

15 Years towards Dam Improvement

1989: The Hydroplus System was invented by Mr. François Lempérière. Fifteen years later, more than 40 dams around the world are using Fusegates to increase storage capacity and dam safety. On this issue and the following ones, clients of HYDROPLUS have kindly accepted to voice their opinion of and share their experience with the Fusegate technology.

Puylaurent Dam

France – 1994/1996

*Interview with Mr. Bruno BORANGA,
Chassezac Plants Grouping Manager
(Electricité de France)*

The Puylaurent hydropower dam is the latest arch dam in France. This 73 m high dam was built between 1994 and 1996 for river flow management, irrigation and generation of hydroelectricity. The live storage capacity is 12 million m³ and the spillway design discharge is 560 m³/s.

It was first intended to build a free overflow spillway fitted with 3 spans of 14 m wide. However, this configuration required a massive spillway, impacting on the road access to the hydropower station, located at the dam toe, at the time of overspilling.

Instead, using the Hydroplus System allowed the construction of only 2 spans of 15.6 m wide. The installation of 8 Fusegates, each 1.10 m high, do not



modify the Full Supply Level nor the Maximum Water Level. The modification of the spillway also permitted to reduce by 2000 m³ the quantity of concrete needed.

“Since its installation, the Hydroplus System performed its mission perfectly. On December 3rd 2003, the Fusegates successfully withstand a 131 m³/s flood, stronger than the 10-year return flood of 128 m³/s.” This is still far behind the first tip-off, calculated for a 400 m³/s flood.

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RETROSPECTIVE – Cont. of cover

Puylaurent Dam

At Puylaurent, the Fusegates do not have individual inlet wells. The engineers took advantage of the new construction to incorporate the inlet wells into protective enclosures connected to the reservoir. Each funnel is then linked to a pipe embedded in the spillway sill which daylight in the chamber of the Fusegates. This design enables the water to discharge unencumbered.

“We are totally satisfied with the system. The Fusegates use no mechanical parts, which makes it really easy to maintain and facilitates the work of the operator. After 9 years of operation, the Fusegates’ steel structure is not corroded and the sealing joints are in good condition. Regularly, as a preventive measure, we only remove woods and floating debris from the Fusegates’ bucket.”

A second phase to the project is planned to eventually increase the reservoir capacity by an extra 1 million m³. The actual Fusegates would be simply replaced by 2.6 m high units, with no modification to the concrete works nor the MWL.



INSIDE VIEW OF THE PROTECTIVE ENCLOSURE FUNNELS, LINKED TO THE FUSEGATES BY EMBEDDED PIPES



THE TWO-SPAN SPILLWAY BEFORE AND DURING OVERSPILLING, WITH HYDROPOWER PLANT AT THE DAM TOE

“We do recommend the Hydroplus System for similar applications, as we really appreciate its light and easy maintenance.”

BIBLIOGRAPHY

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- P. Castaing, P. Gaudron, J.-P. Habauzit, B. Mahiou. “Le barrage de Puylaurent : une grande voûte en construction avec des procédés innovants”. *BTP*, N. 6, August 1994.
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CYPRUS

Heavy Rains Filling Up Dams

The dry country of Cyprus encountered an especially wet Winter this year to the relief of the government and the dam owners. Most of the dams are overflowing, including Xyliatos and Dhypotamos, which are both equipped with Hydroplus Fusegates.



XYLIATOS DAM OVERSPILLING

In Cyprus, the water resources development is impressive compared to that of other countries of similar size. In total, there are 105 dams and ponds in operation with an approximate capacity of 305 million m³.

Unfortunately, despite the remarkable work that has been achieved, the quantity of water available for domestic and irrigation purposes has been inadequate due to the reduction in both rainfall and dams' water-flow. As a result, in the past few years water-rationing measures were introduced with adverse effects on all fields of activities.

In addition to the construction of seawater desalination plants and to the promotion of water saving measures, the

Cyprus government has stressed the importance of optimising the use of existing dams.

The government's voluntary policy now bears fruit. Thanks to one of the wettest January since 1902, almost all the spillways of dams in the country are overflowing. Among them is Cyprus' largest dam, Kourris Dam, which is located outside Limassol, in the south of the island. The dam is overflowing for the first time since its construction in 1988.

During the first months of 2004 alone, more than 2.0 millions m³ of water have accumulated behind the Fusegates installed at Xyliatos and Dhypotamos. The return on investment is substantial considering the capital cost of the two dam raising projects, approximately €800,000, as compared to the expensive cost of water produced by desalination plants.

The HYDROPLUS projects in Cyprus correspond to a sustainable logic by helping the country to meet the growing water demand as well as to better face the drought periods without any major works.



DHYPOTAMOS DAM OVERSPILLING

USA

Terminus Dam Project Completed



The 6 Fusegates are completed and ready for operation. The US Corps of Engineers is looking forward to seeing the reservoir filled up with the Spring waters. The official inauguration is scheduled on June 7, 2004.

Recent Papers and Forthcoming Conferences

MARCH

- **“Giant Fusegates Add Safety to Terminus Dam in California”**
By H. Kocahan, HYDROPLUS Inc.
International Water Power & Dam Construction
March 2004
- **USSD Conference 2004 - St. Louis, Missouri, USA**
March 29 - April 2, 2004

APRIL

- **NHA Conference 2004 - Washington, D.C., USA**
April 25-28, 2004

MAY

- **ICOLD Conference - Seoul, Korea**
71st Annual Meeting
May 16-22, 2004
- **Sustainable Development for Additional Water Supply Storage**
By A. Walz, Jr., P.E., GANNET FLEMING, Inc.

JUNE

- **Hydroenergia 2004 - Falkenberg, Sweden**
June 17-19, 2004
- **17th Intl Symposium on Ice - St. Petersburg, Russia**
June 21-25, 2004
- *Presentatation on Khorobrovskaya Dam Project*

HYDROPLUS

5, cours Ferdinand-de-Lesseps
92851 Rueil-Malmaison Cedex—FRANCE
Tel: +33 (0)1.47.16.44.34 ■ Fax: +33 (0)1.47.16.42.12
contact@hydroplus.com ■ www.hydroplus.com