PIARC International Seminar

The Best Practices for Earthworks and Rural Roads

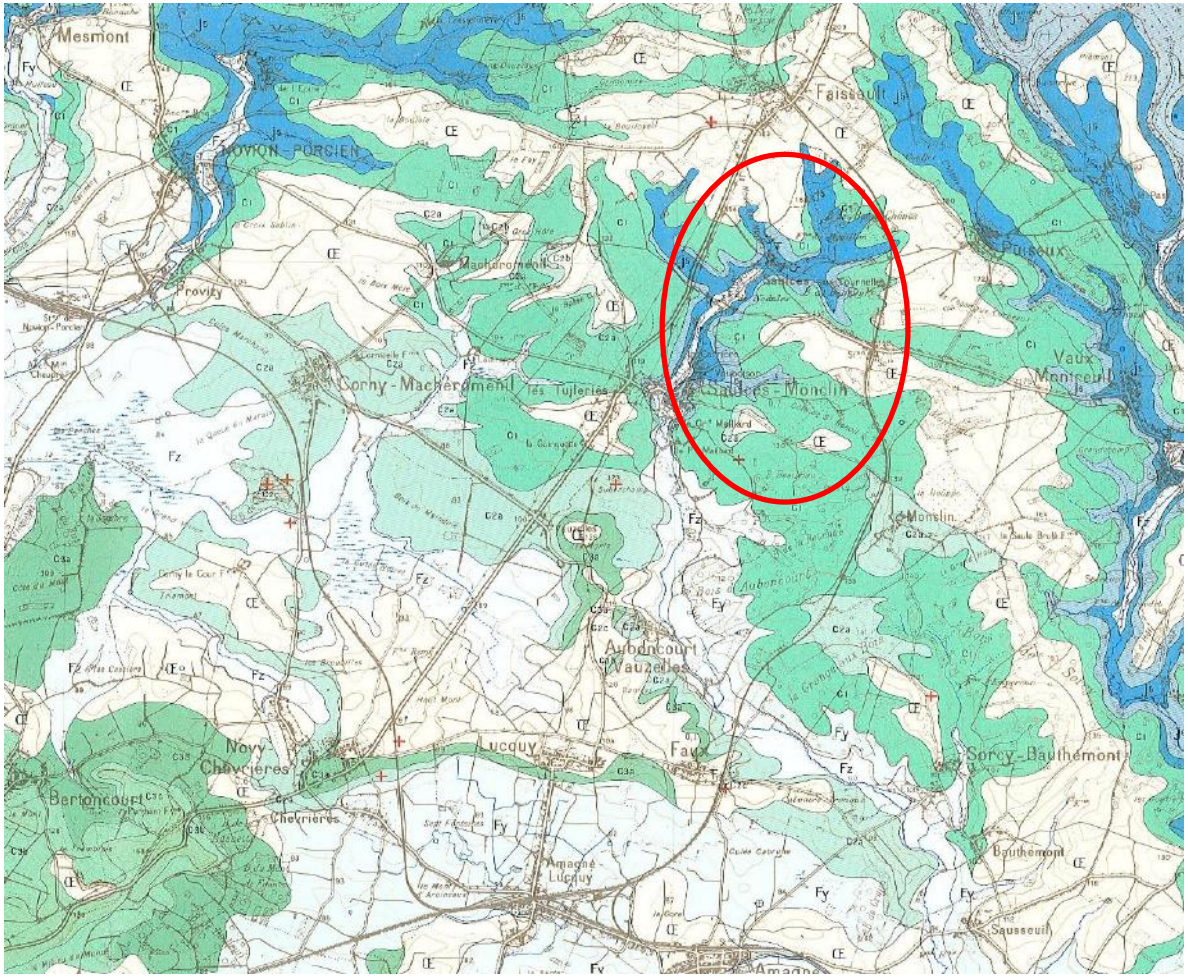
Tunis, Tunisia, 14 - 16 November 2018
Hotel Golden Tulip El Mechtel Tunis

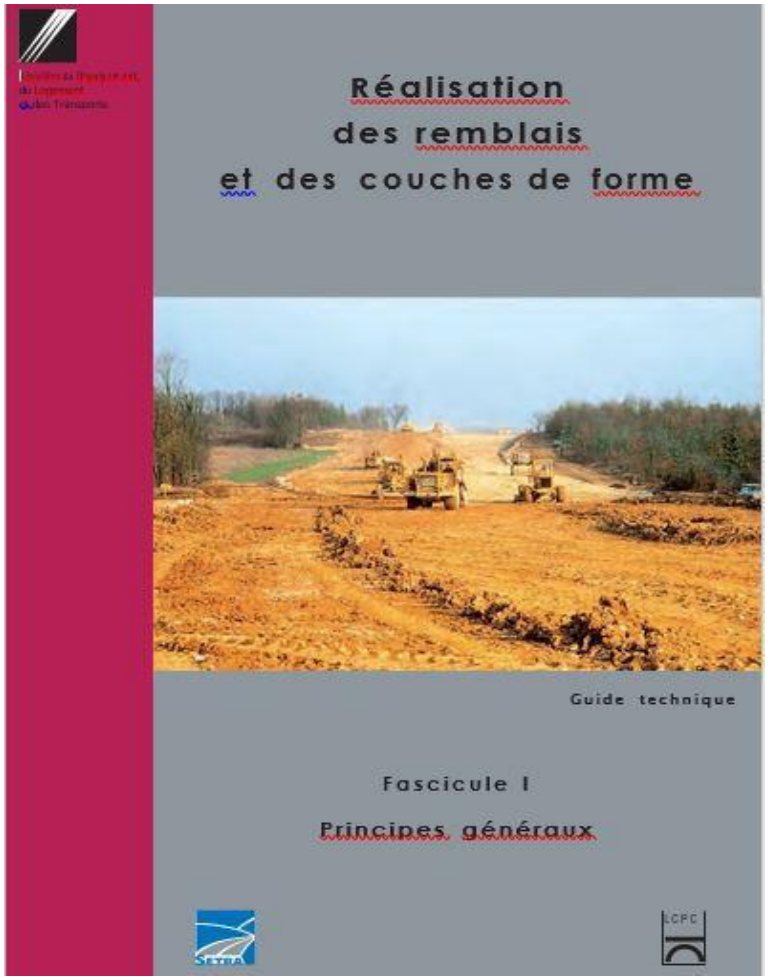
USE OF VERY HIGH PLASTIC CLAYED MATERIALS IN FILL CONSTRUCTION - EXPERIMENTAL EMBANKMENTS OF A34 HIGHWAY 6 SECTION FAISSAULT BERTONCOURT

Mrs Véronique Berche- Cerema Nord Picardie

Tunis, 14.11.2018

USE OF VERY HIGH PLASTIC CLAYED MATERIALS IN EMBANKMENTS

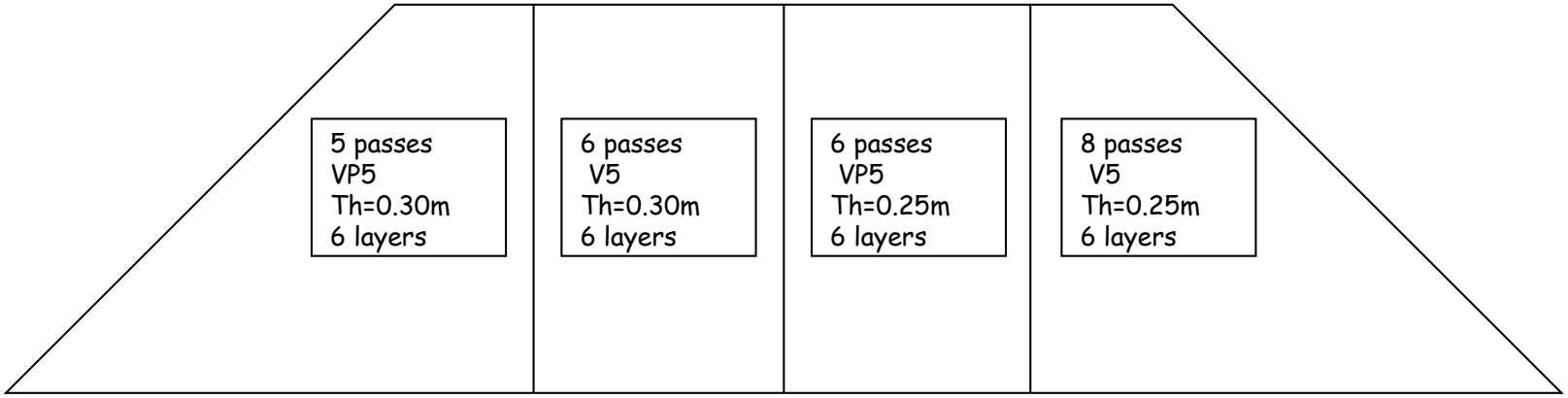




USE OF VERY HIGH PLASTIC CLAYED MATERIALS IN EMBANKMENTS

Two embankments

- one treated with 2% of lime
- one treated with 3% of lime and a capping layer with 3% of lime and 7% of hydraulic road binder



Type and level compaction (for each embankment)

USE OF VERY HIGH PLASTIC CLAYED MATERIALS IN EMBANKMENTS

Construction of embankments

Construction of the subgrade

Draining layer ungraded material 0/300

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Construction of embankments

Treatment in the cut after excavation

Treated material brought in on ungraded material (first layer)

USE OF VERY HIGH PLASTIC CLAYED MATERIALS IN EMBANKMENTS

Construction of embankments

Treatment in the embankment

Resupply of materials

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Construction of embankments

Tilth (0/20 mm)

Compaction plant (VP5 and V5)

USE OF VERY HIGH PLASTIC CLAYED MATERIALS IN EMBANKMENTS

Follow-up and technical approvals trials in time:

- 2 technicians, 3 weeks
- Measurement of the bearing capacity for each layer (dynaplate)
- Measurement of the densities for each layer (GPV, Proctor)
- Whole acceptation measurement with a double probe and with PDG 1000
- Evolution of the levelling bases in time

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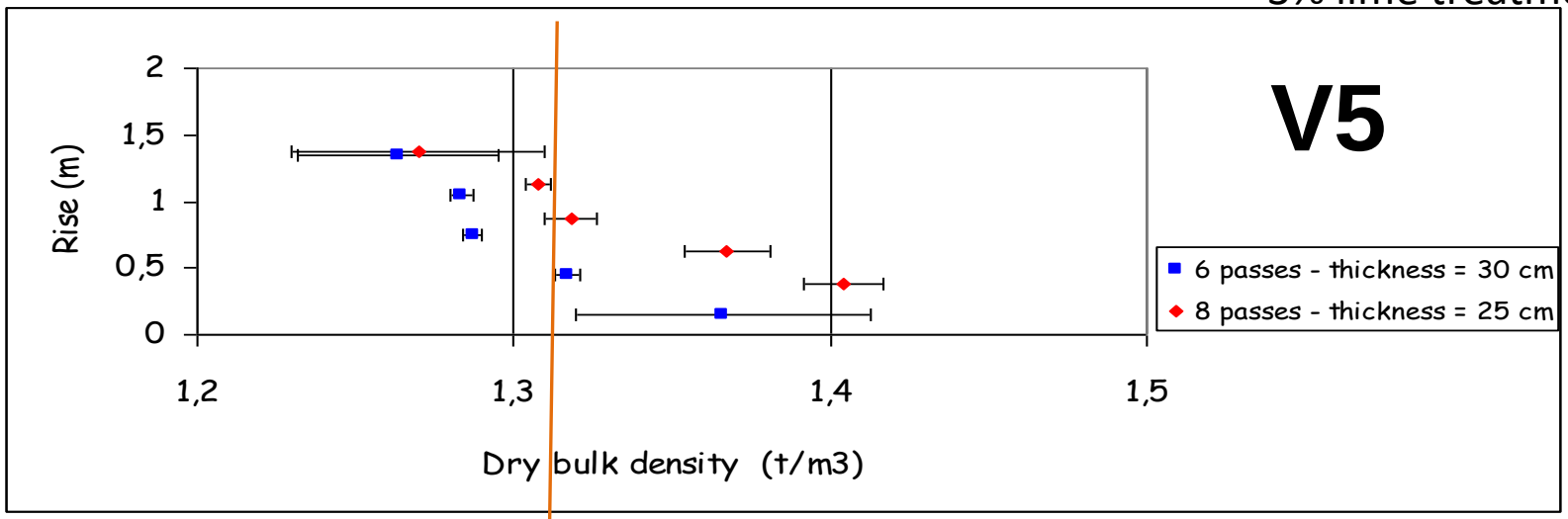
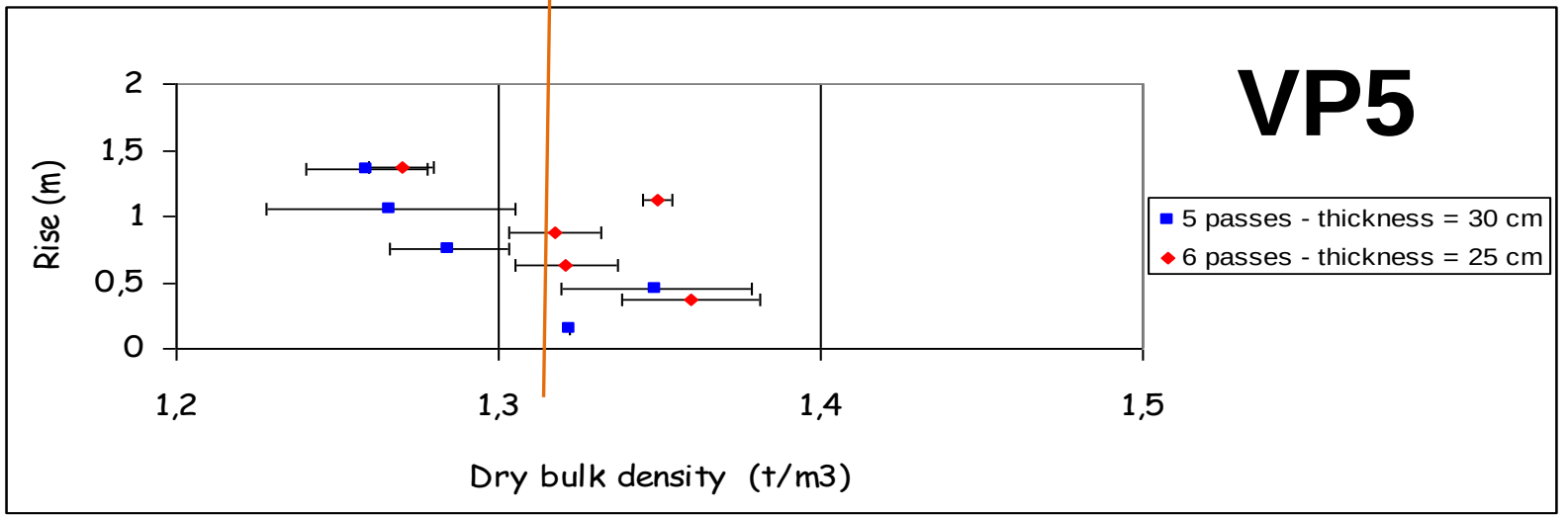
3% lime treatment





USE OF VERY HIGH PLASTIC CLAYED MATERIALS IN EMBANKMENTS

3 years after : 2006

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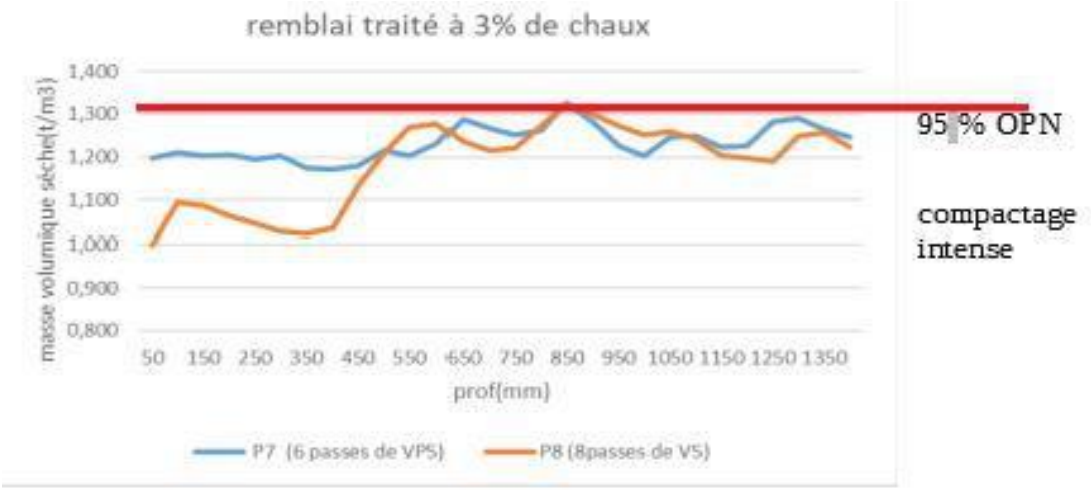

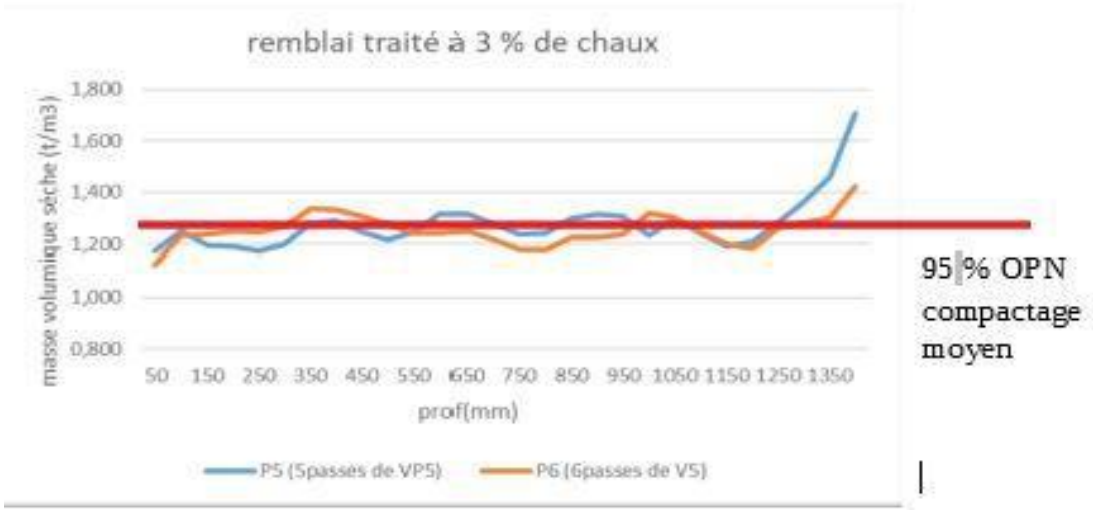

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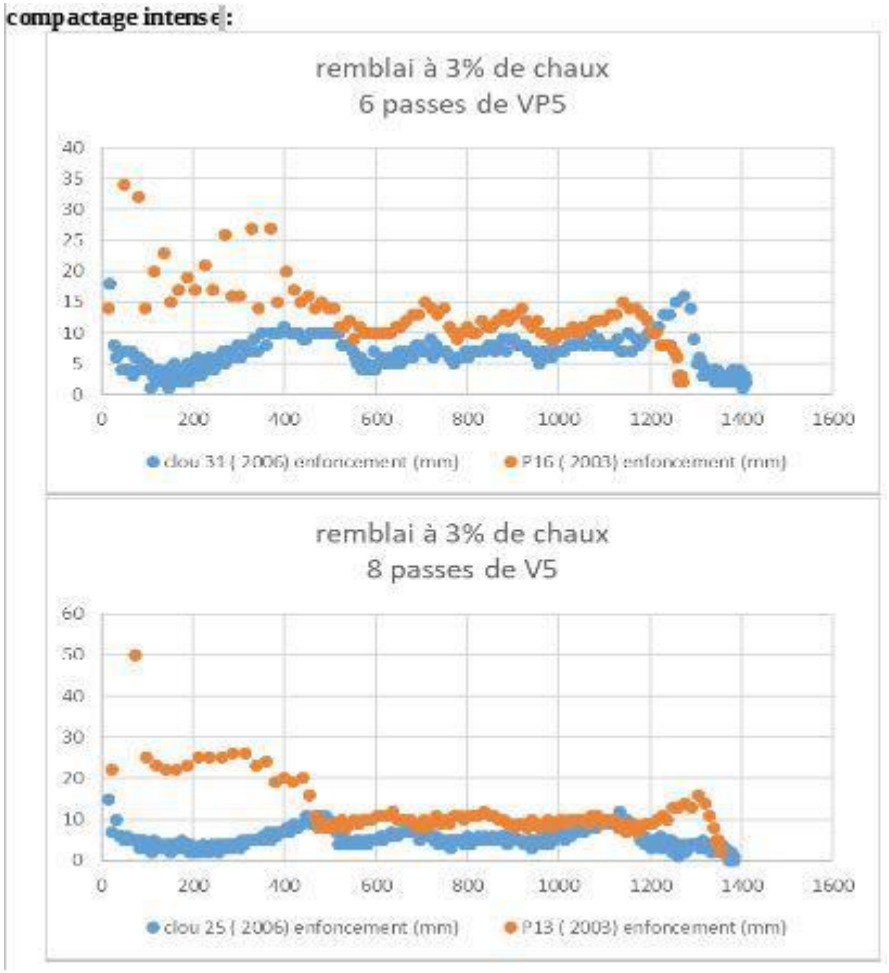

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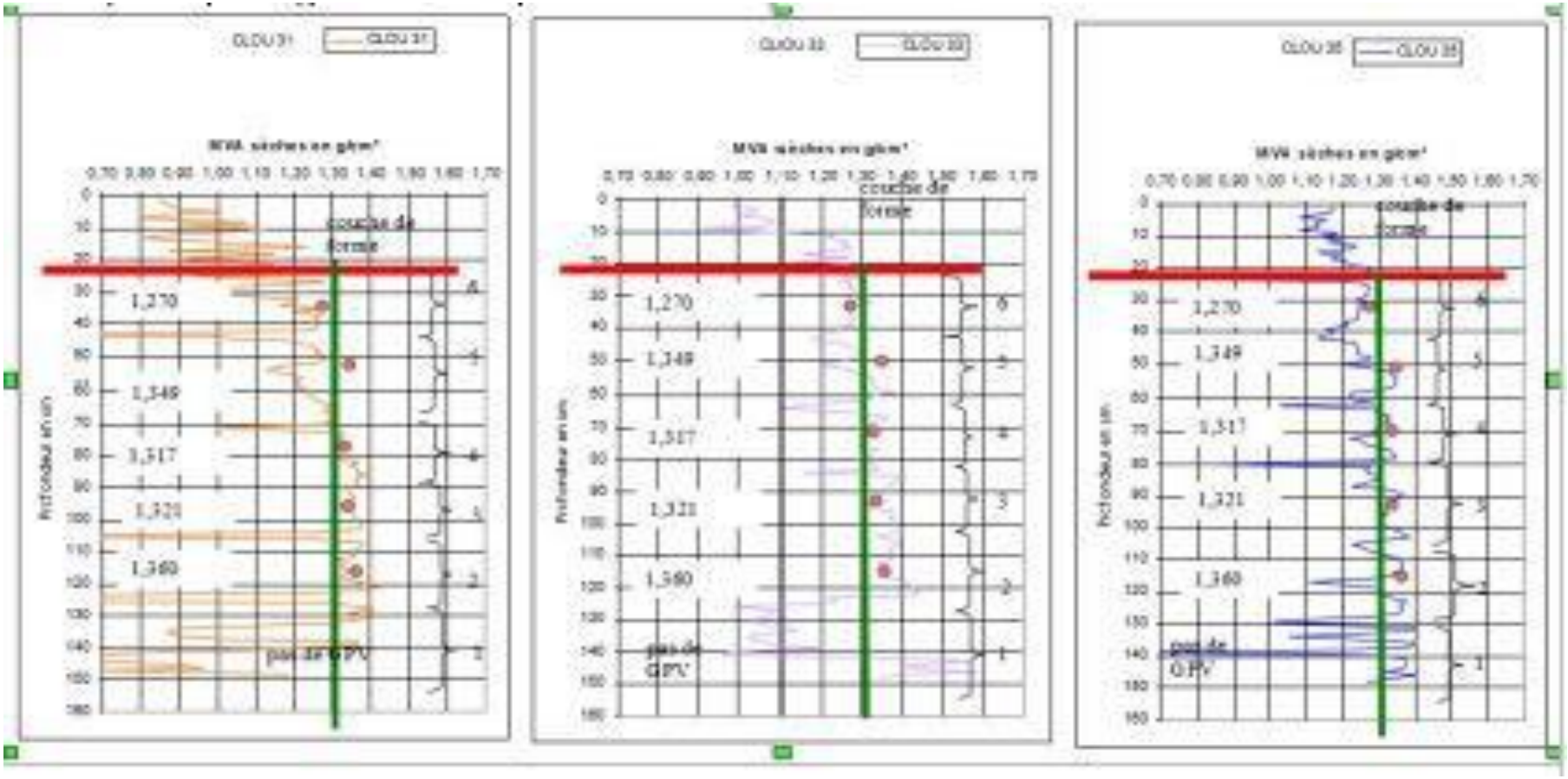

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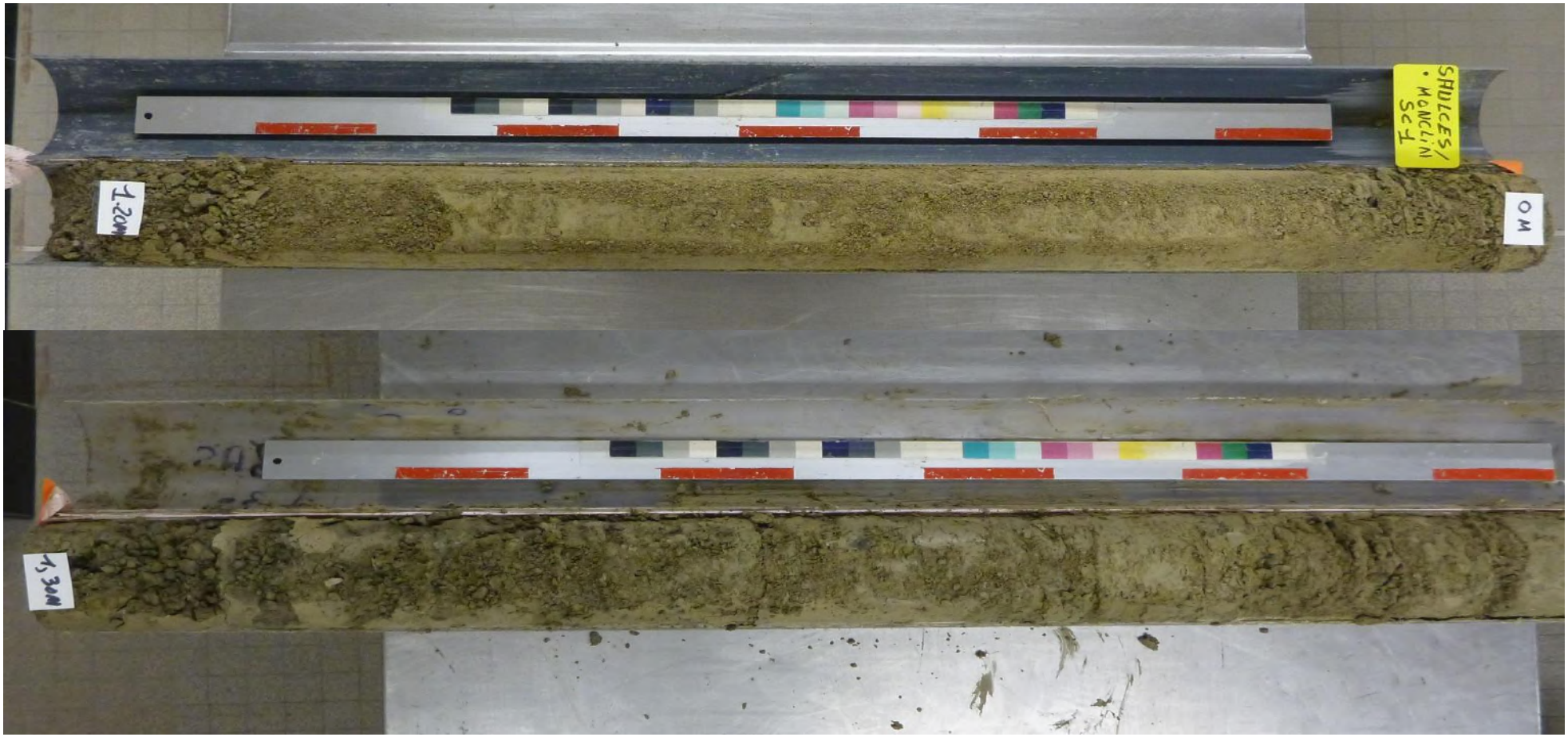
14 years after : 2017



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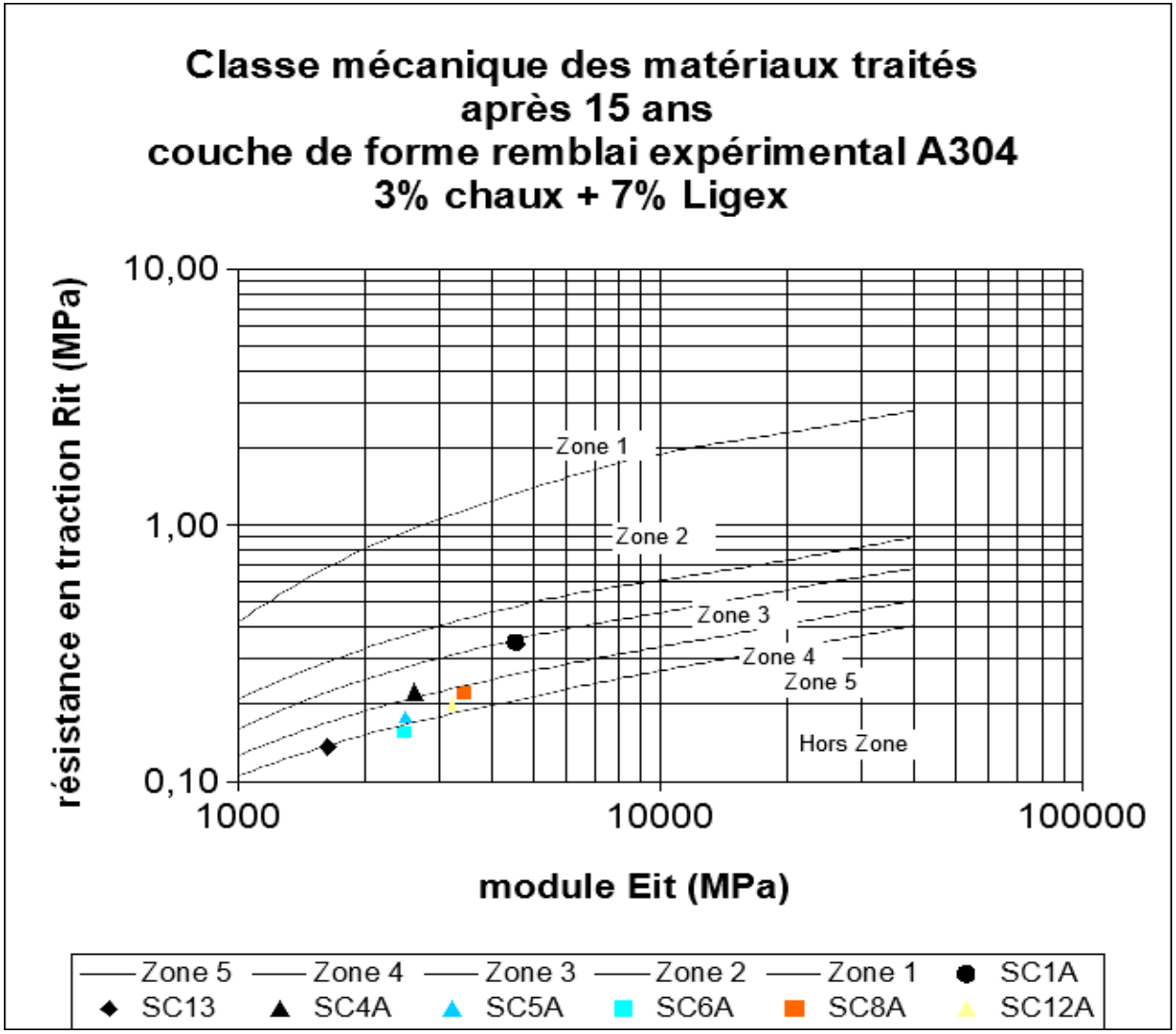
14 years after : 2017



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CONCLUSIONS:

Dmax ≤ 50mn et tamisat à 80µm > 35 %	A sols fins		plastiques, argileuses...	le mieux adapté	I_c > 1,4 ou w_n < 0,7 w_{OPN}	A_2ts
		25 < I_p ≤ 40 ou 6 < VBS ≤ 8	A_3 Argiles et argiles marneuses, limons très plastiques...	Ces sols sont très cohérents à teneur en eau moyenne et faible, et collants ou glissants à l'état humide, d'où difficulté de mise en œuvre sur chantier (et de manipulation en laboratoire). Leur perméabilité très réduite rend leurs variations de teneur en eau très lentes, en place. Une augmentation de teneur en eau assez importante est nécessaire pour changer notablement leur consistance	IPI ≤ 1ou I_c ≤ 0,8 ou w_n ≥ 1,4 w_{OPN}	A_3th
					1 < IPI ≤ 3 ou 0,8 < I_c ≤ 1 ou 1,2 w_{OPN} ≤ w_n < 1,4 w_{OPN}	A_3h
					3 < IPI ≤ 10 ou 1 < I_c ≤ 1,15 ou 0,9 w_{OPN} ≤ w_n < 1,2 w_{OPN}	A_3m
					1,15 < I_c ≤ 1,3 ou 0,7 w_{OPN} ≤ w_n < 0,9 w_{OPN}	A_3s
					I_c > 1,3 ou w_n < 0,7 w_{OPN}	A_3ts
		I_p > 40 ou VBS > 8	A_4 Argiles et argiles marneuses, très plastiques...	Ces sols sont très cohérents et presque imperméables : s'ils changent de teneur en eau, c'est extrêmement lentement et avec d'importants retraits ou gonflements. Leur emploi en remblai ou en couche de forme n'est normalement pas envisagé, mais il peut éventuellement être décidé à l'appui d'une étude spécifique s'appuyant notamment sur des essais en vraie grandeur.	Valeurs seuils des paramètres d'état, à définir à l'appui d'une étude spécifique	A_4th
						A_4h
						A_4m
						A_4s

- Proposals of the laboratory studies to be conducted,
- Definitions of the hydric states ,
- Possibility of re-use on embankment less than 5m with adapted compaction

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Thanks for your attention