

Spillways protection

Resistance to Hydraulic Abrasion

Spillways protection with Ciment Fondu®/Alag® concrete was specified for the protection of the AREQUIPA Dam

PERU - 1994

Special feature : Hydraulic abrasion, ease of installation

1 Expected performances

The "Sociedad Electrica del Sur Oeste S.A." and the engineering company "S & Z Consultores Asociados", Lima, Peru, required a Ciment Fondu®/Alag® concrete protection for all the spillways and side walls of this dam, in substitution of granit blocks traditionally used in this region.

Ciment Fondu®/Alag® concrete was specified based on the severe hydrologic conditions, such as abrasion and shock that happen every year during the 3 months rain period.

The design was based to resist a 600 m³/sec flow and 22 m/sec water velocity.

2 Solution applied

The product selected was a Ciment Fondu®/Alag® based concrete :

For 1 m³ cast in place :

Ciment Fondu®	: 515 kg
Alag® Fine	: 1030 kg
Alag® Coarse	: 1030 kg
Water / Cement ratio	: < 0.40



The spillways protection is secured by a Ciment Fondu®/Alag® concrete that resists the effects of hydraulic abrasion and shock from the Rio Chili.

The area of 400 m² was cast using a checker-board method with 2 m squares in average, at a thickness of 20 cm.

Side walls were also protected with a 15 cm thick Ciment Fondu®/Alag® concrete layer.

Wire mesh was fixed in the Portland concrete sub-base to provide a maximum adherence. Ciment Fondu®/Alag® concrete was cast, vibrated and cured following best practices of conventional concrete.

This dam has been in service since 1995.

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