

ROSANNE Final seminar, Sterrebeek
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**Trailer-based RR
measurement method: draft
standard preparation**


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1. Introduction



- **Scope draft standard:** measuring RR
 - under realistic conditions
 - on real road surfaces
 - using pneumatic reference tyres
 - trailer-based method
- **Stepwise approach:**
 - D3.1 Sota on RR measurement devices incl. draft standard outline to identify gaps in available research
 - Measurements to supplement available research, determining possible correction procedures for influencing parameters
 - D3.5 Draft standard for a trailer-based RR measurement method including robust calibration procedures
 - RRI to validate D3.5
 - D3.6 Experimental validation of the RR measurement method including updated draft standard

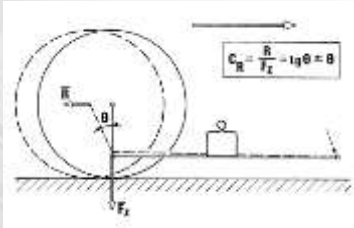


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2. Test methods

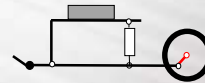
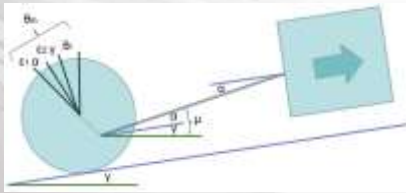
- **Angle based**

e.g. trailers BRRC, TUG



Significant influence on small angle

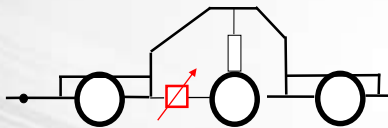
- Slope road
- Angle towing vehicle (fuel & passenger load)
- Acceleration
- Air drag
- ...



2. Test methods

- **Force based**

e.g. trailers BRRC (new), BAST



Parasitic influence of:

- Friction losses
- Offset force transducers
- Acceleration
- Slope of road
- Air drag
- Prestress/unevenness in static condition
- ...



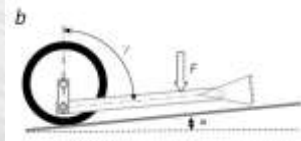
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3. Test equipment

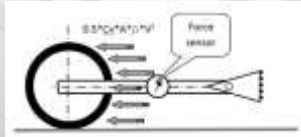


- Certification/calibration procedures towed trailer
 - Approval test equipment
 - Annually or after serious intervention test equipment
 - Each measurement campaign

- 1) Tyre load test
- 2) Road grade influence



- 3) Acceleration/deceleration influence
- 4) Aerodynamic force influence

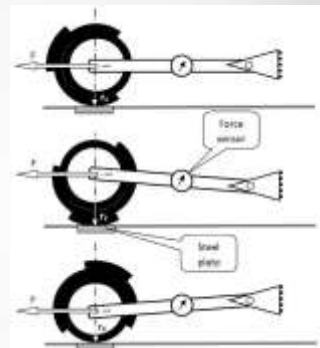


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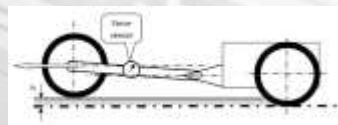
3. Test equipment



- 5) Calibration temperature sensors
- 6) Calibration tyre inflation sensor
- 7) Tyre size influence



- 8) Calibration speed measuring equipment
- 9) Calibration RR sensor
- 10) Influence of rutting and towing vehicle



- 11) RR reference surface as check (see D4.3)

3. Test equipment



- Reference **tyres**: representative for passenger cars and trucks e.g. SRTT (P1) and AAV4 (H1), for electrical vehicles, ...



- **Wheel** dimensions for various reference tyres e.g. 6.5J x 16 for P1 (tolerance ± 0.5 inch)



4. Test and meteorological conditions



- Reference **speeds**: 80, 50 and 30 km/h
- Tyre **load**: e.g. 4 kN for P1 and H1
- Tyre **inflation**: e.g. 210 kPa for P1 and H1
- **Temperature** measurements (air, tyre, road surface)
- **Test site** requirements
- Wind
- Temperature range
- Moisture and rain: **dry!**



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5. Test procedure



- Thermal conditioning
- Tyre condition check
- Inflation pressure adjustment
- Warm up at reference speed, e.g. 20 min. for P1
- Lateral position
- Longitudinal position
- Measurement and recording



6. Data interpretations and analysis



- Rolling resistance coefficient C_r
- Temperature correction:

$$F_{r20} = F_r [1 + K_t (t_{amb} - 20)]$$

where

F_r rolling resistance, expressed in newtons;

t_{amb} ambient air temperature, expressed in degrees Celsius;

K_t constant, with the following values:

0.015 for P1

0.010 for H1

- Gradient correction:
 - Mechanical device
 - Driving in both directions
 - Calculating mathematically
- Acceleration/deceleration correction



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