



## Urban Bus Fuel Economy Simulation Using the Cruise Transient Rolling Resistance Module.

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# Fuel Consumption and Transient RRt

## Agenda



- ➔ Definition & Context
- ➔ Tire model details
- ➔ Transient characterization procedure
- ➔ Urban bus simulation and measurement
- ➔ Conclusion & Discussion



# Fuel Consumption and Transient RRt

## Definition and Context



- ➔ The rolling resistance represents the energy dissipated by the tire per unit of distance traveled. The units are therefore [J/m] or [N.m/m] or simply [N]. Rolling resistance is therefore often expressed (and measured) as a force.
- ➔ The rolling resistance is defined by a coefficient expressed in [kg/T].

$$C_{rr} = \frac{F_{rr}}{Z}$$

- ➔ The rolling resistance depends on several parameters including load, pressure, speed, ambient and tire temperature, etc.
- ➔ **For Heavy trucks, as much as 35% of the fuel is expended to overcome tire rolling resistance.**
- ➔ Vehicle manufacturers rely more and more on virtual models to reduce development time and they are therefore in need of highly accurate component models (including the tire) to predict fuel consumption.



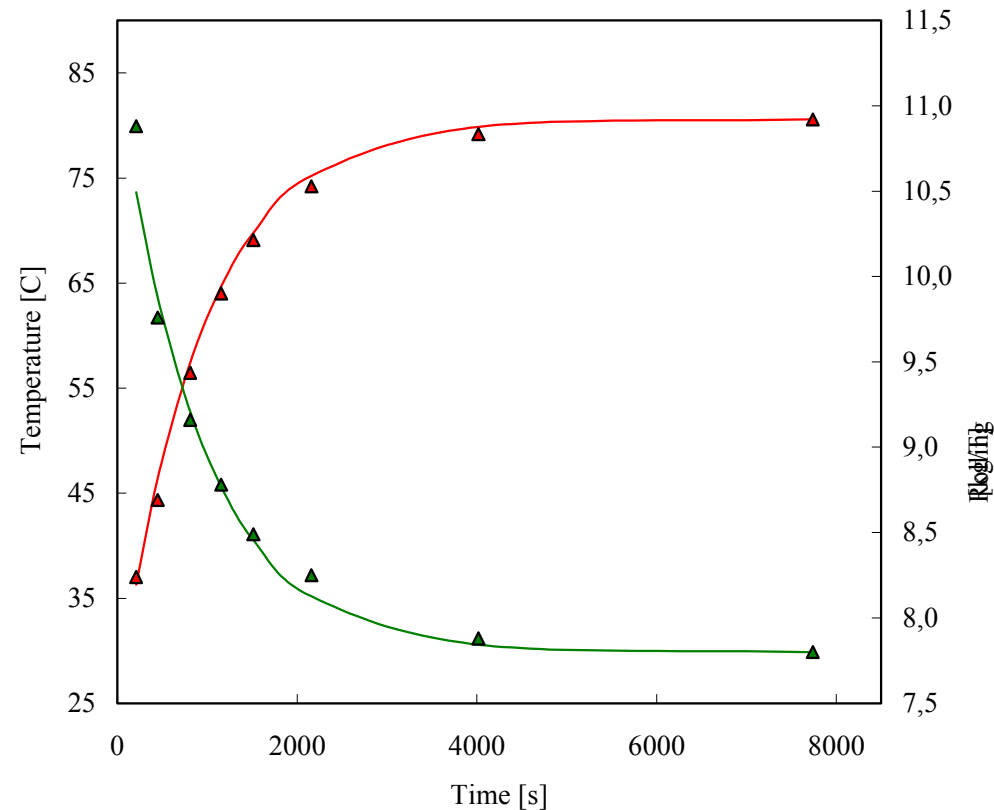
# Fuel Consumption and Transient RRt

## Definition and Context



- ➔ The rolling resistance of tires is transient in nature.

Transient Rolling Resistance for a Heavy Truck Drive Tire



*For Heavy truck or Bus tires it takes 1h30 or more to establish the steady state condition*



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