

## Perspectives 2005

Hydroplus is very upbeat as it begins the 2005 year, its enthusiasm fuelled by the 40 dam rehabilitation projects studied in 2004. Increased interest in the system of Fusegates and the efforts made over the past few years have resulted in the signing of several contracts.



Terminus dam spillway enlargement in California, inaugurated in June 2004.

The National Dam Agency of Algeria, in light of the Beni Amrane project completed in 2003, commissioned Hydroplus to heighten the Fom el Gueiss dam, near Batna. The Fusegates for this project are presently under construction.

As for Australia, it will soon hold the record for the tallest Fusegates ever built. The Jindabyne flood control contract, which is well under way, has had an energizing effect on the Hydroplus team. (See article on p. 4)

This year Hydroplus will also participate in bilateral financing development programs, sharing its expertise with local governments.

At the same time, the team – convinced of the system's potential – will continue to invest in R&D. In so doing, it can rely on support from major partners for conducting fundamental and applied research.

Having achieved ISO 9001 and ISO 14001 standards last June, Hydroplus renews its commitment to quality, environment and safety in 2005. It will focus on steering its clients to the most beneficial solutions and accompanying them every step of the way, from the development of their projects to their completion. Hydroplus will strengthen its position as a top-notch partner.

### INSIDE

Discover a new type of Fusegates:  
**the Folding Fusegate**

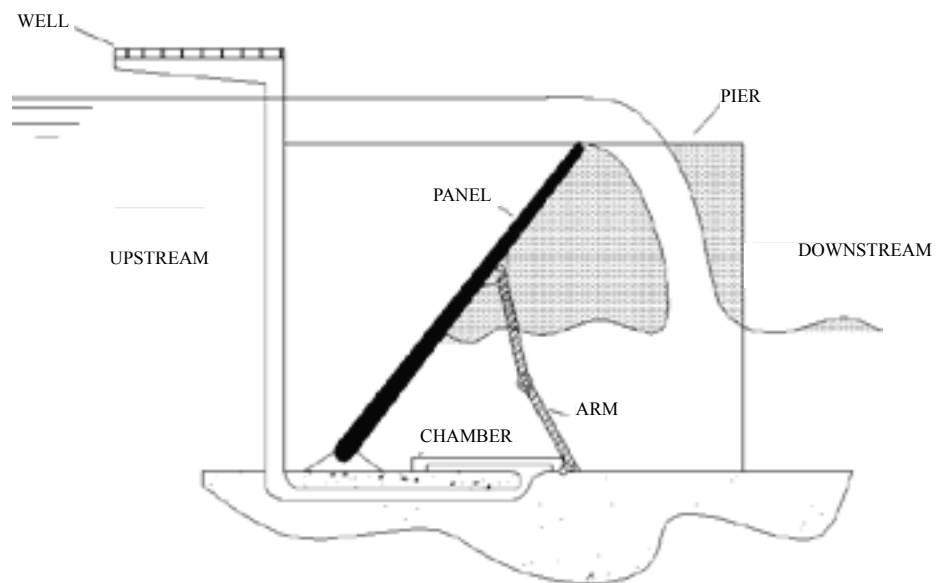
# Initial release of Folding Fusegates

R&D carried out by Hydroplus in cooperation with the Scientific Research Institute of Energy Structures (NIIES) of Russia has borne fruit, as a new type of Fusegate has just been fine-tuned: the Folding Fusegate. This brand new, patented product functions according to the same principle as the original Fusegate system and its operation requires neither external energy nor human intervention.

## What does it look like?

Each element is comprised of 4 separate parts:

- the panel, attached to the sill of the dam by a rotating axle.
- the mobile chamber, which pivots on an axle anchored to the sill on the downstream side.
- the supporting arm, consisting of two folding bars. Depending on the panel size, the arm can be reinforced with an additional bar.
- the well, linked to the chamber.



## How does it work?

### *Under normal operating conditions*

The panel is raised and forms a watertight barrier. The arm, the two bars of which form almost a 180° angle, rests on the chamber and supports the panel.

The Fusegate is stable and operates like an ungated spillway.

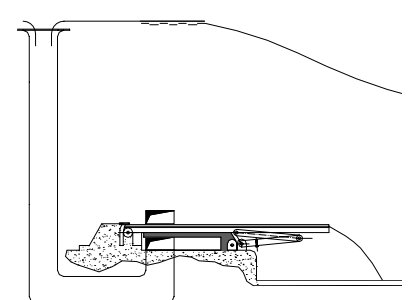
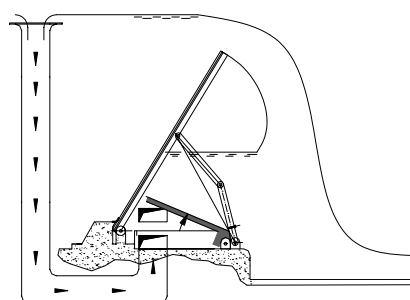
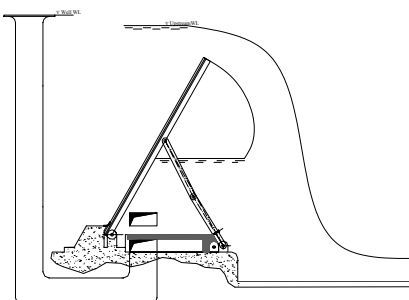
### *In case of a major flood*

When the upstream water level reaches the inlet shaft level, water enters the well and causes an uplift pressure to develop in the chamber. The mobile chamber then rotates and pushes against the lower section of the arm. As soon as the arm angle comes to an angle greater than 180°, the panel falls down flat.

### *During the flood*

The panel stays flat, the chamber is back to its original position and the arm remains bent.

Once the flood is over, a winch or a jacking system is used to raise the panel up again.



## Testing the technology

A series of laboratory tests was conducted in Russia with the NIIES. The first models of Folding Fusegates were experimented on a hydraulic model, demonstrating their expected reaction according to various downstream water levels as well as their great shock resistance.



In order to optimise the system, various spillway configurations were studied, including the installation of Fusegates between walls parallel to the current in order to recreate the performances of a labyrinth.

## Full size Folding Fusegates

These more than satisfactory results culminated, in July 2004, with the construction of steel Folding Fusegates, 1.80 m tall, which were installed at one end of the Korobrovskaya dam spillway (Russia). Artificial floods validated their proper operation and an observation campaign is now underway to study their behaviour in icy conditions.



Folding Fusegates do not replace the Fusegates currently on the market. They function according to the same principle as the original version, but their more elaborate design allow for a response that is better adapted to projects where the local hydrology requires frequent lowering of the Fusegates in order to protect the structure. With the inception of Folding Fusegates, Hydroplus reconfirmed its commitment to R&D while demonstrating the potential and adaptability of its process.

## JINDABYNE DAM – AUSTRALIA

# Successful model tests runs

The challenge involving the tallest Fusegates in the world (7.6 m high) continues. The Hydroplus team has fine-tuned its highly innovative concept, which allows the performance of conventional labyrinth Fusegates to be optimised through a configuration that is even more economical.

Tests were conducted last fall in cooperation with the Sogreah Laboratory in Grenoble, France. Adjustments were made using two hydraulic models, built to scales of 1/20 and 1/45 respectively. The first model measured the stability of the Fusegates under normal and down-graded working conditions, while the second studied the hydraulic performance of the spillway.

The results of the tests are very satisfactory. They highlight the potential uses of Fusegate technology and contribute to the progress of Hydroplus R&D initiatives.



Small (above) and large (right) hydraulic models for Jindabyne Dam.

The next project step will consist of preparing the construction drawings and environmental reports necessary to begin construction of the Fusegates in the third quarter of 2005.



## FASEP – THAILAND

# Solutions for meeting water needs

Supported by the FASEP (the French Government's Private Sector Study and Aid Fund), Hydroplus, in partnership with Sogreah, was commissioned to conduct a study to optimise the dams belonging to the Royal Irrigation Department of Thailand.

The project, which is scheduled to last over a 10-month period, will begin in March. Engineers will closely examine

the possibility of raising 10 dams, selected on the basis of technical feasibility criteria and the importance of the demand for water.

In so doing, Hydroplus hopes to find a suitable solution to the increasing need for water in Thailand.

Hydroplus

5, cours Ferdinand-de-Lesseps  
92851 Rueil-Malmaison Cedex  
France

Tel: (+33) 1 47 16 44 34

Fax: (+33) 1 47 16 42 12

Email: [contact@hydroplus.com](mailto:contact@hydroplus.com)