Politecnico di Torino

Dams & Reservoirs DAY 2025

Water and Energy security for Europe

ITCOLD

ITYP

OPEN DAY ON DAMS



Dams and environment: engineering solutions for the future

TORINO , 28 maggio 2025

Young engineers in Enel: surveillance and monitoring of dams

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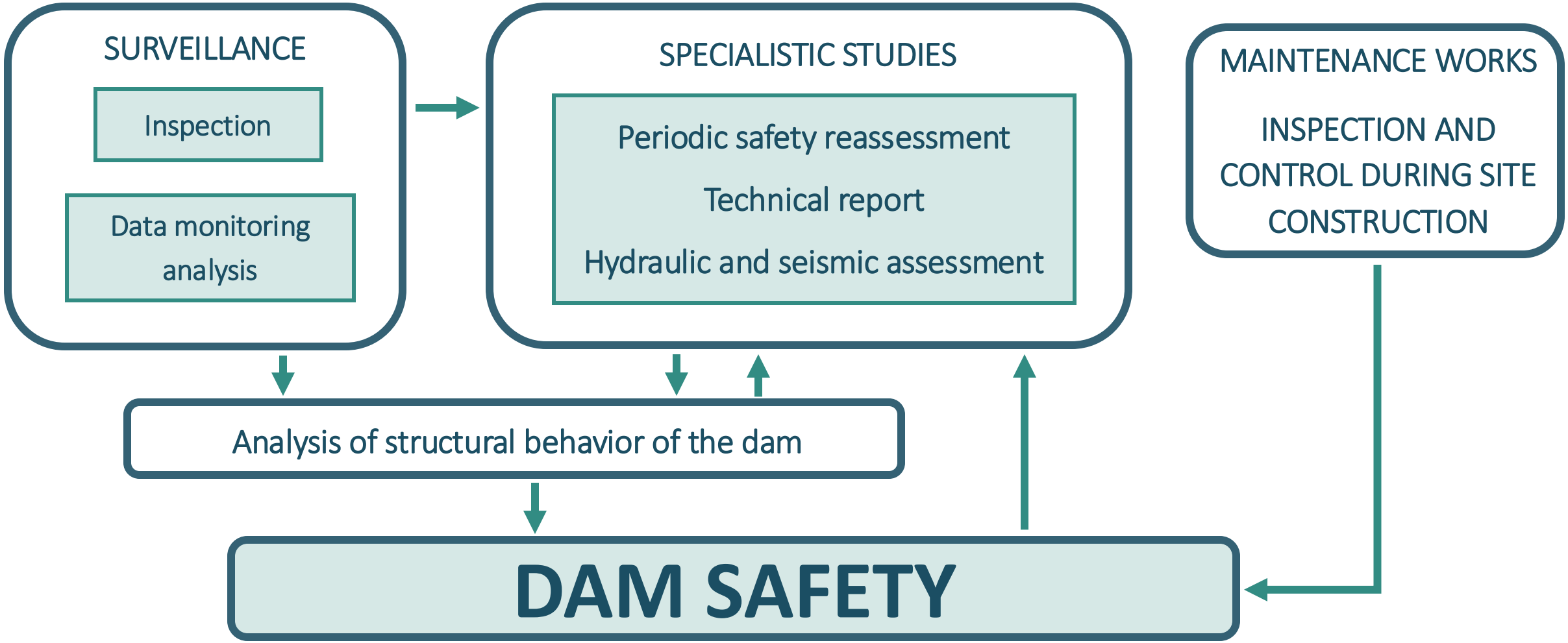
ITCOLD – II Concorso Fotografico

Dams & Civil Infrastructures Safety on our country

- Torino
- Milano
- Venezia
- Firenze
- Roma
- Napoli



Dams & Civil Infrastructures Safety: scope



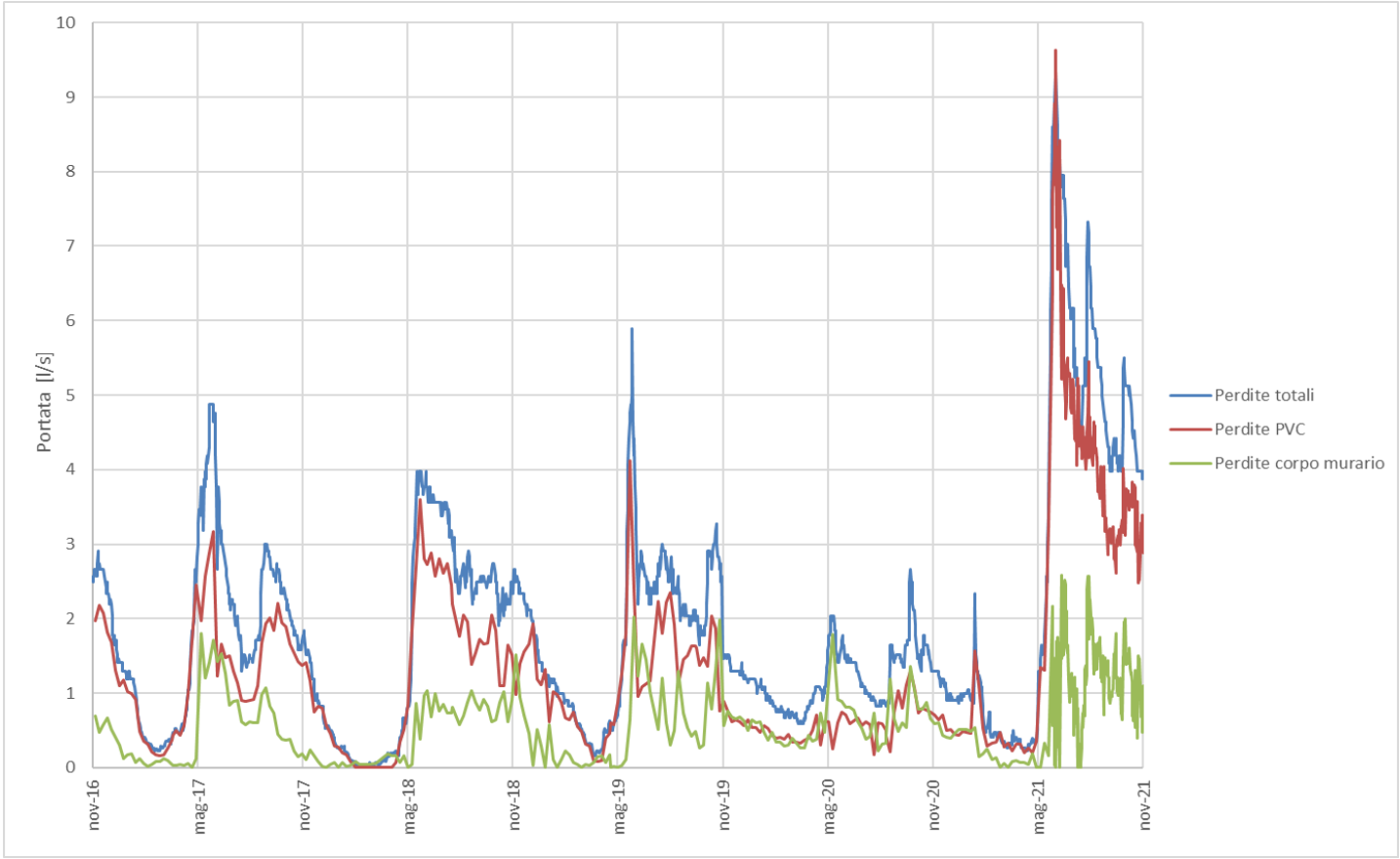
Law 21 october 1994, n. 584 – Urgent measures regarding dams

«In order to guarantee the control action exercised in the construction and operation of dams by the public administration, ***each owner*** *of the dams is required to identify, even within its own structure, an engineer, designated* ***responsible for the safety of the strucuture*** *and the operation of the plant»*



Dam surveillance: "office" activity

- Analysis and interpretation of measurements and monitoring data
- Technical reports
- Inspection reports
- Seismic and hydraulic reassessment
- Design proposal



Dam surveillance: activity on field

- Specialistic inspections
- Technical inspections
- Topographical surveys
- Visit of dams with government agency



From monitoring data to semestral certification of the dam

MONITORING DATA

Field measurements and structural monitoring

Measurements collected on database

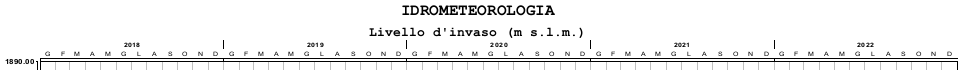
Critical analysis and interpretation of measurements

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MONTHLY BULLETINS

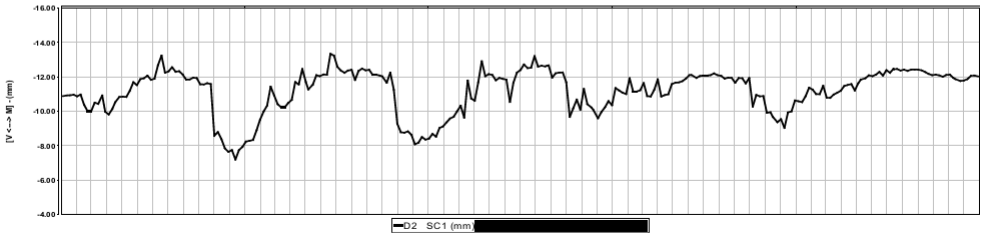
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SEMESTRAL CERTIFICATION



ASSEVERA

- che le opere relative al corpo diga sono in buono stato di conservazione e manutenzione;
- che le sponde dell'invaso non presentano segni di dissesto significativi nei confronti della sicurezza delle opere;
- che le apparecchiature a servizio degli organi di scarico della diga, le fonti di energia ausiliarie e la sirena d'allarme sono in buono stato di conservazione, manutenzione ed efficienza;
- che la strumentazione di controllo, con le tolleranze ammesse dal "Foglio di Condizioni per l'Esercizio e la Manutenzione", evidenzia un normale comportamento dell'opera di sbarramento; [redacted];
- che il Gestore ottempera alle prescrizioni del "Foglio di Condizioni per l'Esercizio e la Manutenzione", intervenendo tempestivamente con provvedimenti di manutenzione che si rendono necessari nel rispetto del progetto approvato;
- che il Gestore cura lo stato di efficienza della sirena d'allarme e il buono stato di conservazione dei cartelli monitori installati in conformità alle circolari e alle indicazioni del "Foglio di Condizioni per l'Esercizio e la Manutenzione", sostituendoli in caso di danneggiamento;
- che il Gestore ha regolarmente comunicato al Ministero delle Infrastrutture Ufficio Tecnico per le Dighe ogni eventuale modifica dei dati riportati nel "Foglio di Condizioni per l'Esercizio e la Manutenzione";
- che la stazione idrometrografica di [redacted] è correttamente installata e funzionante e che il Gestore invia periodicamente i dati registrati al competente ufficio ARPA della Regione Lombardia;
- che alla data odierna non si ravvisano situazioni di pericolo per le popolazioni.



Engineers in Enel on the unit of D&CIS

- Safety responsible engineer for dam
- Project and design of maintenace work and rehabilitation
- Technical assistance and management of site construction
- Inspection of hydraulic structures



Maintenance rehabilitation: the case of Cingino dam

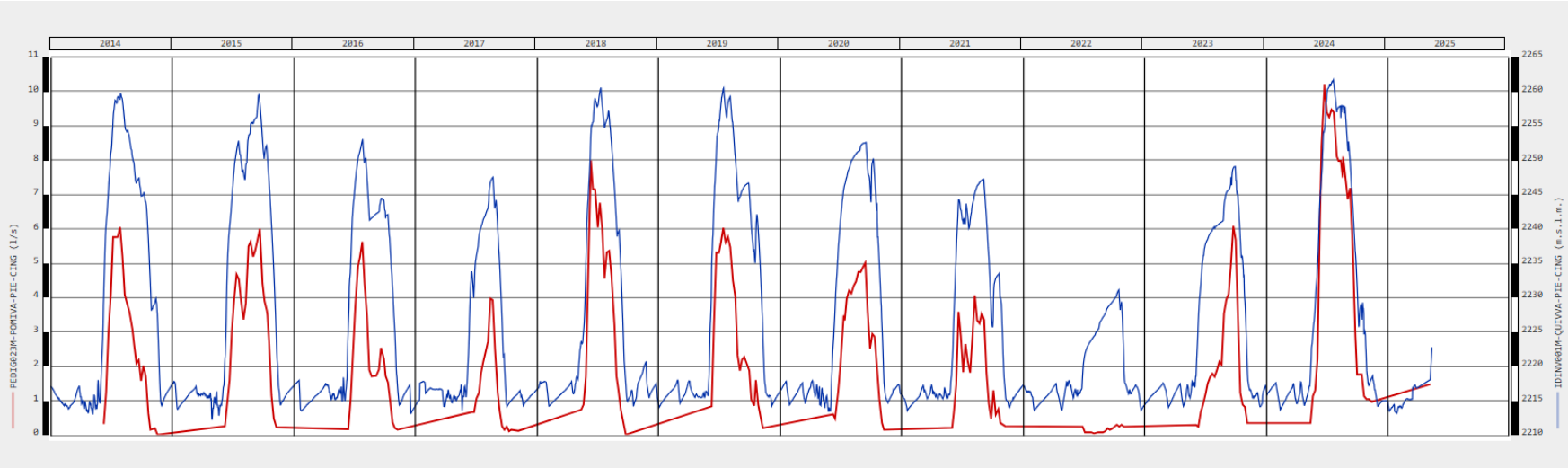




The Cingino is a gravity dam located in the Northern part of Italian Alps, close to the Swiss boundaries.

In the last years, increasing seepage from the upstream face of the dam was observed.

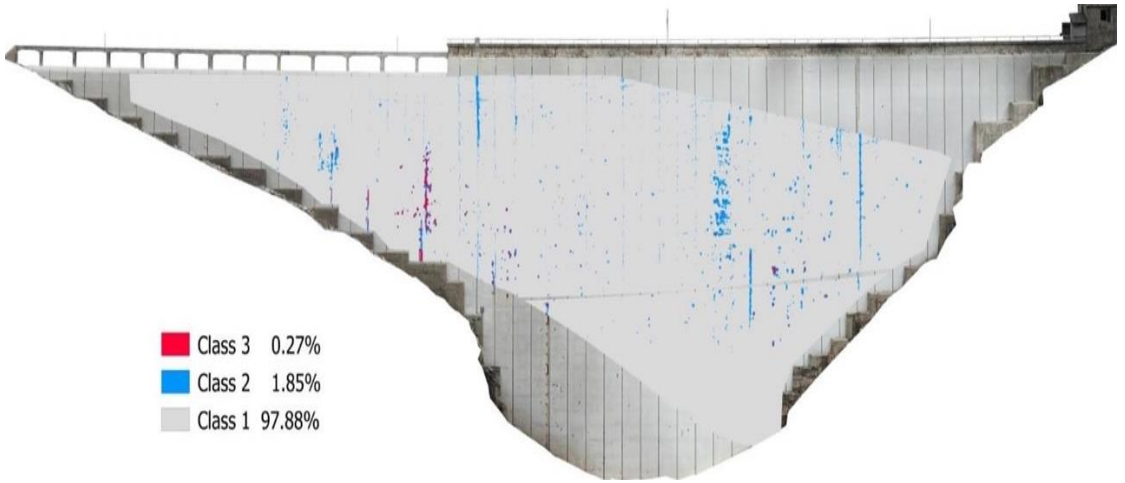
The upstream face is constituted by a steel sheet cover of the concrete wall

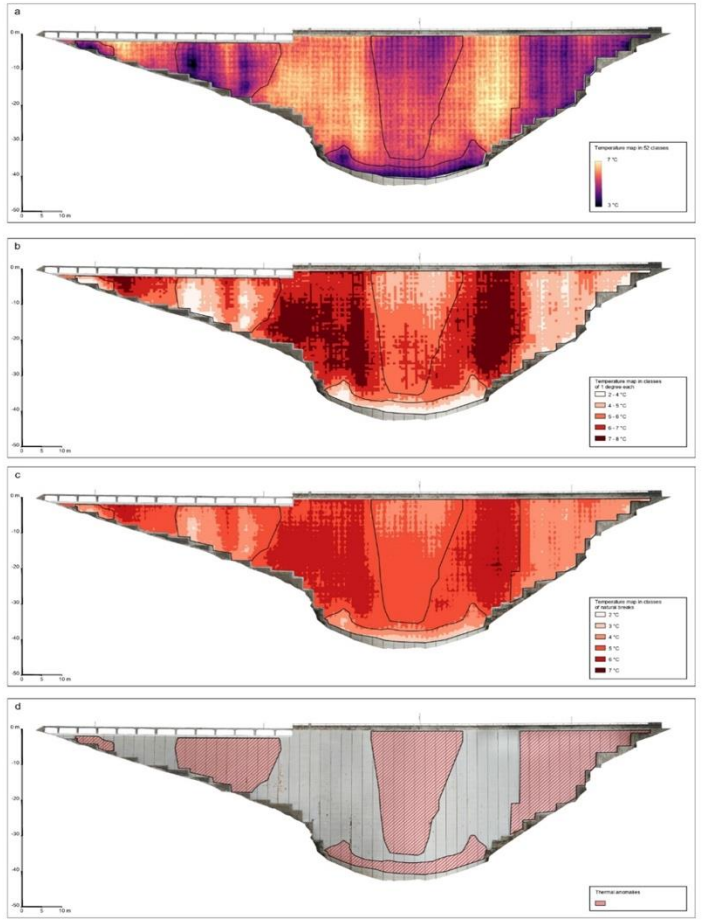


Maintenance rehabilitation: the case of Cingino dam – Technical survey

- Thermal and visual inspection of the steel face with a drone
- Hyperspectral inspection with fixed camera
- Elaboration of data results
- Preliminary design of rehabilitation

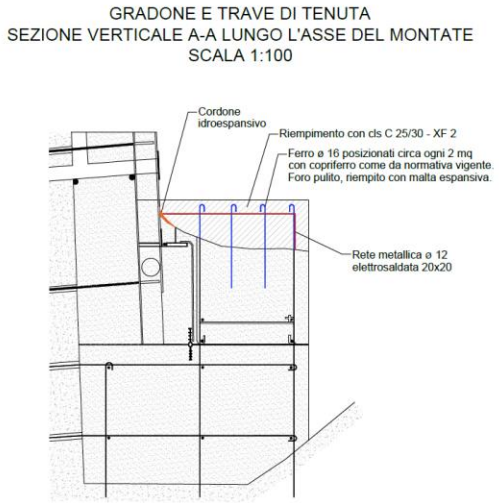


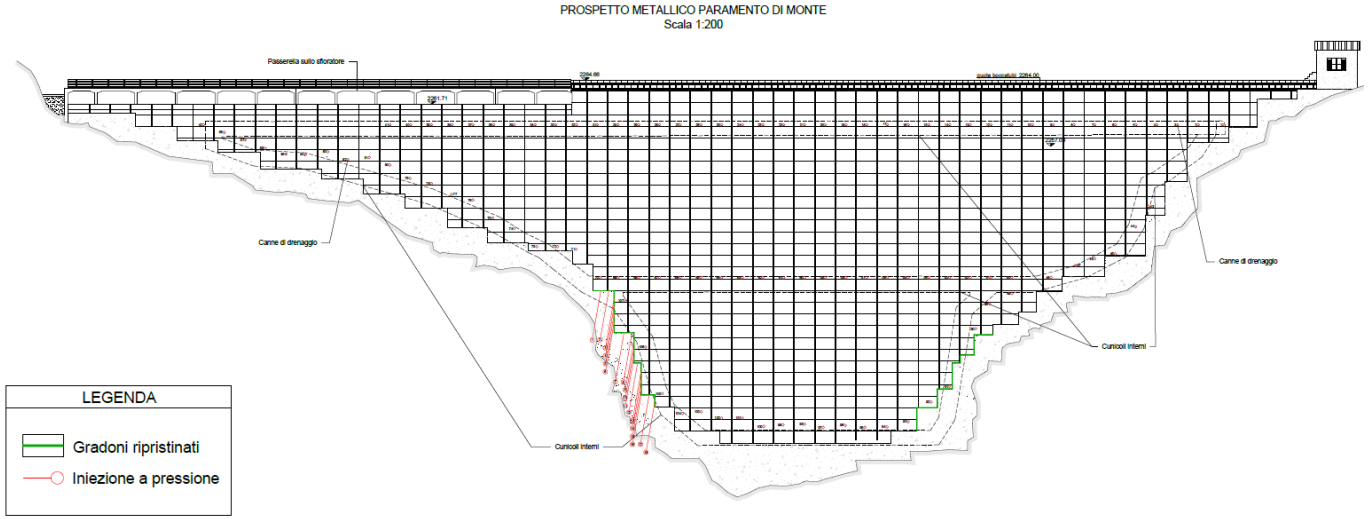




Maintenance rehabiliation: the case of Cingino dam – Project design

- Permits construction
- Report and drawings
- Foundation injection
- Rehabilitation of concrete abutment of the dam





Maintenance rehabilitation: the case of Cingino dam – Technical assistance

- Technical assistance during site construction
- Support for technical variation during the site construction









Thank you for the attention

