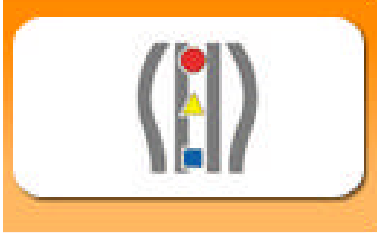




Road Equipments' Syndicate  
Association for Road Equipments'  
Qualification  
Laboratoire Central des Ponts et Chaussées



# Dynamic measurement of Type 2 road markings' performance

Mesure dynamique  
des performances des  
marquages VNTP

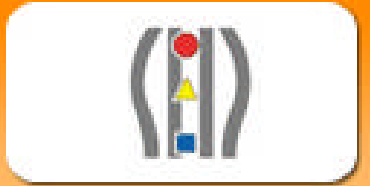
## The question: road managers' needs

- § To manage the performances in use of road signs
- § Including type 2 road markings
- § To be able to control and measure them (including RR)
- § In acceptable conditions (costs, quality)



Dynamic metrology for  
Type 2 road markings

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EQUIPEMENTS  
de la ROUTE



## French WG' Features

### § WG partners

§ private companies syndicate (SER),

§ French certificating body (ASQUER)

§ Regional Public Works Research Laboratory of Strasbourg (LRPC)

§ French Public Works Research Laboratory (LCPC)

§ 5 contractors and 5 manufacturers implied

§ 90 000 Euros Budget

§ 3 years

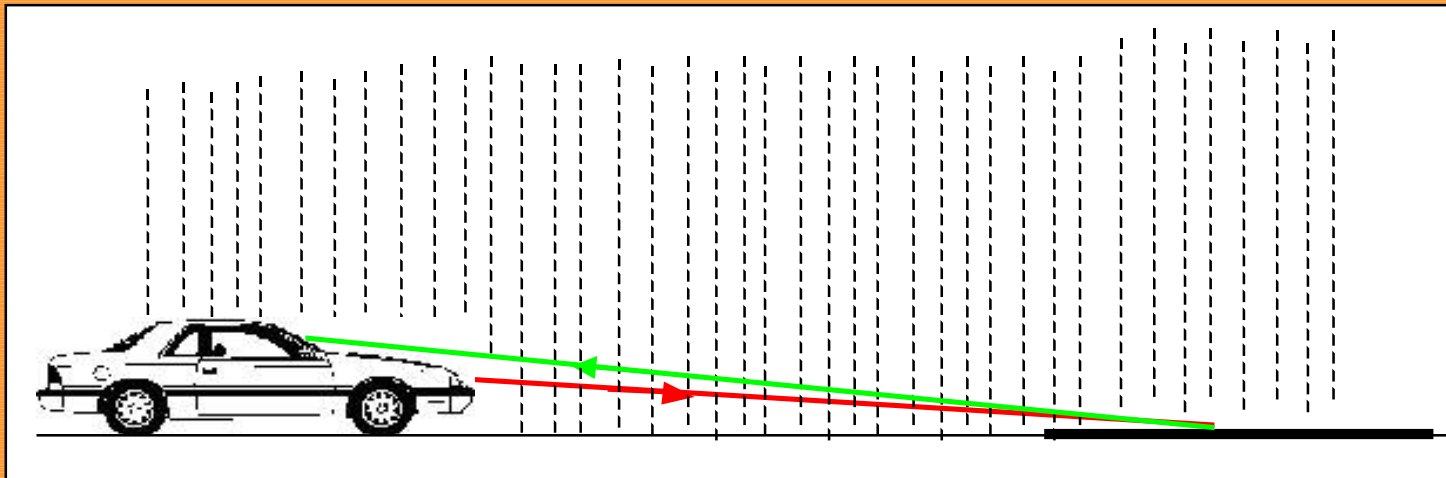
## French WG Targets

- § To set up a suitable method to measure Type 2 road markings rain night visibility in use (RR)
- § To have a dynamic, high yield method based on Ecodyn
- § Correlated to the EN 1436



## Rain Retroreflection Coefficient

- § simulation of the visibility of a road marking for a road user
- § under vehicle headlamp illumination
- § without public lighting
- § during rain at 30 meters



# **Conventional measurement method: retroreflection during rain**

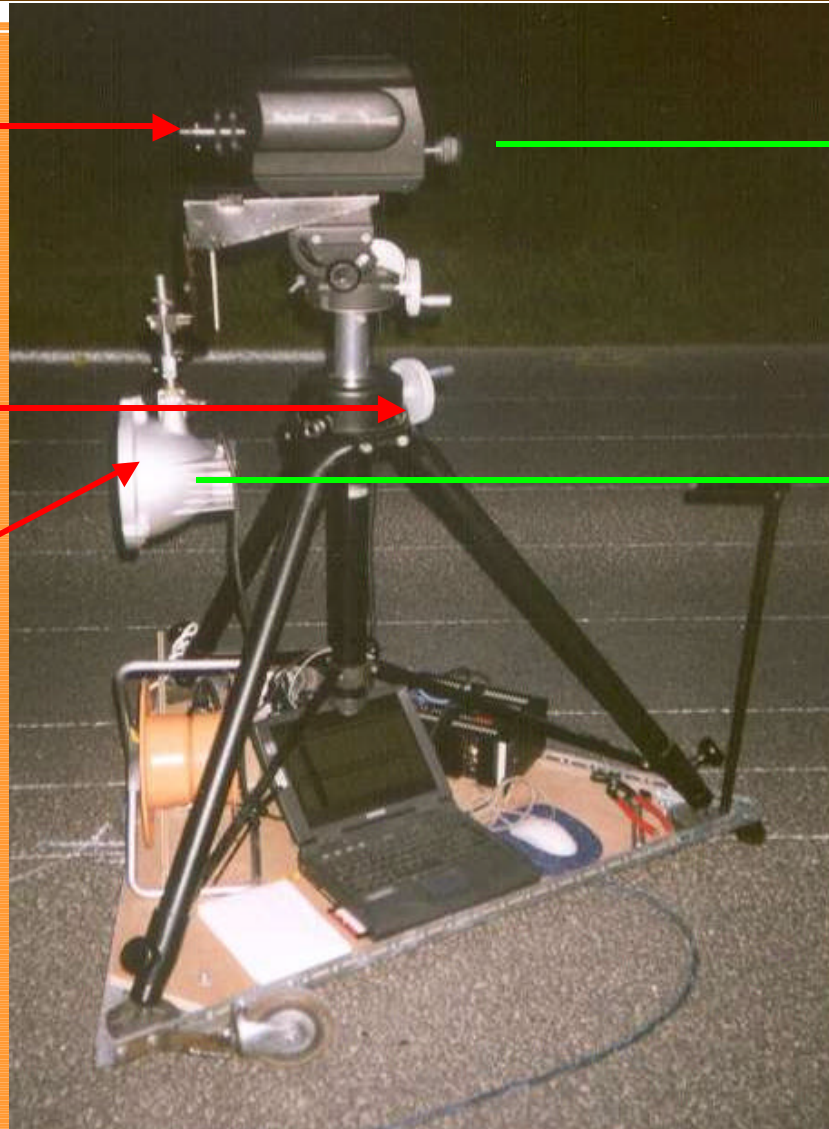
**(EN 1436)**

Luminancemeter

Highness tuning  
 $\alpha, \epsilon$

Illumination  
system

Measurement  
at 30 m



Fixed distance

**Conventional  
measurement  
method for  
RR**

**(EN 1436)**

## Conventional measurement method for RR

**(EN 1436)**

Condition of rain

§ artificial rainfall

§ average intensity of 20 mm/h

§ width of the measured area : 0,3m

§ surface under rain

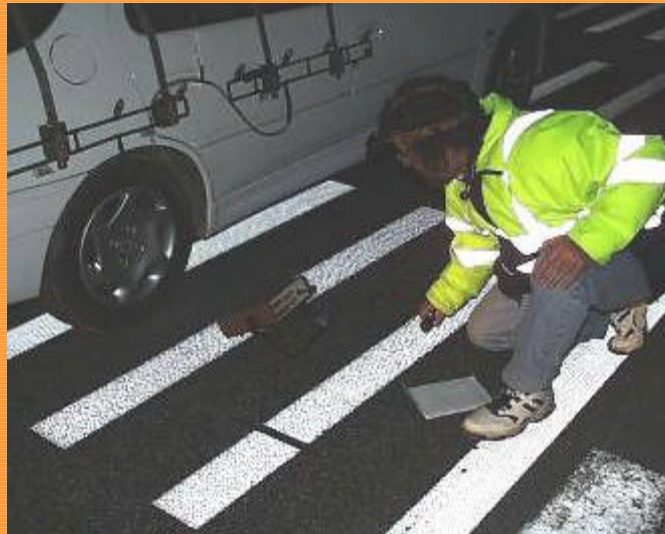
§ RR measured after 5 min under rain

§ RW measured 1 min after rain





- Measurement by night only
- Static: time consuming and risky
- 30 meters between POM and luminance meter
- Rain simulation complex and duration
- Parasite illumination of headlamps' vehicles



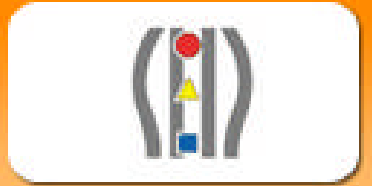
**Conventional  
measurement  
method for  
RR**

**(EN 1436)**



Dynamic metrology for  
Type 2 road markings

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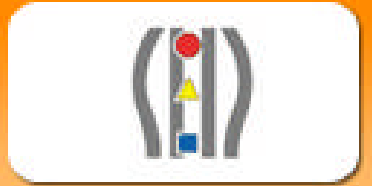


# RR dynamic measurement method: the French experience

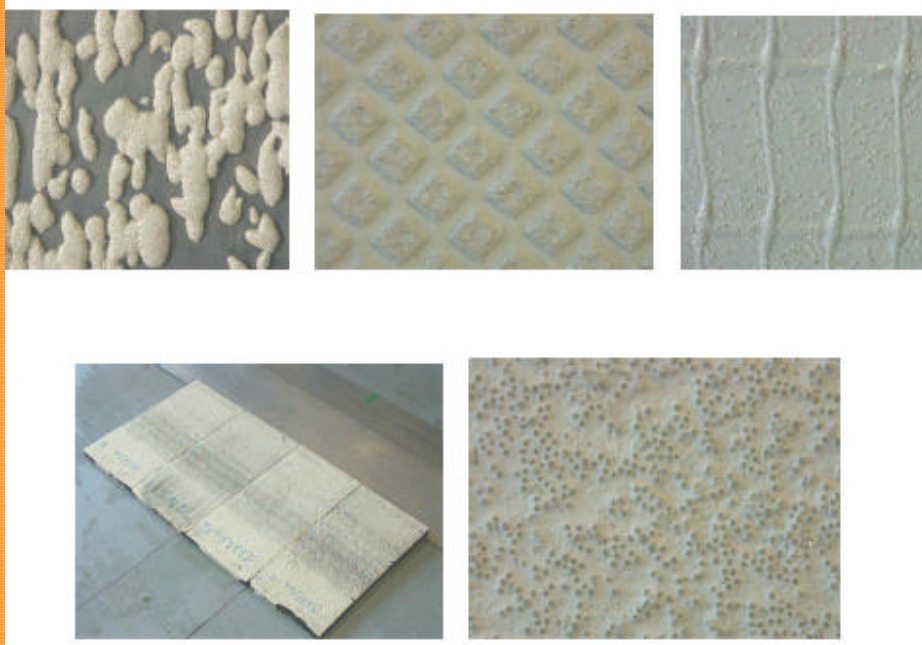
**(ECODYN)**

## Main steps

1. Ecodyn static measurement / laboratory (05)
2. Ecodyn static qualification / on roads (06)
3. Ecodyn dynamic measurement / on roads (07)
4. Ecodyn dynamic qualification / on roads (08)



**Step 1 : luminance meter vs. ECODYN (2005)**  
**Static measurement / laboratory**



Laboratory conditions

Respecting the EN1436

Rain Retro reflectivity

30 m night vision

**Road marking samples (laboratory)**

**Step 1 : luminance meter vs. ECODYN (2005)**  
**Static measurement / laboratory**



Rain simulation (laboratory)

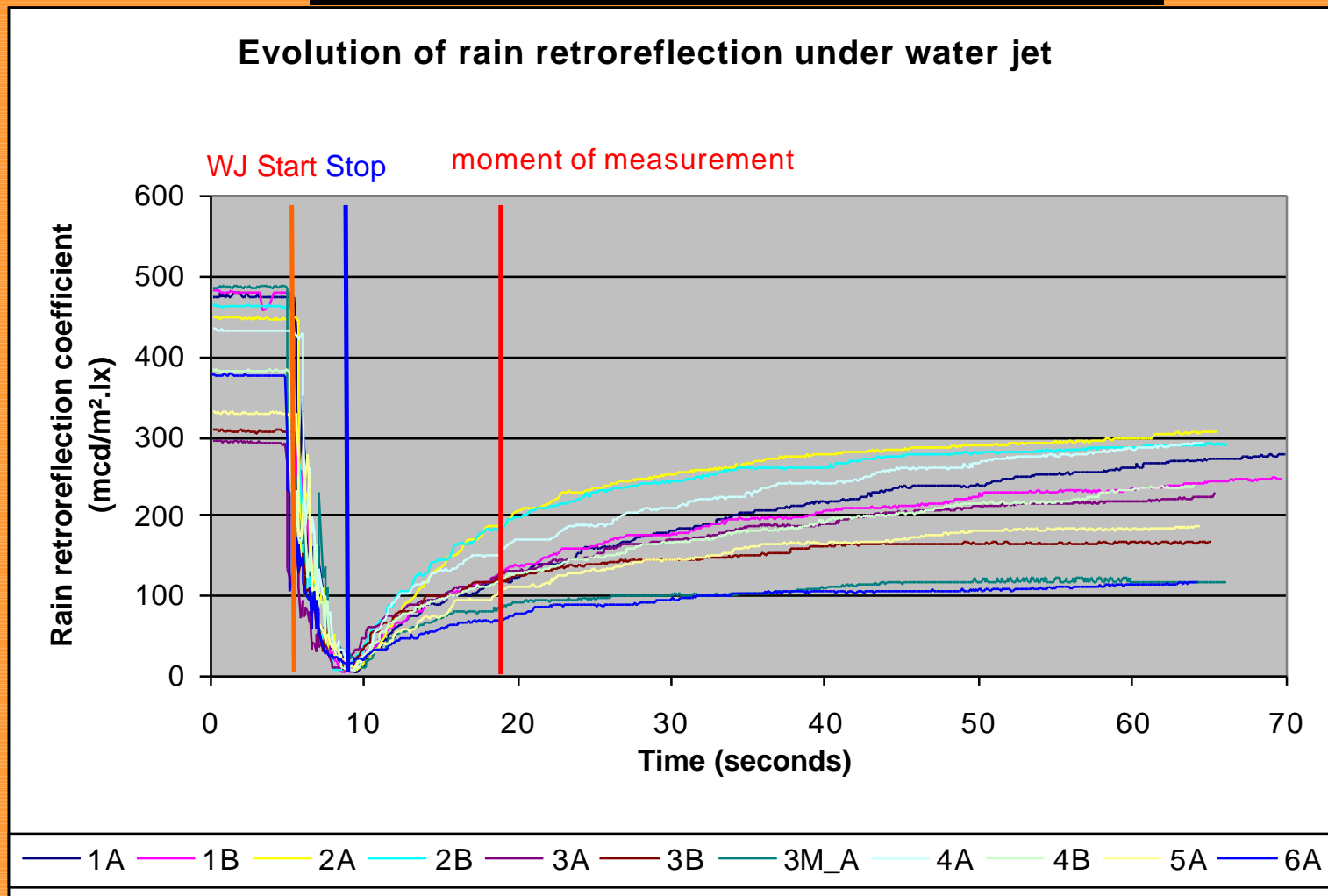
20 mm/h rainfall during 5 minutes

similar RR as

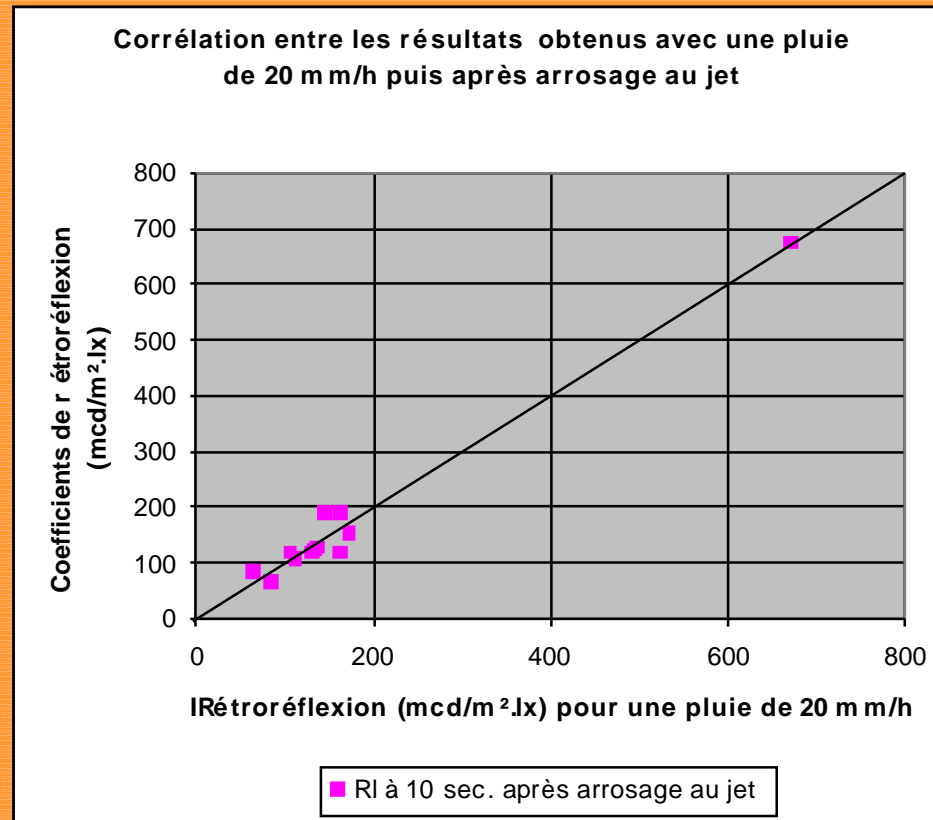
240 mm water jet during 10 second



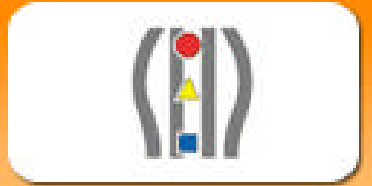
## Step 1 : luminance meter vs. ECODYN (2005) Static measurement / laboratory



## Step 1 : luminance meter vs. ECODYN (2005) Static measurement / laboratory



Correlation between the 2 methods



## Step 2 : luminance meter vs. ECODYN (2006) Static Qualification / roads

- Conventional rain simulation
- Correlated with the conventional luminance meter
- Used for road markings' certification since 2006

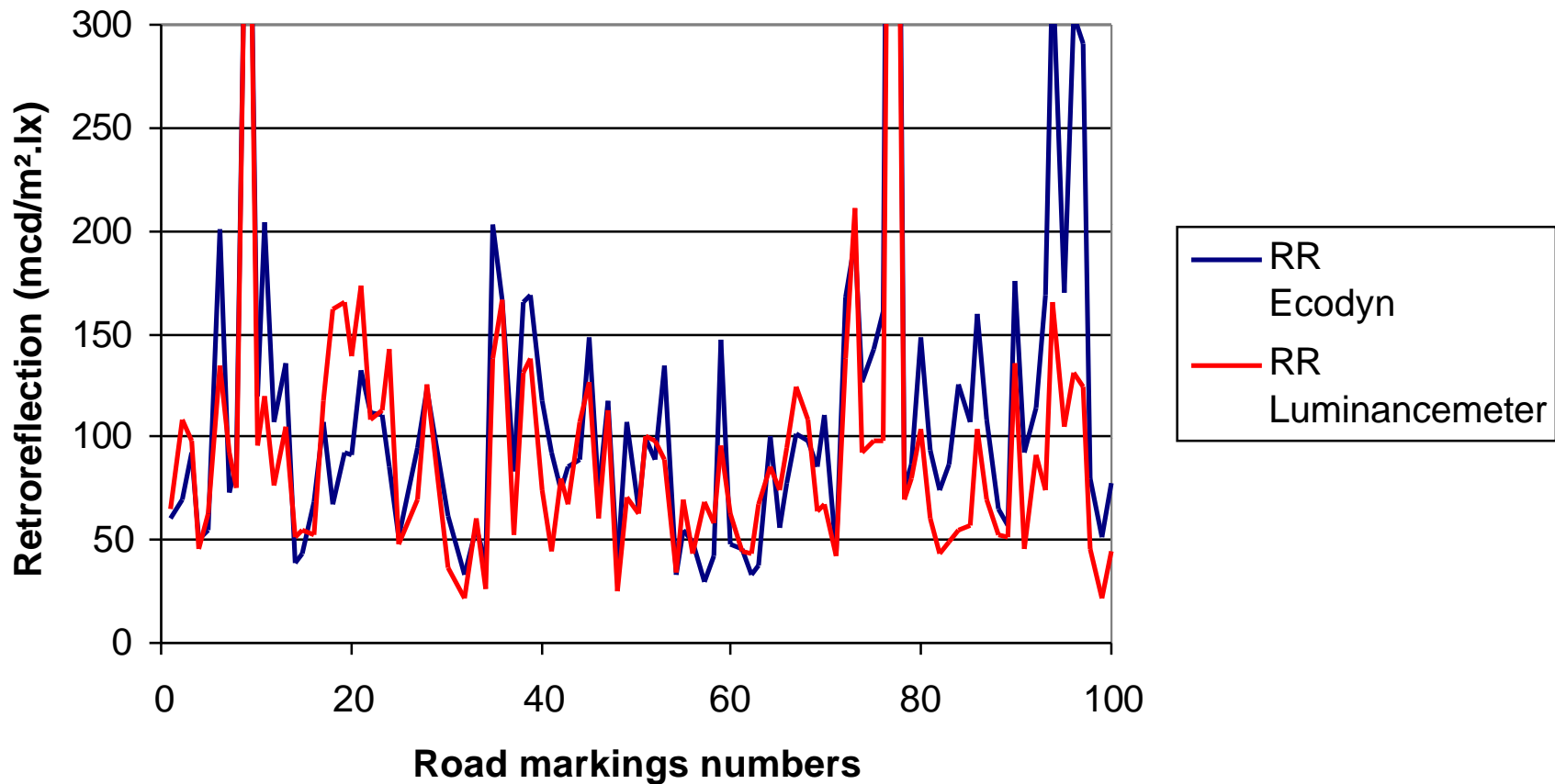
**Ecodyn equipment  
(static measurement)**





## Step 2 : luminance meter vs. ECODYN (2006)

RR measures (Ecodyn et Luminancemeter)

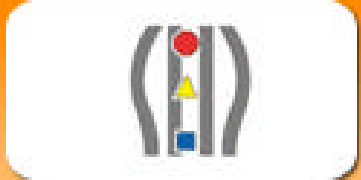


## Step 3 : Dynamic measurement ECODYN (2007)

### Roads

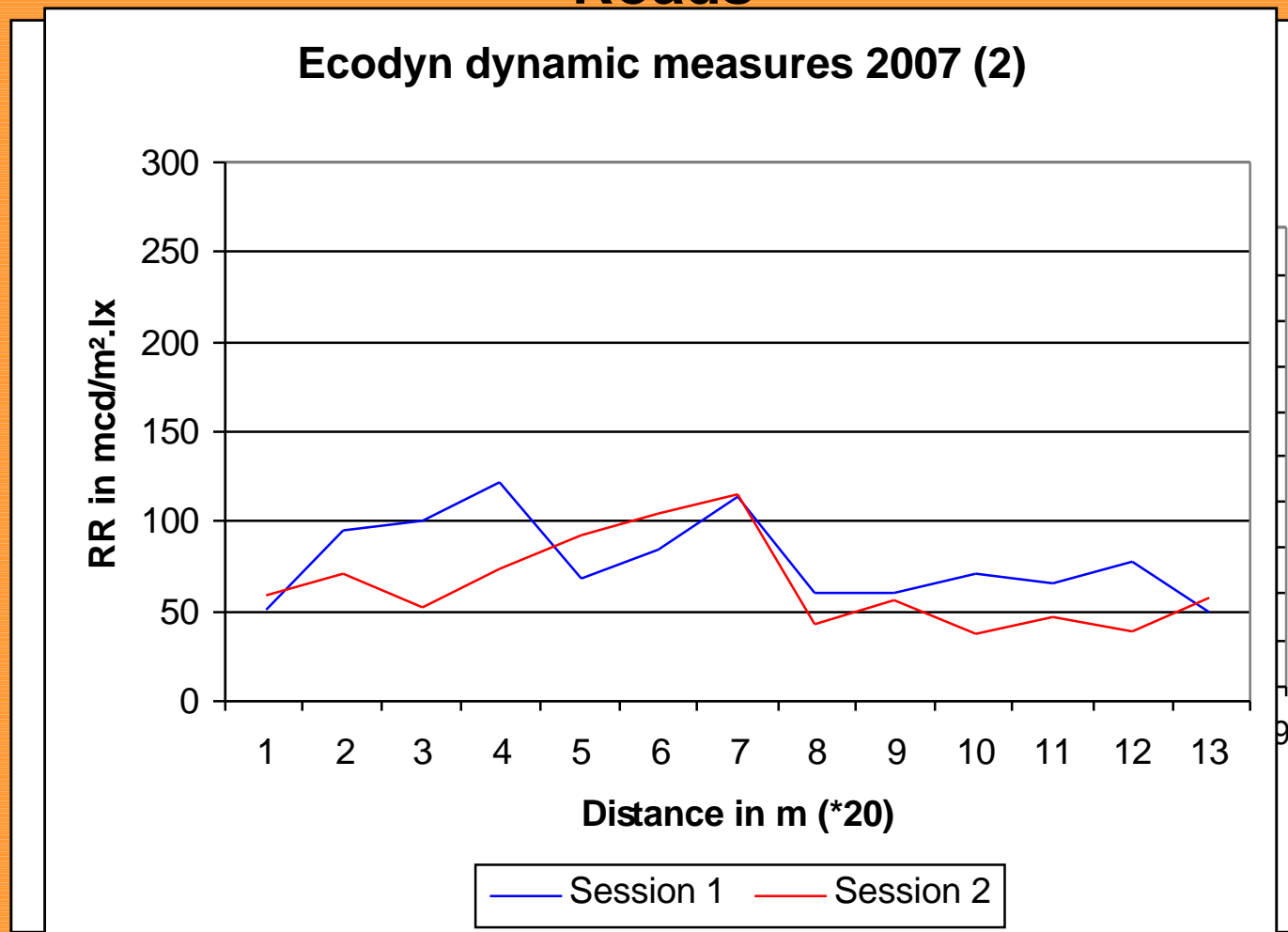


Tests on highways and rural roads ; 10 km/h ; water dispenser ; IVT : 10 sec



## Step 3 : Dynamic measurement ECODYN (2007)

### Roads



## Step 4 : Qualification of dynamic ECODYN (2008)



- Rain simulator 35 cm wide
- Inter vehicle time
- Video line tracking

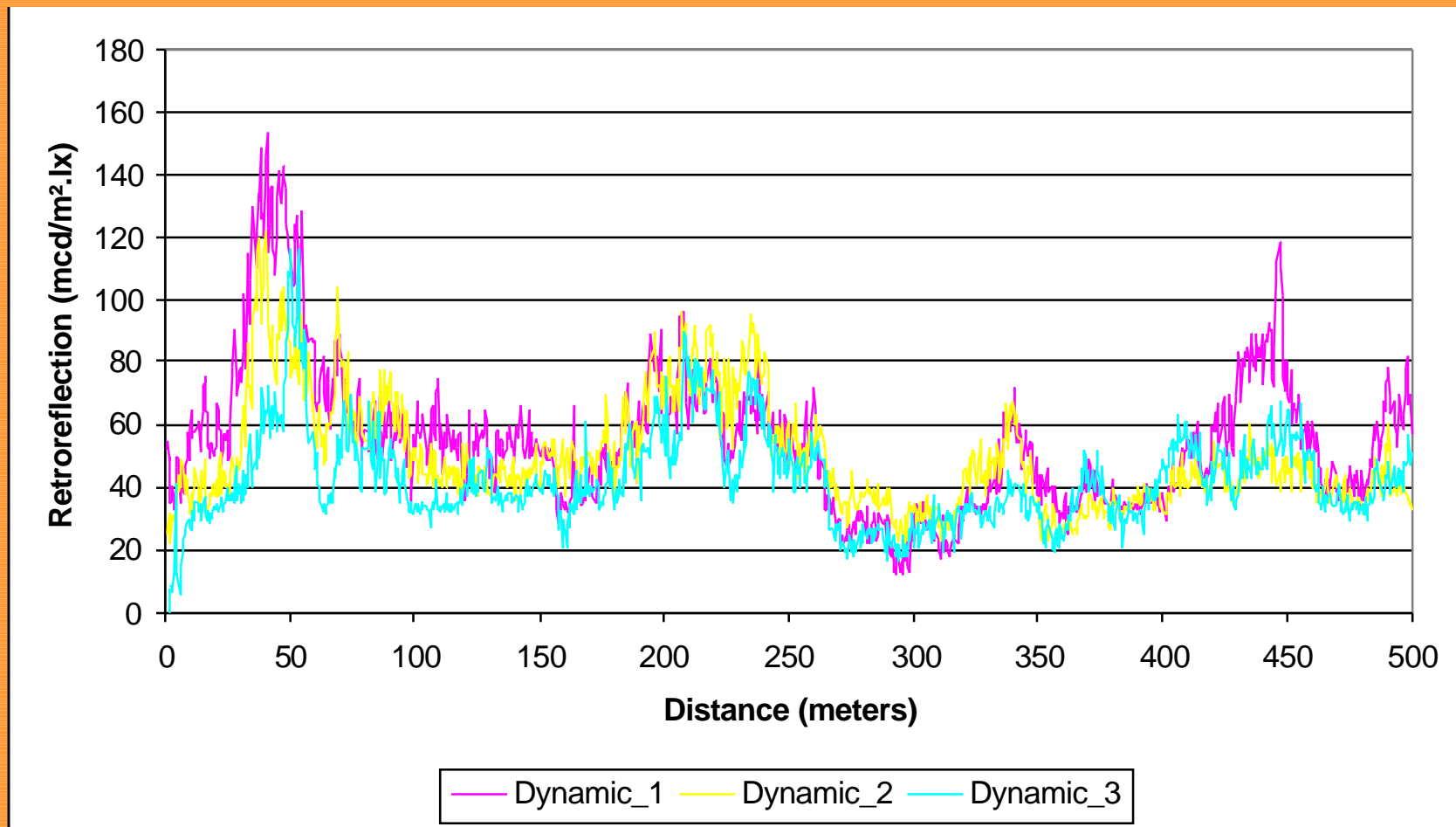
- Acquisition at 20 Km/h
- Autonomy : 5000 m of continuous line
- Measurement : 1 static + 3 dynamic
- 0.9 liter/sec





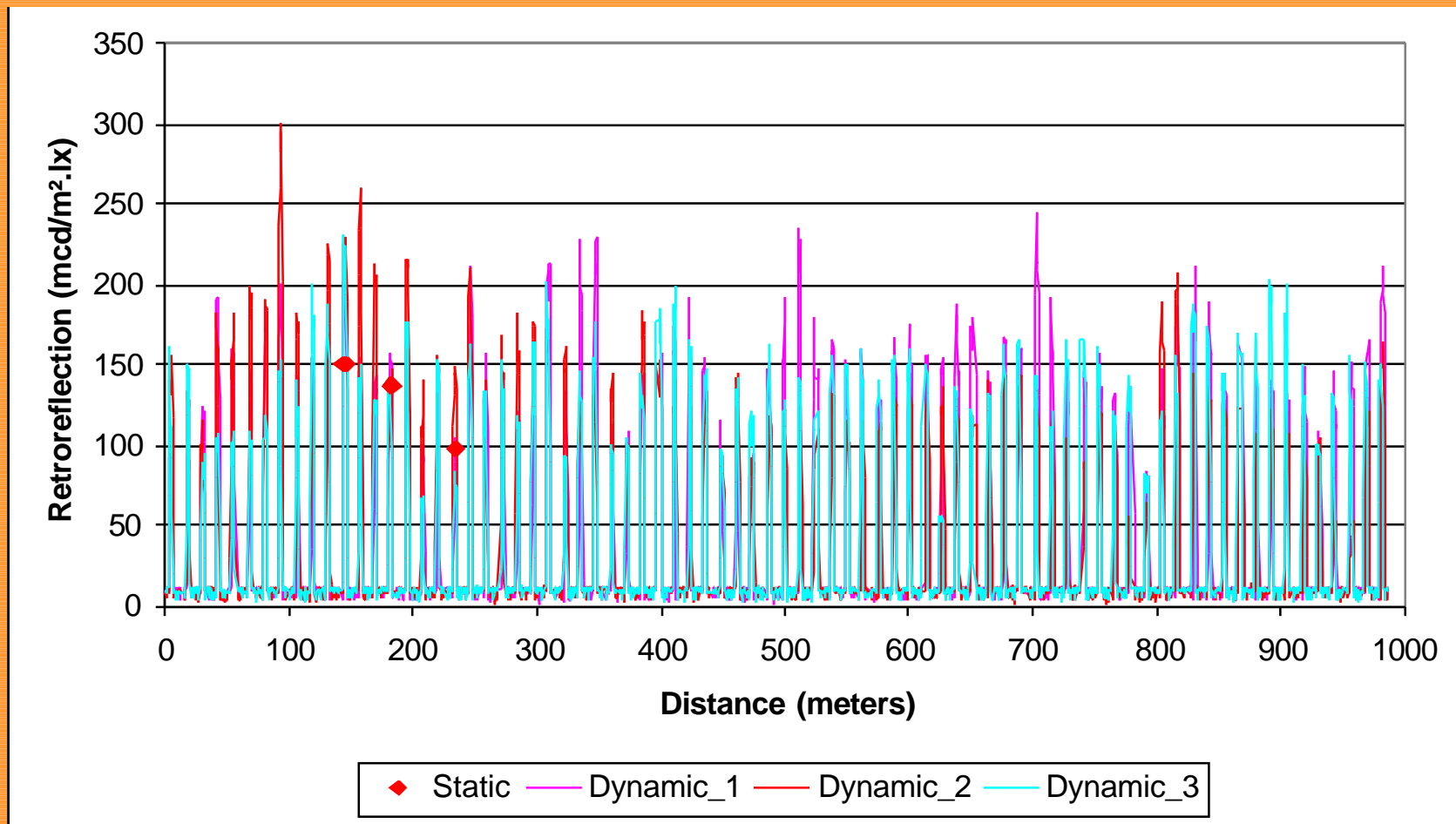
## Step 4 : Qualification of dynamic ECODYN (2008)

### Ecodyn : dynamic measurement repeatability



## Step 4 : Qualification of dynamic ECODYN (2008)

### Ecodyn : dynamic measurement repeatability



## Conclusion for dynamic RR measurement (2008)

A new method to control the rain retroreflection of road markings in use

A way of improvement for the road community:  
road marking products manufacturers  
private or public contractors  
road authorities

A great opportunity to **improve the quality** of road markings for **road users**.



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Q&A