Simulation of Compaction in Asphaltic Mixtures, Part I: Gyratory Compactor

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Simulation of Compaction in Asphaltic Mixtures
Why?

✓ Modernize manufacturing, **mobility** and logistic
✓ Use energy efficiently

**Smart infrastructure**

✓ Innovative strategies
✓ Design
✓ Construction
✓ Maintenance
✓ Renovation
How?

Developing a compaction model for asphaltic mixtures

Simulation Compaction of asphalt concrete layer

Optimum Compaction Procedure
Methods of compaction in laboratory

Laboratory compaction method

Field compaction method
Methods of measuring compaction

How?

- Laboratory compaction method
- Field compaction method
- Modelling compaction

- Environment information
- Aggregate properties
- Bitumen properties
- Equipment
- Compaction curve
1. Composition of asphalt mixture (characteristic level)

- Mixture with high volume of natural sand and soft bitumen
- Mixture with high volume of crushed aggregates and stiff bitumen
How? Important parameters in compaction

2. Temperature (characteristic level)

- Initial mixture temperature
- Base temperature
- Air temperature
- Wind speed
- Layer thickness

Mix temperature in °C

Compaction effort

End of Compaction

Favourable Compaction Temperature

Start of Compaction
How?  Important parameters in compaction

3. Type and magnitude of applied load (Characteristic level)

- Static compaction
- Tandem rollers
- Pneumatic tired rollers
- Vibratory compaction
How?

$q = M_p$  

Critical state line

Nonlinear elastic zone

$q = \frac{p_c}{2}$

Hardening

Softening

$p_c$

$p_c$

$\hat{\kappa}$

$\hat{\lambda}$

$\ln (p_{refN})$

$\ln (p_{C0})$

$e$

$q$

$p$

$N$
What?
What?
What?
What?
Questions?
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