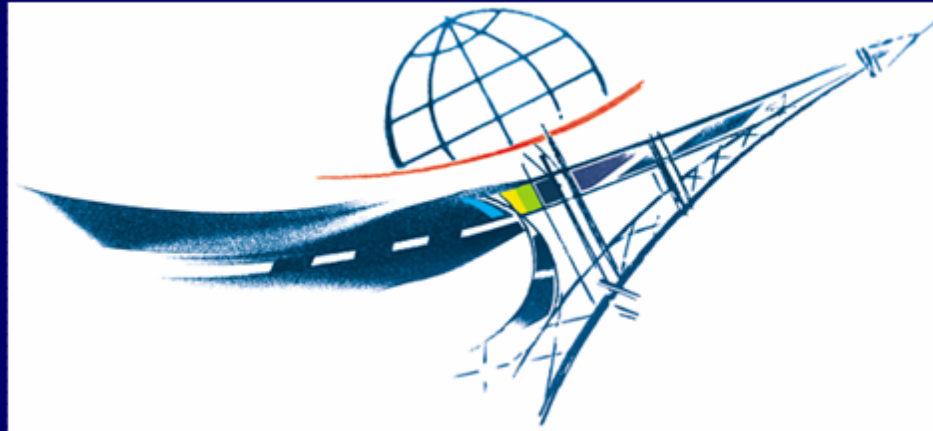


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## EARTHWORKS, DRAINAGE AND SUBGRADE

### Conclusion

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## ***Topic 4.5.1 – Promoting optimal use of local materials***

### ***Theme 1 – identifying progress in terms of soil and rocky materials treatment for road applications***

✓ Large development in soil treatment techniques in developed countries over the two last decades. Nevertheless, too many developing countries don't have access to these techniques (cost, lack of binders, lack of adapted equipment...)

✓ Technical guidelines elaboration in the developed countries, for soil treatment, accepted by owners, contract managers, contractors, binders producers, ...

✓ Need to integrate soil treatment in a sustainable development approach.

✓ Elaborate and develop reliable techniques for soil treatment in developing countries.

✓ Improve the adaptation of soil treatment to marginal materials or materials no compliant with specifications, in order to increase their use in earthworks.

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## ***Theme 2 – identifying progress in the use of wastes and industrial by-products as earthwork materials***

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✓ High variability of waste and industrial by-products used as road materials. If the use of such materials is common in developed countries, it remains marginal in numerous other countries.

✓ Two opposite policies are observed: promoting the use of such materials in spite of potential environmental risks and, on the other hand, a rigorous application of the precautionary principle.

✓ The nature of industrial by-products used as road materials is governed by local industrial conditions.

✓ Need to set up a quality and following policy for use of these materials.



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## ***Theme 2 – identifying progress in the use of wastes and industrial by-products as earthwork materials***

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- ✓ For the proper use of these materials both geotechnical and environmental aspects need to be taken into account.
- ✓ The destination of these materials is quite similar in the different countries.
- ✓ Great interest to adapt and develop specific tests in order to characterize these materials.
- ✓ Well-adapted general legislation for countries involved in the development of the use of such materials, even if a need for a technical guidelines appears clearly in order to define more precisely the conditions of use.



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## ***Topic 4.5.2 –Having indicators representative of the condition of geotechnical structures for road asset management***

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✓A particular focus should be on obtaining good cost, safety and reliability data for asset management regimes operating a ‘reactive’ approach and those operating a ‘pro-active’ approach.

✓The effective and consistent valuation of geotechnical assets should be explored.

✓The work highlighted that a coherent framework is needed for the evaluation of different types of asset. In particular areas of whole life costing, risk management and value management should be integrated.

✓Consideration should be given by PIARC to extending the current study to look more widely at performance indicators adopted Worldwide by operators of other infrastructure systems such as flood defences, dams, railways.



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