergence of about 1.5 m
- Utility grid connection in relatively close proximity
- Structure available and suitable for HYDROMATRIX[®] modules

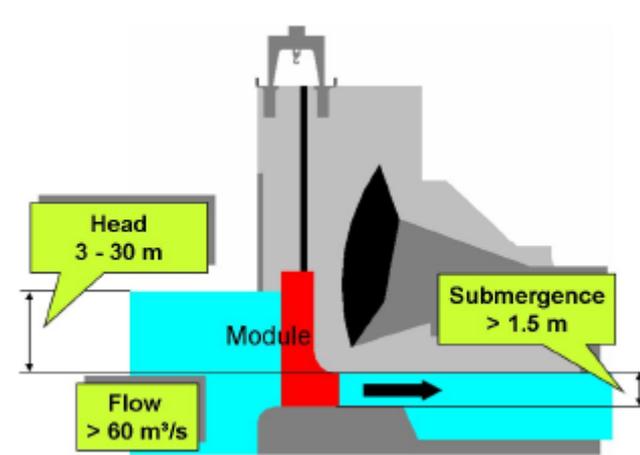


Fig.1: Application range for the HYDROMATRIX[®] system



To get the unabridged version of this paper please contact

**ANDRITZ HYDRO GmbH
Lunzerstrasse 78
A-4031 Linz, Austria**

**Phone: +43 (732) 6986-0
Fax: +43 (732) 6980-2554
Hydromatrix@andritz.com**