THE CHAGLLA DAM – COMPRESSION JOINT DIMENSIONING AND DEFORMATION BEHAVIOUR

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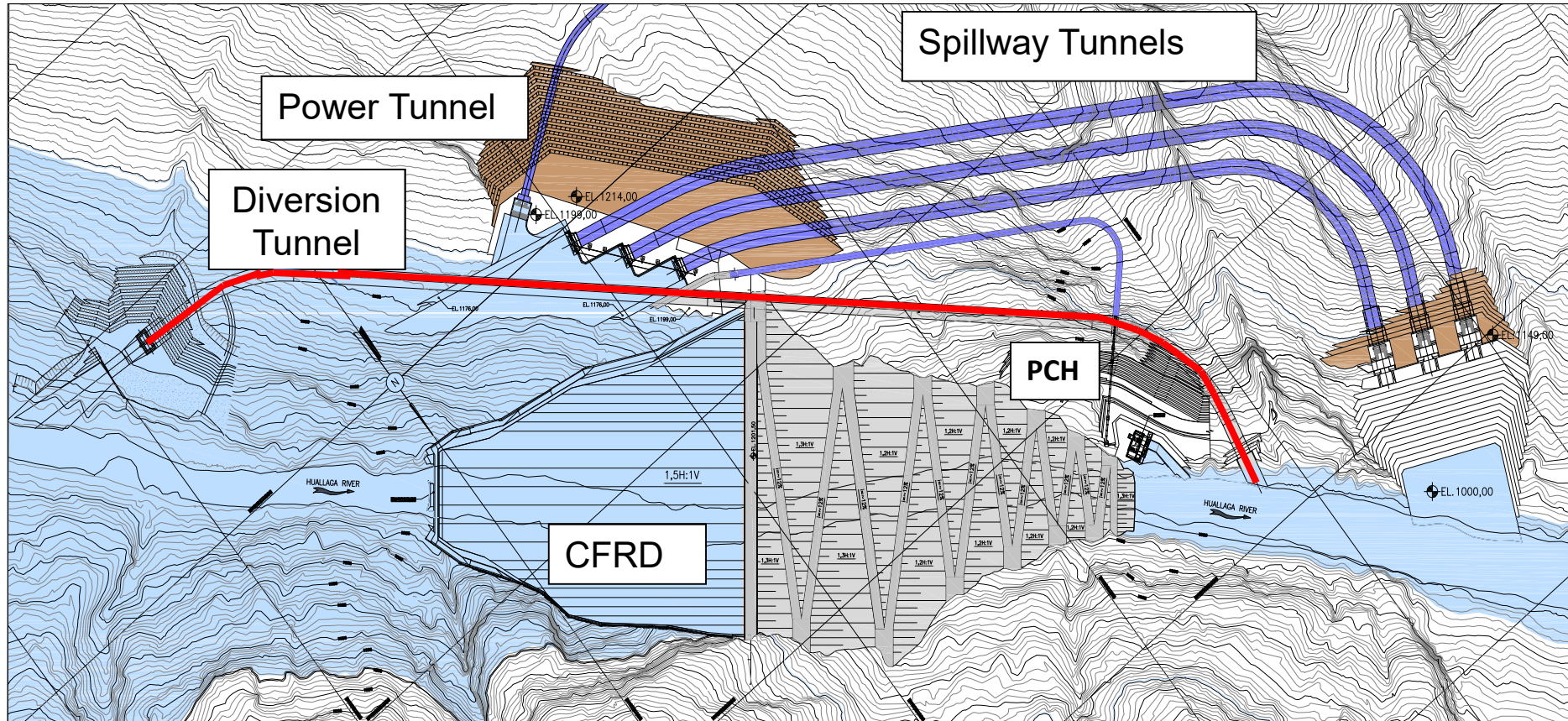Director – Bayardo Materón Associados Ltda

May / 2017

LOCATION - Department of Huánuco, Peru, on the eastern edge of the Andes in the direction of the Amazon Forest region.
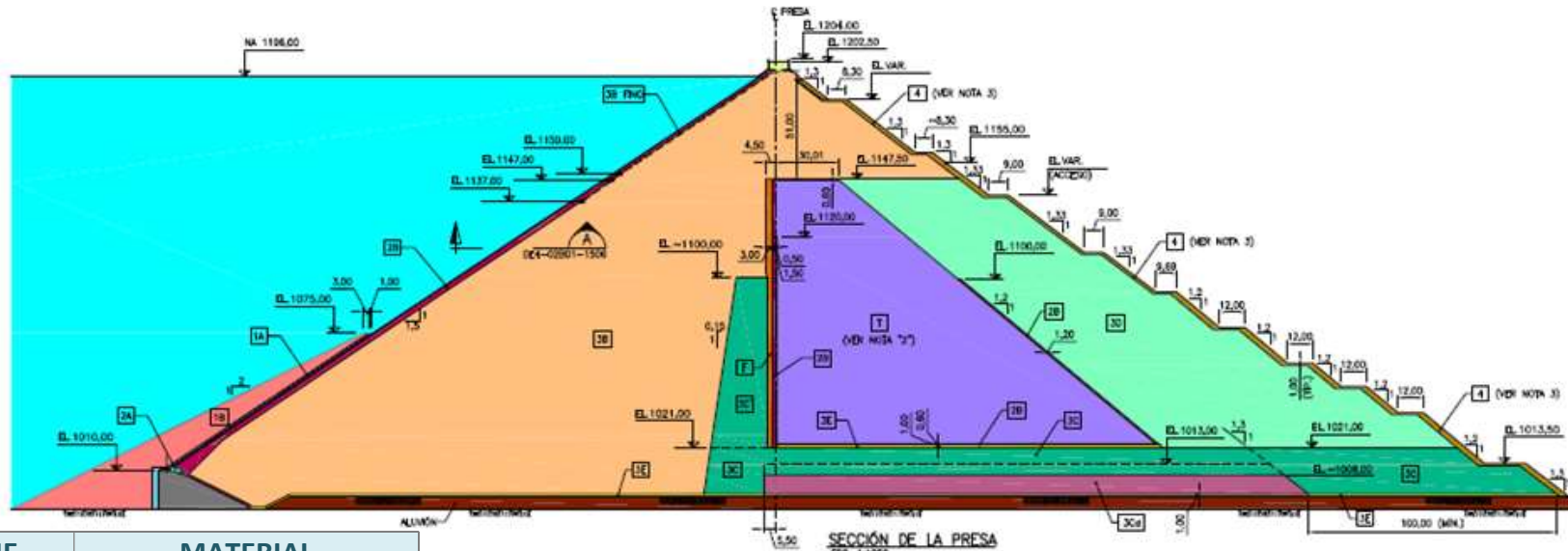
Layout of the Chaglla Dam and the nearby Diversion and Spillway structures.

IV SIBE
SIMPÓSIO INTERNACIONAL DE BARRAGENS DE ENROCAMENTO
IV INTERNATIONAL SYMPOSIUM ON ROCKFILL DAMS
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ZONE	MATERIAL
1B	RANDOM
3A	SOUND ROCKFILL
3B	SOUND ROCKFILL
3B'	NATURAL GRAVEL
3C	SOUND ROCKFILL
3D	SOUND ROCKFILL
F	FILTER
T	SOUND ROCKFILL WITH PORTIONS OF WEATHERED MATERIAL

Zone	Ev (MPa)		
	Estimated (theoretical)	Magnetic Settlement Plate	Settlement Cells
3B	110	220	240
3C+Alluvium	100	70	90
3D	100	---	110
T	80	220	140

Typical dam cross-section and table of construction materials and Vertical Modulus Values
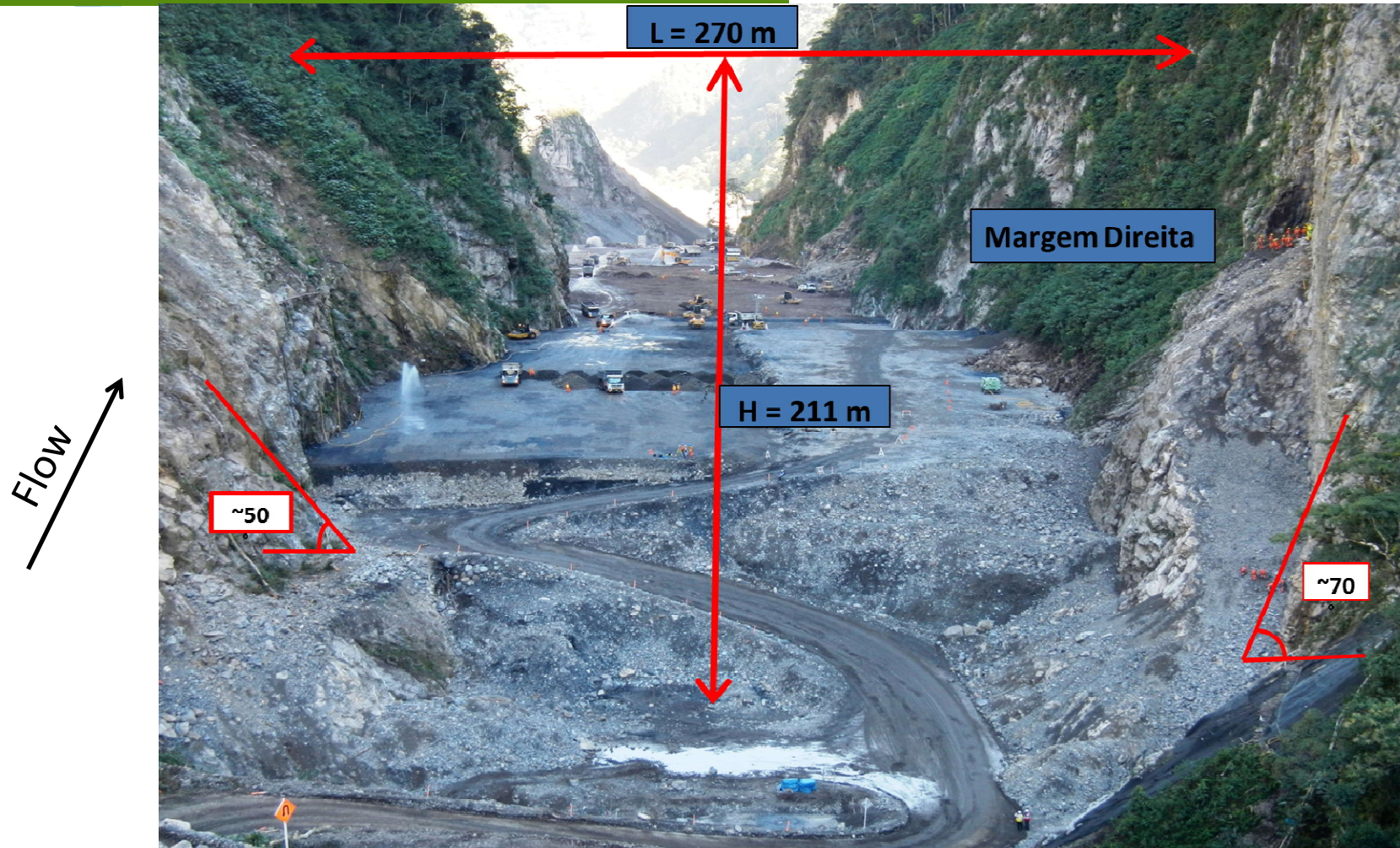
Huallaga river valley, downstream view from the upstream cofferdam.

Indication of the limit line of behaviour trends based on the influence of the valley shape – Ref. Pinto and Marques – 2007

Chaglla Dam – Result of the 3D Stress-Strain Analyses – Identification of the Regions with Tension and Compression Slabs

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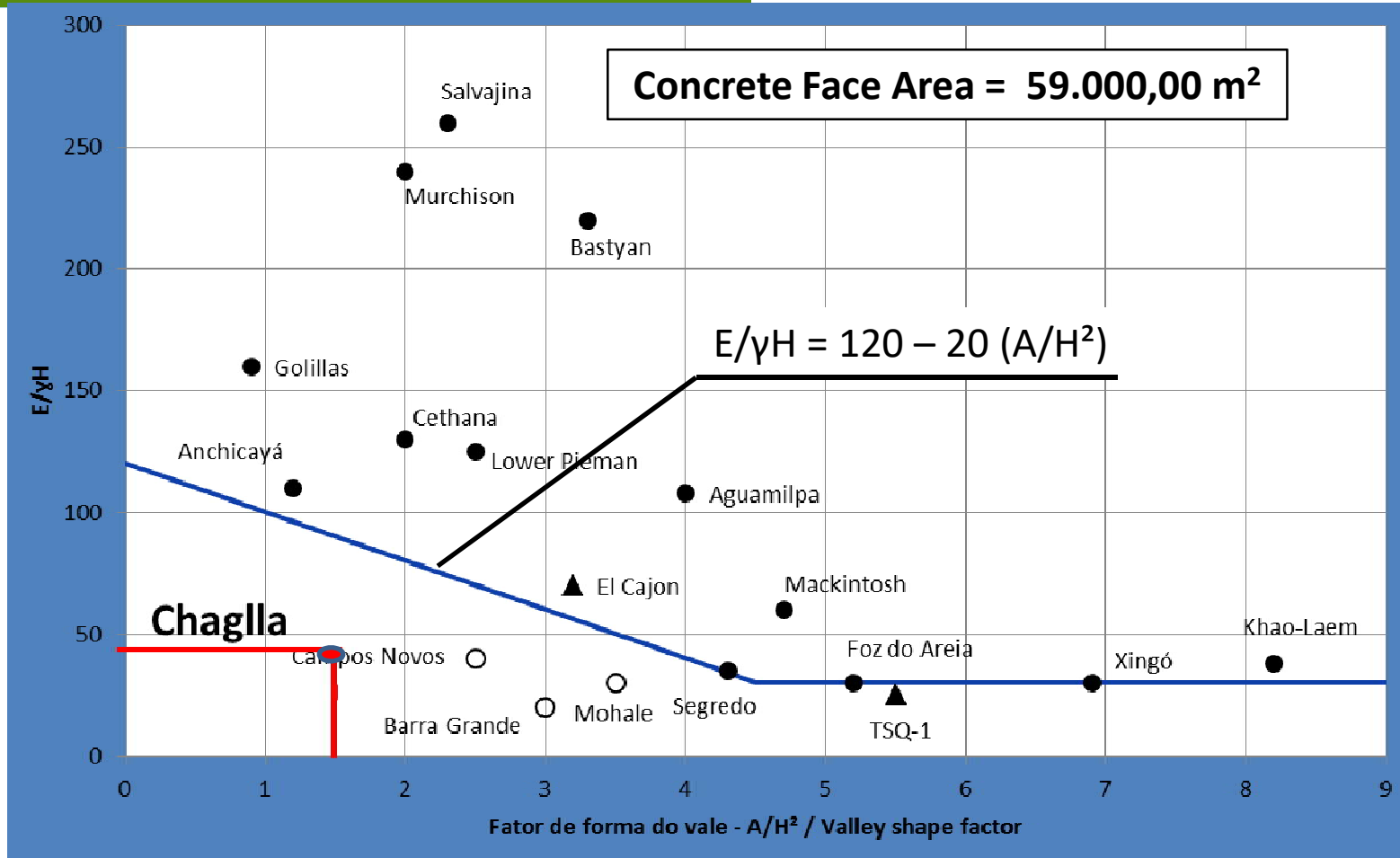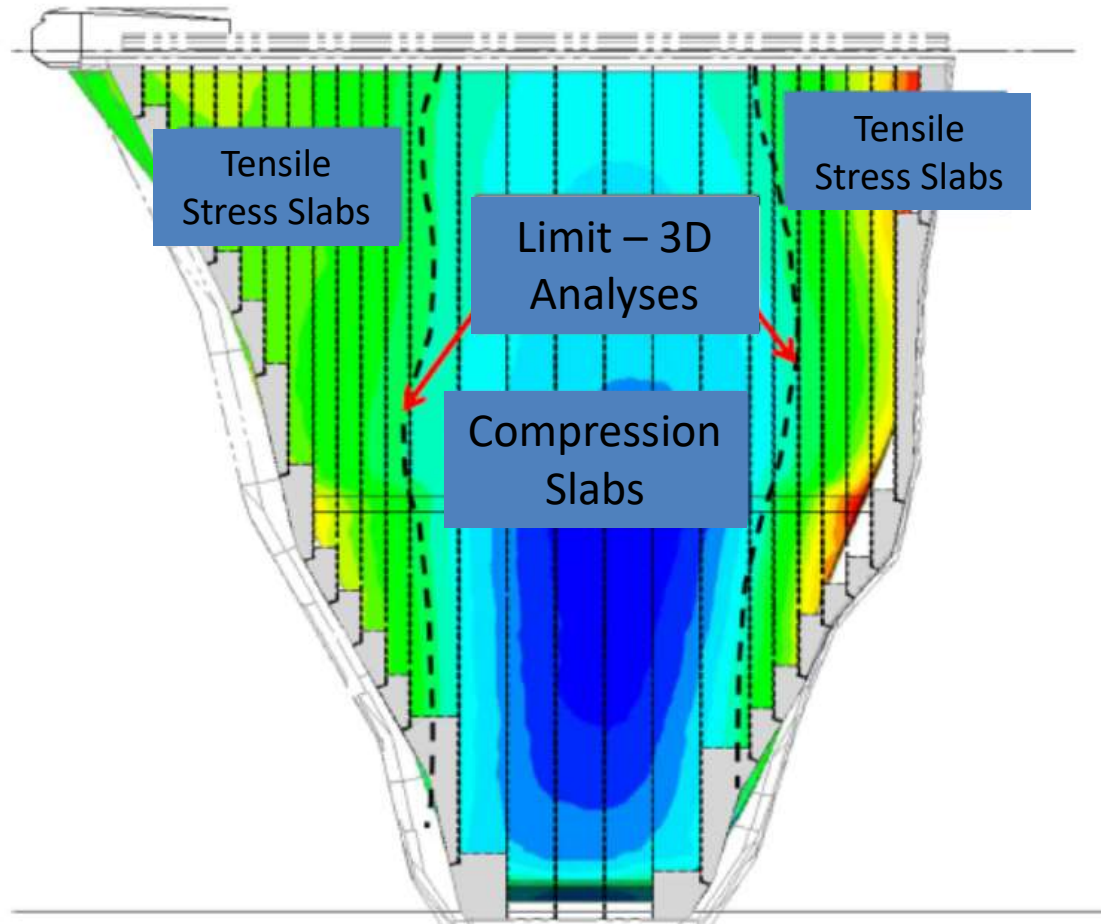17 E 18 DE MAIO DE 2017 | MAY 17-18, 2017

Campos Novos Dam

Compression Joint - Design Criterion (**simplified method**) – Use of the specific deformation in the region of the compression slabs of Campos Novos dam. The deformation following the incident was found to be in the order of 0.1%.
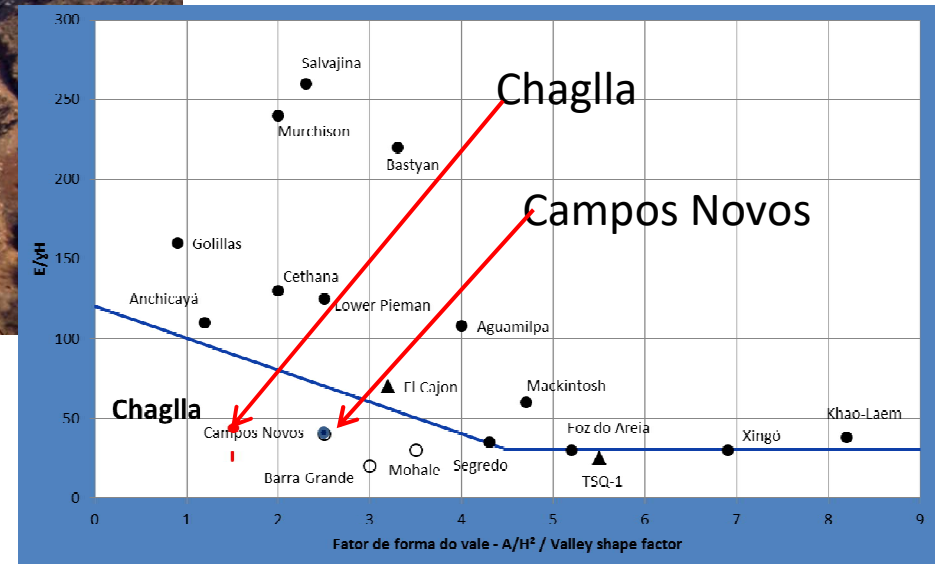
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<u>For this Criterion (specific deformation of 0.1%):</u>

➢ The expected displacement in each of the 8 joints <u>was of about 1.35 cm.</u>

➢ Allowable compressive stress (concrete slab): σ_c = fck/1.5 = 17 MPa. (fck concrete slab=25 MPa)

➢ joints between the slabs should be capable of deforming 50% of its thickness without stress being transmitted to the adjacent concrete (EPDM - an elastomer).

➢ As a safety margin, the necessary thickness of the joint element was defined as being 100% larger than the calculated displacement, <u>namely 2.70 cm</u>

➢ the gap between the slabs was further increased by a factor of 1.5, resulting in a rounded gap size of 4.0 cm

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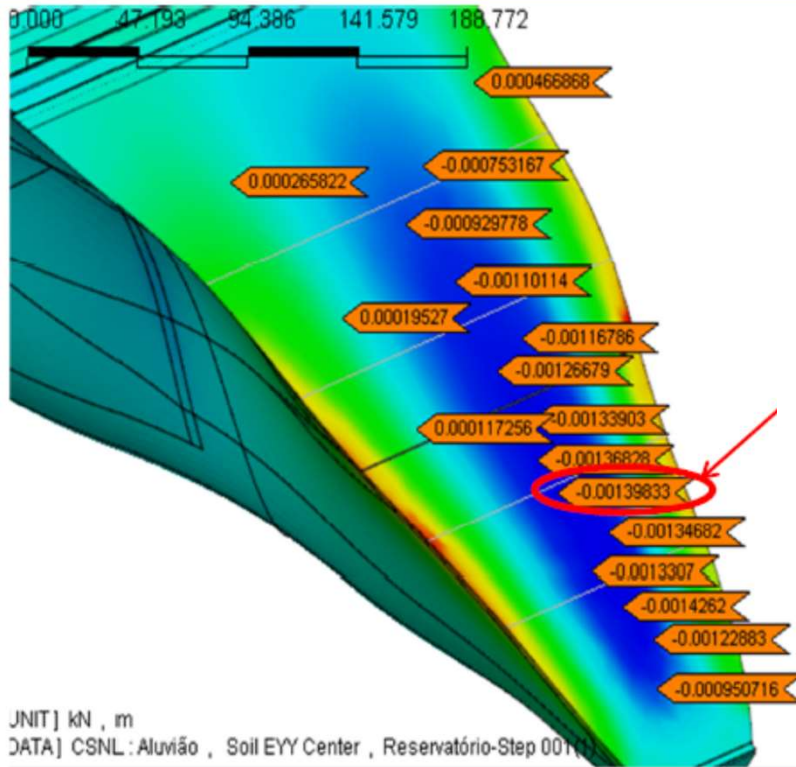
Eh máx = 0,14%

Specific horizontal deformation across the concrete slab

If an analogy is made with the calculation criterion shown above, including all the factors of safety considered, the resulting deformation/gap at each joint is 4.20cm.

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CONCLUSION

We consider that the simplified method described can be safely used for the majority of projects in regions with narrow valleys.

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