Generations in the Ground
Geotechnical Legacy in (some) Argentine Dams

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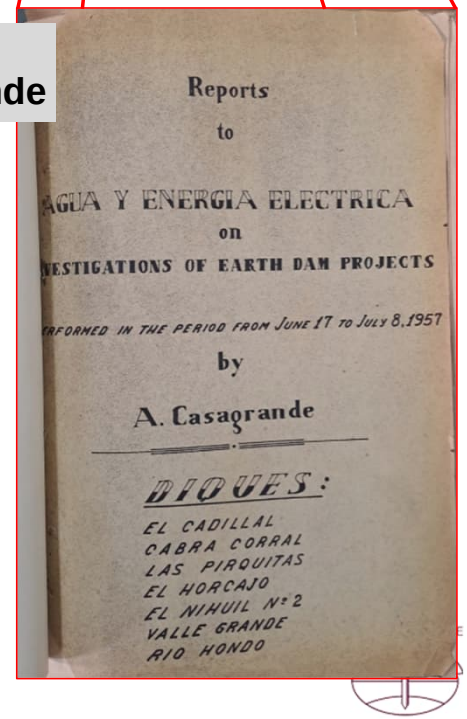
From a casual finding to a bigger question

- I found a report of a visit by **Arthur Casagrande** in **Argentine dam's projects** while organising the Soil Mechanics Lab in University of Buenos Aires.

Arthur **Casagrande**



- This raised a few questions:
  - How do we **relate** to the **first geotechnics generation**?
  - What are the **Argentina's landmark** geotechnical works?
  - How were the problems solved with the **tools available at the time?**

- Then I found the **ISSMGE HTC Project**, with:
  - An interview of Oscar Vardé about the Dam projects he was involved in Argentina: Link (HTC file)
  - TC101 Laboratory testing timeline: Link (HTC file)

Oscar **Vardé**

Geotechnical generations in Argentina

1st Generation
~1908 - 1970


Karl **Terzaghi**


Arthur **Casagrande**


Ralph **Peck**

In memoriam of Ralph Peck : link (HTC file)

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2nd Generation
~1945 - 1990


Arnoldo J. L. **Bolognesi**

ISSMFE South America, Vice-President, 1957-1961
Publications: link (ISSMGE webpage)


Oreste **Moretto**

ISSMFE South America, Vice-President, 1965-1969
Publications: link (ISSMGE webpage)

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3rd Generation
~1970 - 2010


Oscar **Vardé**

ISSMGE South America, Vice-President, 1985-1989
Publications: link (ISSMGE webpage)

Career interview: link (HTC file)


Eduardo **Nuñez**

SAIG President, 1964-1966
Publications: link (ISSMGE webpage)

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4th Generation
~1995 - Present


Alejo **Sfriso**
Publications: link


Roberto **Terzariol**


Luciano **Oldecop**
Publications: link


Virginia **Sosa**
Publications: link


Diego **Manzanal**
Publications: link

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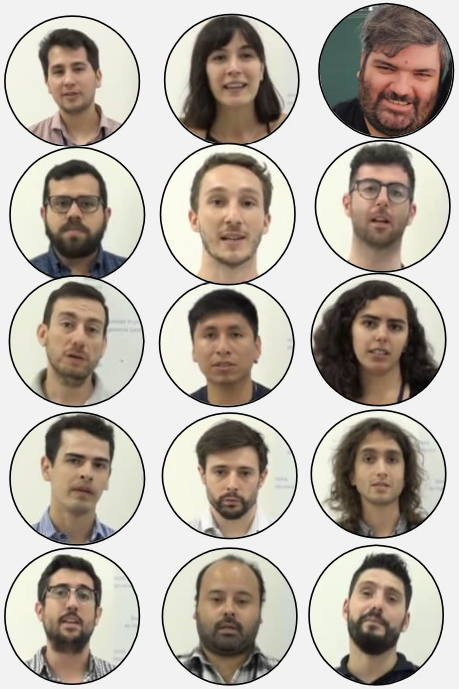
5th Generation
~2015 - Present



Future of Geotechnics - Voices of the Argentine's new generation: link (HTC file)

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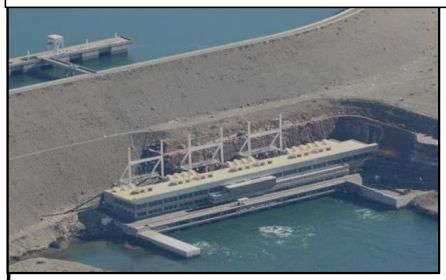
Based on SAIG members, Vardé's career interview, and informal discussions within the community

Characteristic dams in Argentina

El Chocón Dam



- Embankment dam
- Height: 92 m
- Volume: 13 · 10^6 m3
- Crest length: 2.245 m
- Capacity: 1200MW

Geotechnical panel in El Chocón Dam:

Oscar **Vardé**

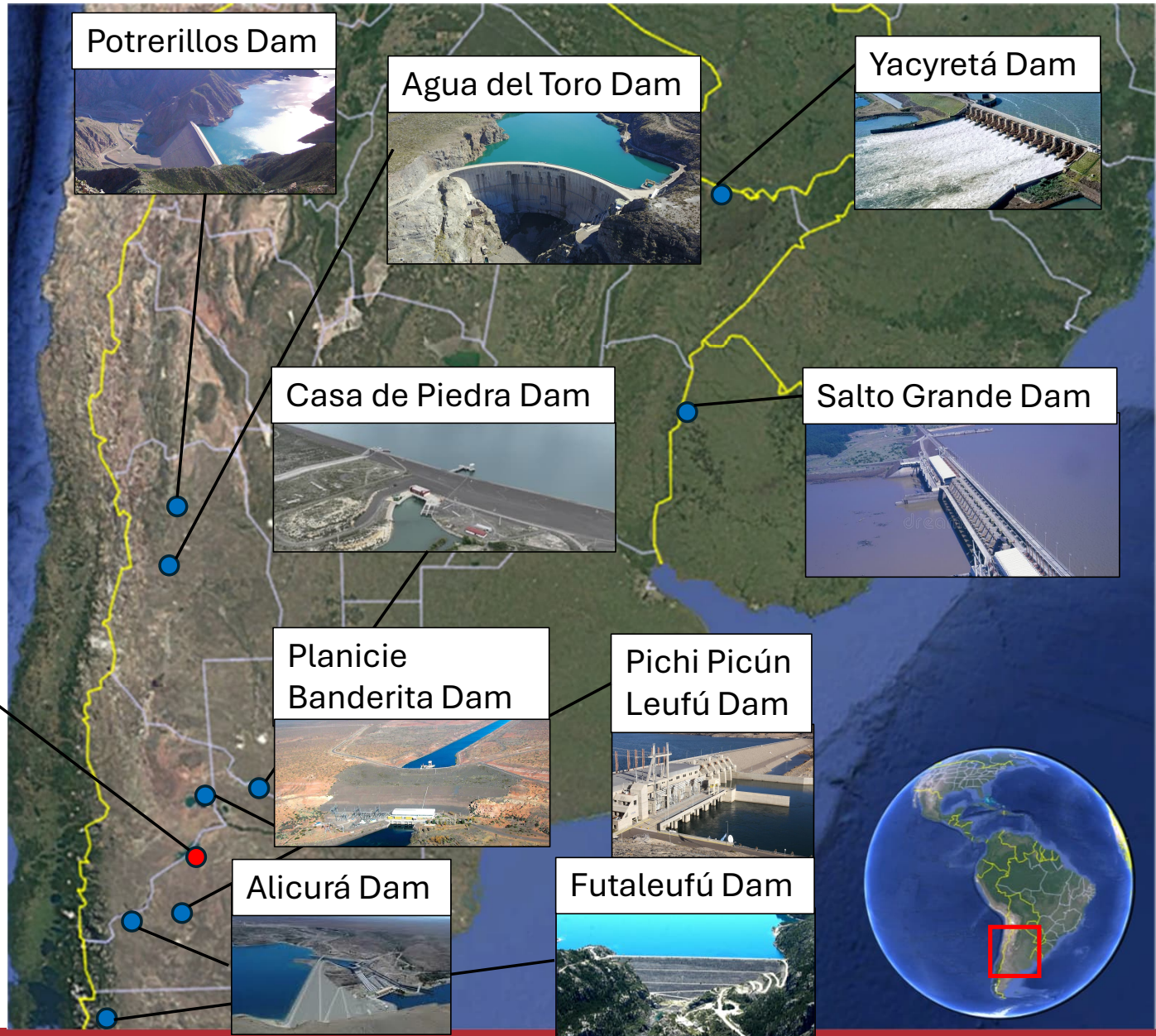
Geotechnical Consultant
In-situ test execution

Laboratory tests specialists

Arnoldo J. L. **Bolognesi**

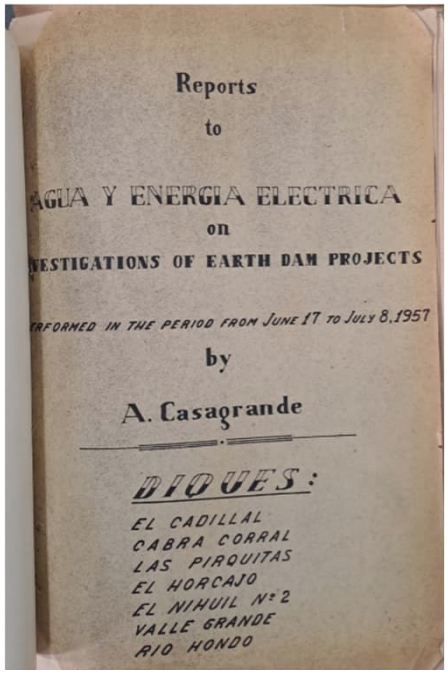
Oreste **Moretto**

Dam's technical details: link (HTC file)



Arthur Casagrande's dams visit

Arthur **Casagrande**



Courtesy of the Soil Mechanics Laboratory,
University of Buenos Aires
also named as Arnoldo Bolognesi Laboratory

Arnoldo J. L. **Bolognesi**

Las Pirquitas Dam

Cabra Corral Dam

Rio Hondo Dam

El Cadillal Dam

El Horcajo Dam
(Unfortunately, not constructed)

Casagrande's visit to different dams' project in 1957

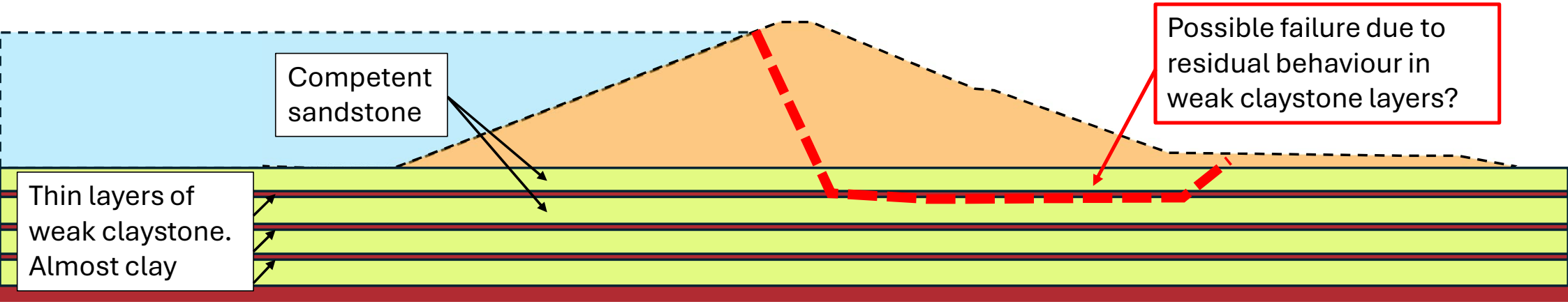
Valle Grande Dam

El Nihuil Dam

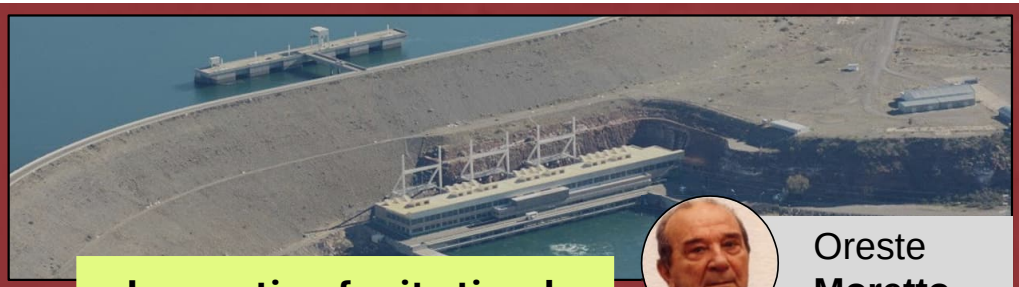
Weak claystone layers in Patagonia Dams

- Not critical in El Chocón, but decisive in others such as Alicurá and Planicie Banderita.
- Low residual strength in thin claystone layers.
- This behaviour is consistent with residual strength in such materials, as highlighted by **A. W. Skempton**.

Remembering A.W. Skempton link (HTC file)



Patagonia Dams in laboratory testing timeline



Oreste **Moretto**

Arnoldo J. L. **Bolognesi**

Innovation for its time!
Triaxial tests on soils and rocks included in design

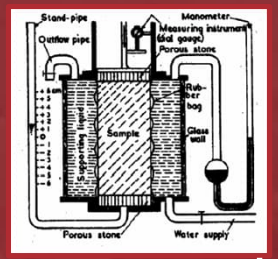
El Chocón Dam

Design (1962-1965)

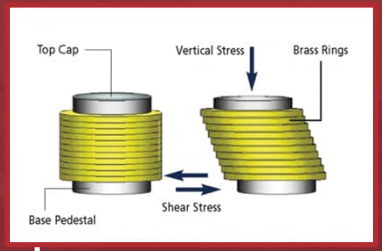
Construction (1965-1968)

First impounding (1972)

1940 — **1950** — **1960** — **1970**



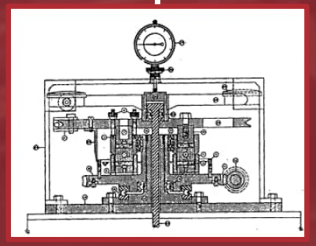
Cell apparatus (1950)



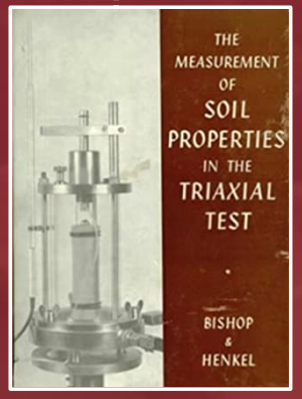
Stacked ring DSS (1951)

Resonant column test (1940)

Oedometer apparatus



Ring shear test (1952)



Triaxial test (1962)

NGI Simple shear apparatus (1966)

Cyclic triaxial testing (1967)

TC101 laboratory tests timeline: link (HTC file)

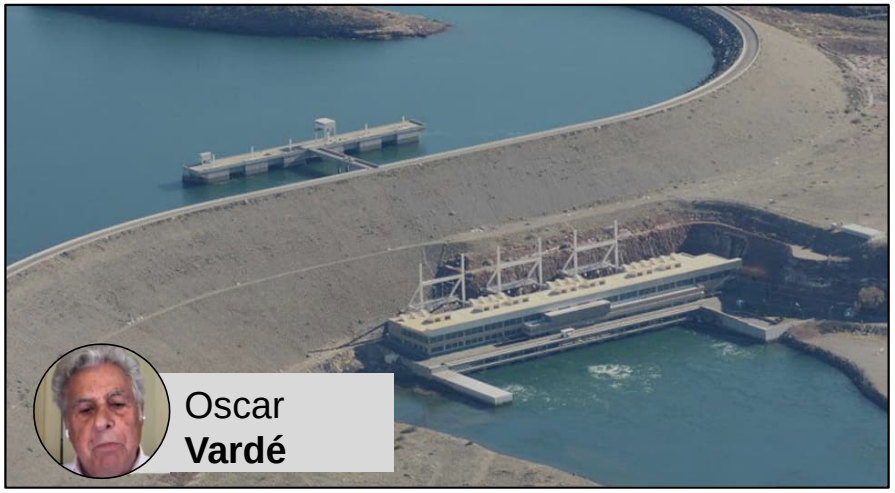
What would their perspective be today?

- For the new Argentine's generation:

  Would **AI and new technologies** change your vision of geotechnics for 2036?

- For Oscar Vardé:

  Would modern tools like finite element method (**FEM**), finite difference method (**FDM**), **AI** and **programming** change how you would approach some of the problems of the Argentine Dams projects?



References and Curiosities

ISSMGE History Time Capsule (HTC):

- Interview with Oscar Vardé – Link
- TC101: Laboratory testing timeline - Link
- Future of geotechnics – Voices of the new Argentine generation - Link
- Remembering Sir Alec W. Skempton – Link
- In memoriam of Ralph Peck – Link

Other sources:

- Arthur Casagrande visit report to Argentina
  Courtesy of Soil Mechanics Laboratory Library, University of Buenos Aires
- Members of Argentine Society of Geotechnical Engineers (SAIG) - Link
  Discussions with members of SAIG
  (Used for generational context and references)