

EasyWay



Annual Forum 2010



Shortcut to the future.

Lisbon • November 16th-18th



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Dynamic speed control in the metropolitan area of Barcelona: evaluation and next steps

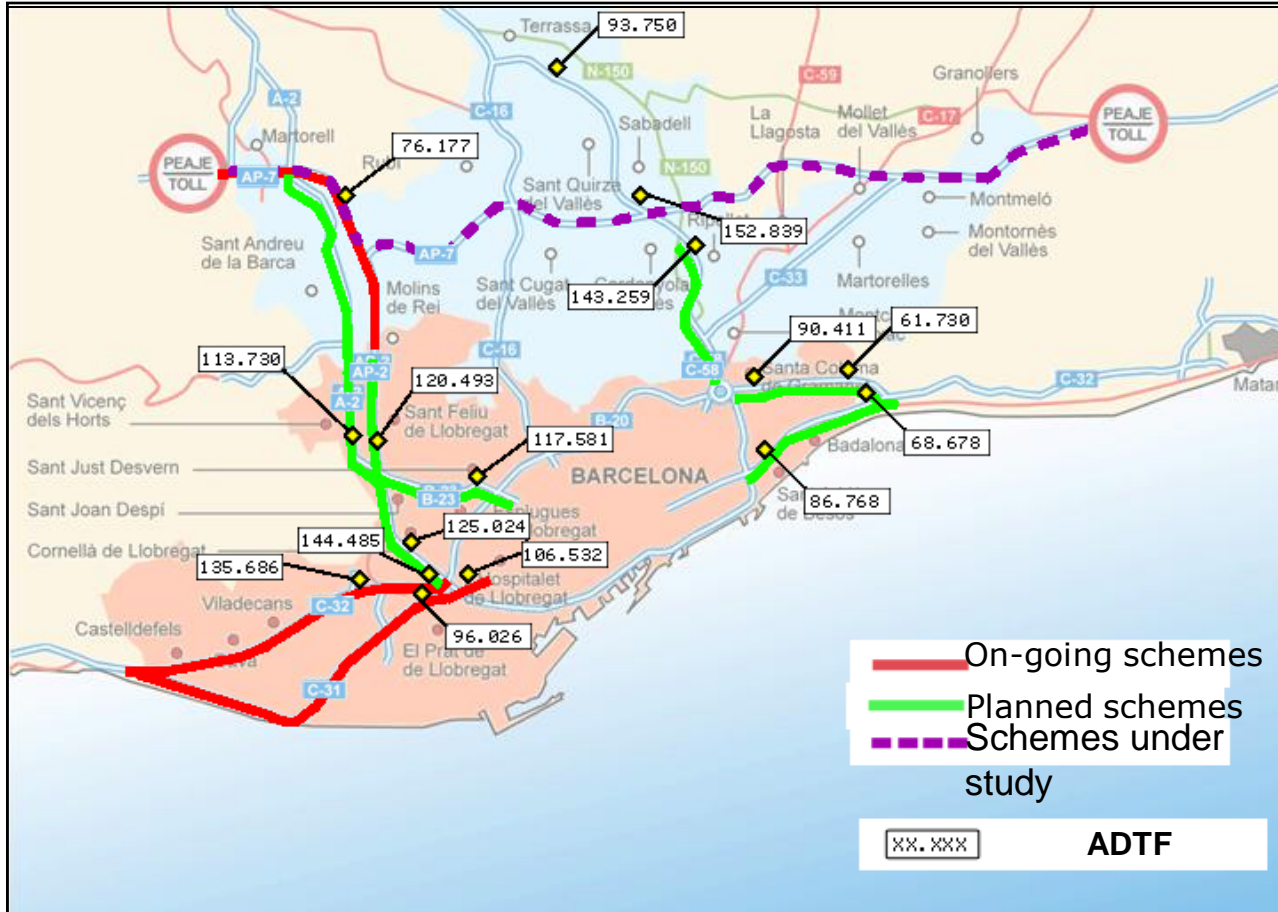
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ITS Senior consultant, LISITT, University of Valencia

The present situation



The ADTF (Average Daily Traffic flow) in the MABCN
On-going and planned projects

Evolution of speed limits in the MA of BCN:

2007:



2008:



red area blue area

From 2009 onwards:





red and blue area



The evaluation: A) Road safety

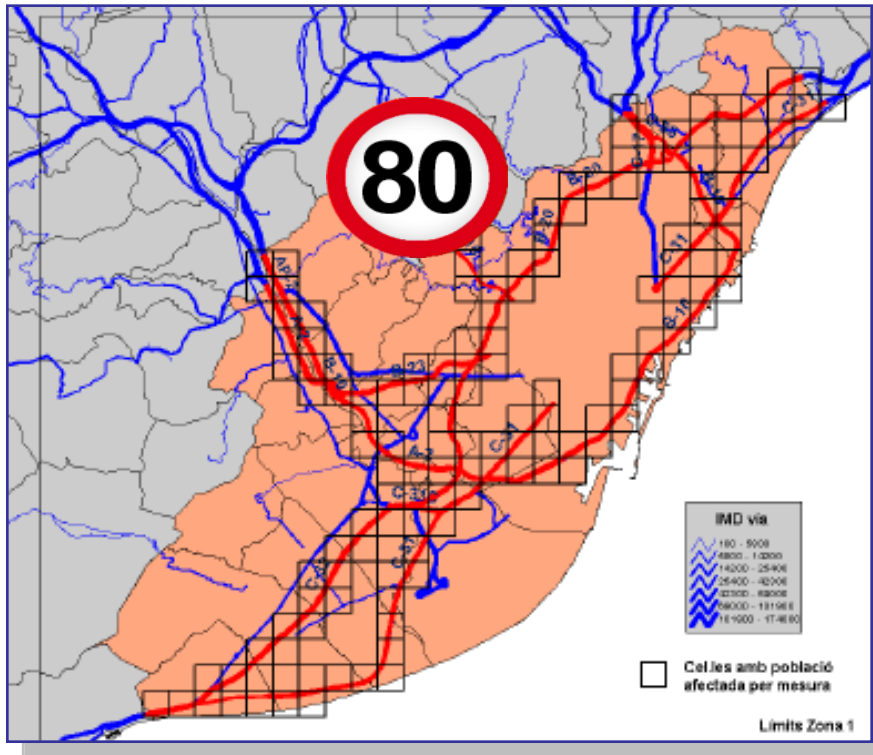
Here we have de comparison of: *accidents and casualties + seriously injured*, for the January-December period of 2007-2008-2009, in the 80 Km/h zone and DSC roads (C-31 and C-32):

		2007	2008	%08/07	2009	%09/07
	accidents	658	512	-22,19	535	-18,99
	Casualties+ seriously injured people	67	40	-40,30	37	-44,78
	Accidents (C-31,C-32)	190	123	-35,26	131	-31,05
	Casualties+ seriously injured people (C-31,C-32)	29	12	-58,62	9	-66,97

The reduction of road safety parameters has been more significant comparing 2008 (80 Km/h) vs 2007, and only a small reduction in 2009. In 2010 the number of accidents and the average speed are slightly increasing. We are still studying why.



The evaluation: B) Pollution (Emission)



80 **DSC**

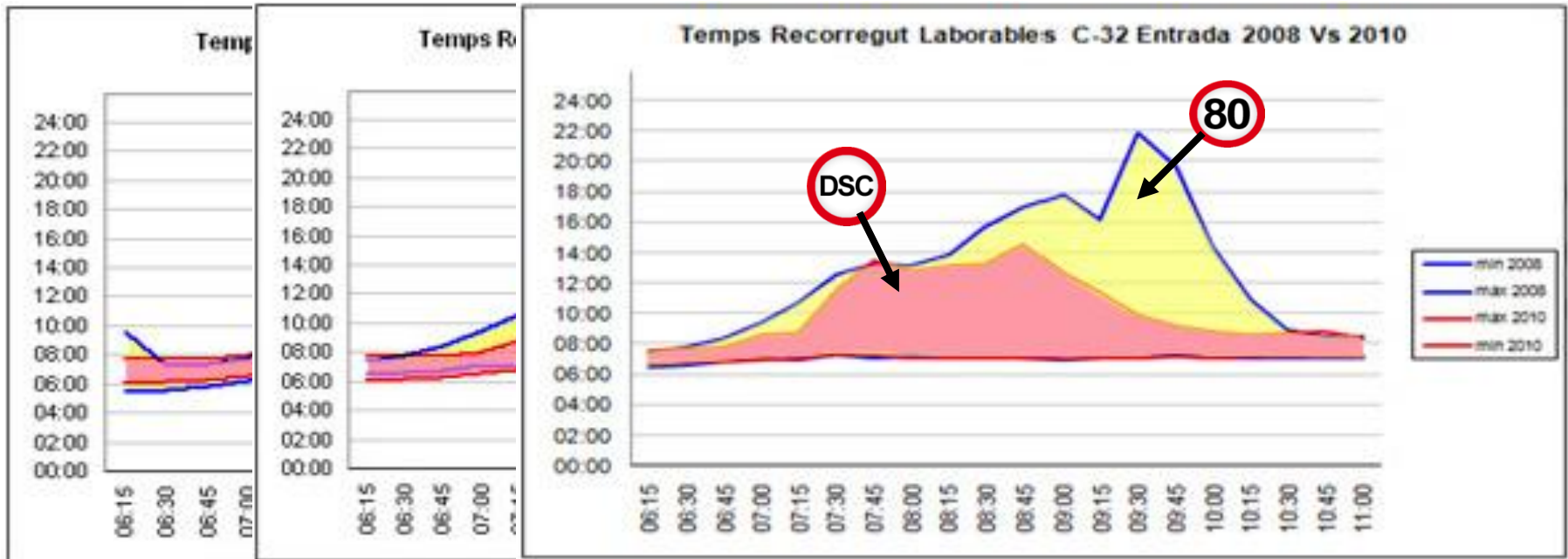
Ton/day	2007	2008	2009	%08/07	%09/07
Fuel cs	526,9	471,6	460,4	-10,4	-12,5
NOx	11,1	9,8	9,6	-11,0	-13,2
PM10	0,8	0,7	0,7	-11,0	-13,0

CONCLUSION: the reduction in Fuel consumption, NOx and PM10 has been significant 2008 vs 2007, and not so significant 2009 vs 2008, specially if we take into account the reduction of 0,8% of the ADTF (09 vs 08)



Evaluation: C) Travel time (TT)

Comparison every 15 minutes between the maximum and minimum travel time for peak-hours period 6:00-11:00 am : 2009 vs 2007, 2009 vs 2008 and 2010 vs 2008. (January-June)

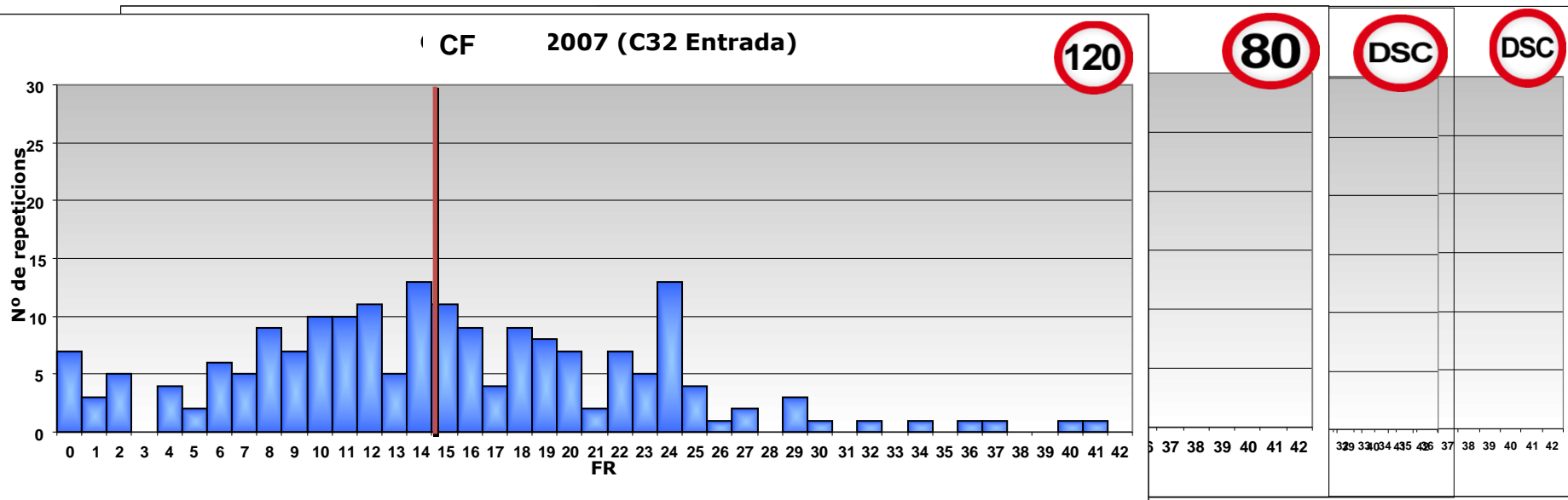


Conclusion: With the DSC (2009), there is a smaller difference in travel time between the maximum and minimum values than in previous periods.



Evaluation: C) Congestion factor

Comparison of Congestion factor (CF)=Average length of congestion x duration of congestion, labour days, entrance BCN, 2007-2008-2009-2010, on C-32 road:



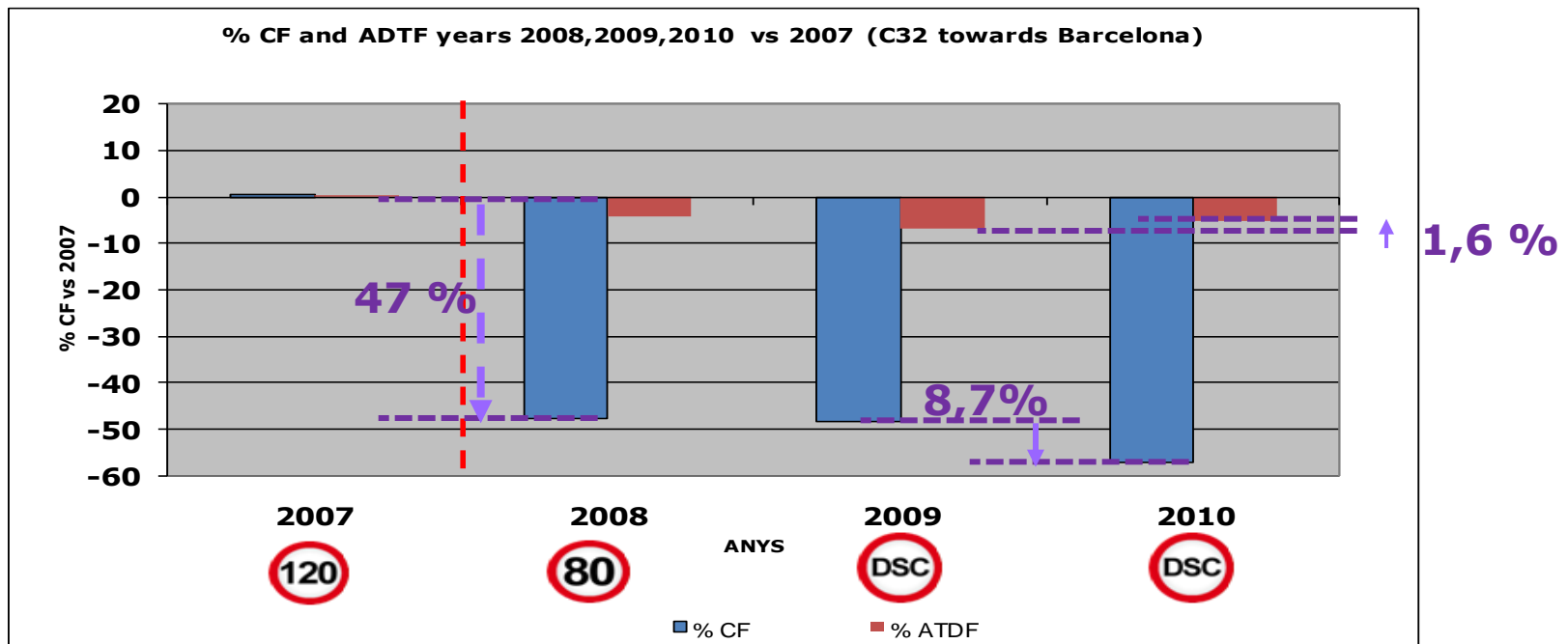
This is the repeated number of CF per year, and the average value.

(We consider Congestion as a situation with a traffic level C,D,E or F)



Evaluation: C) Congestion factor and ADTF

Here we have the evolution of the congestion factor (blue bar) and ADTF (red bar), at the BCN entrance, for 2007 (year of reference)-2008-2009 & 2010 on C-32 road.



A strong reduction of CF (47%) took place in 2008 (80 Km/h fix) with a 4.22% reduction of ADTF.

With DSC measure (2010 vs 2009), the CF has still reduced another 8.7%, despite an increasing of 1.6% of the ADTF



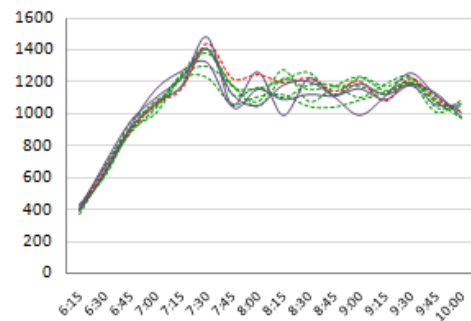
Fluidity: THE SIMULATION

Another way to evaluate the effectiveness of DSC measures, is to compare a certain parameter (TT, CF, pollutants..) using the SAME DEMAND in two scenarios. For example, on the C-32 road, we have compared:

- scenario 1: "do nothing", to sustain the fixed speed at 80 Km/h
- scenario 2: operating with the DSC (Dynamic Speed Control) measures.

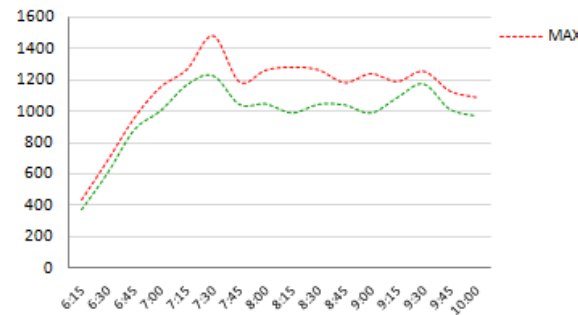
1st step: Calibration of Intensity

Intensity - Detector PK 51

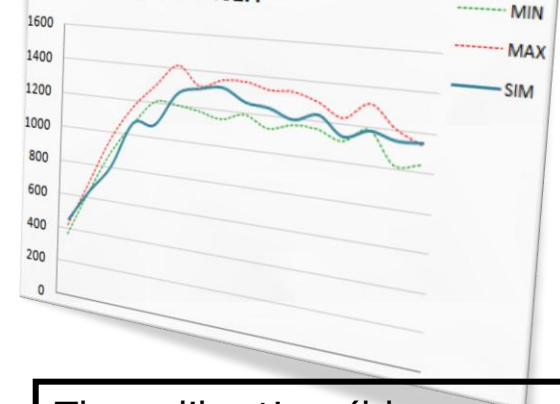


05-may
06-may
07-may
12-may
13-may
14-may
03-jun
04-jun
09-jun

Intensity - Detector PK 51



Intensitat - Detector PK 52.4



Define a "pattern" of intensity curves



Maximum and minimum of this curves



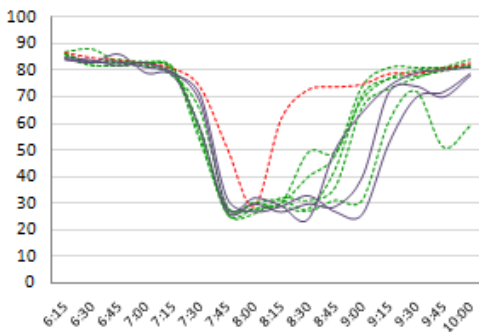
The calibration (blue curve) between M and m



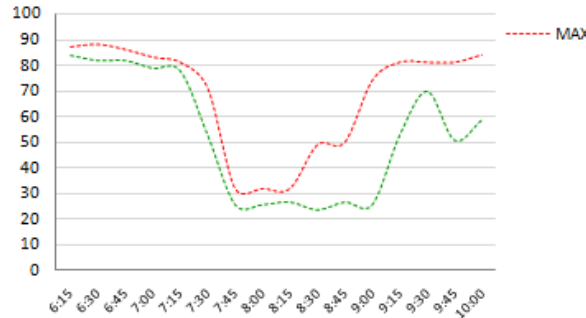
Fluidity: THE SIMULATION

2on step: calibration of Speed

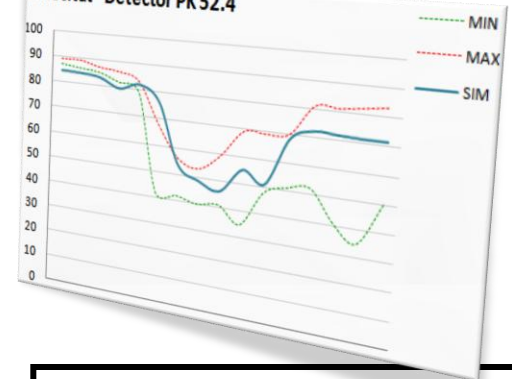
Speed - Detector PK 51



Speed - Detector PK 51



Velocitat - Detector PK52.4



Define a "Pattern" of speed c.

Maximum and minim...

Calibration (blue curve)

3th step: calibration of Travel time (loops, LPR and floating car data)



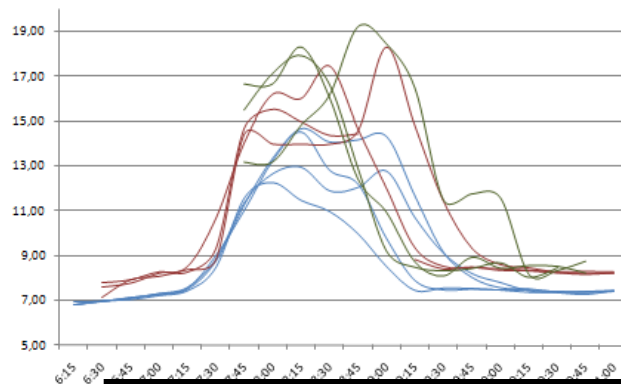
loops



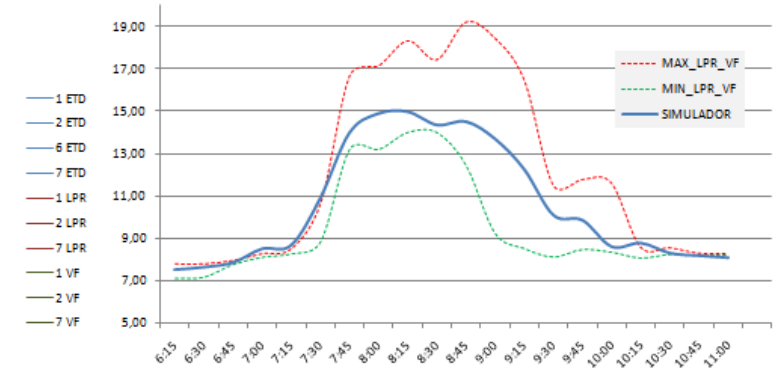
LPR



Floating car data



"Pattern" of TT curbs



Calibration (blue curve)

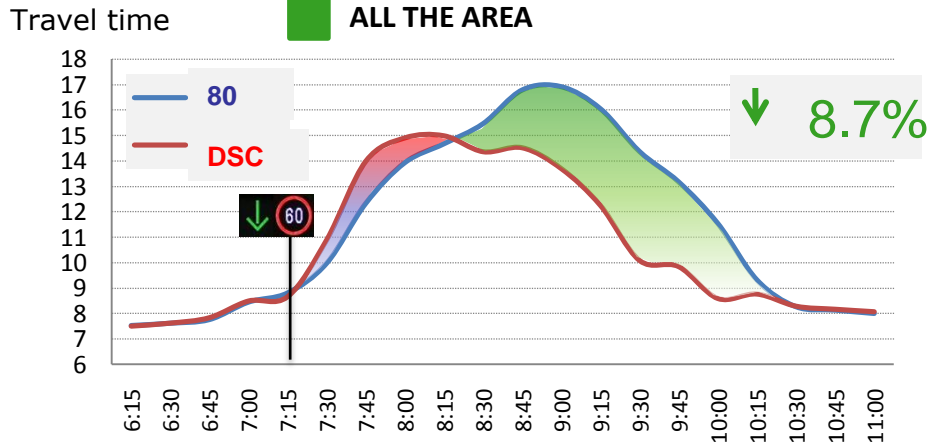


Fluidity: THE SIMULATION. The results

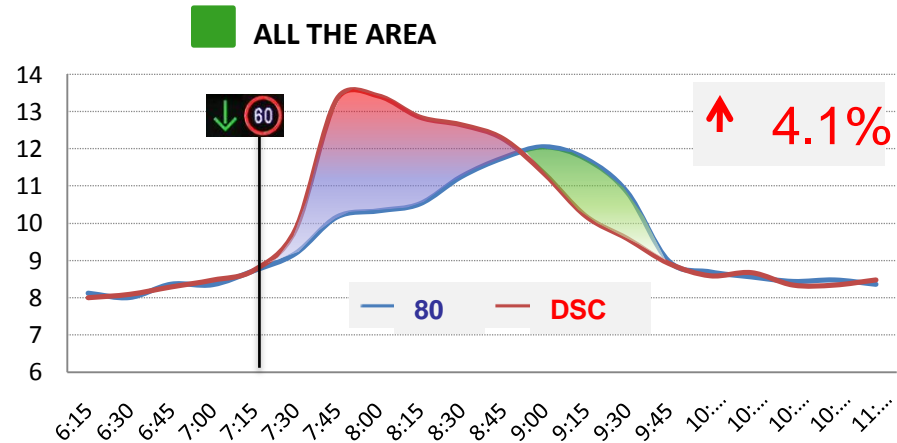


[Video](#) showing a presentation of the simulation on C-32 road

Results of simulation: 1) Travel time (peak hour)



Demand 1: "high demand"



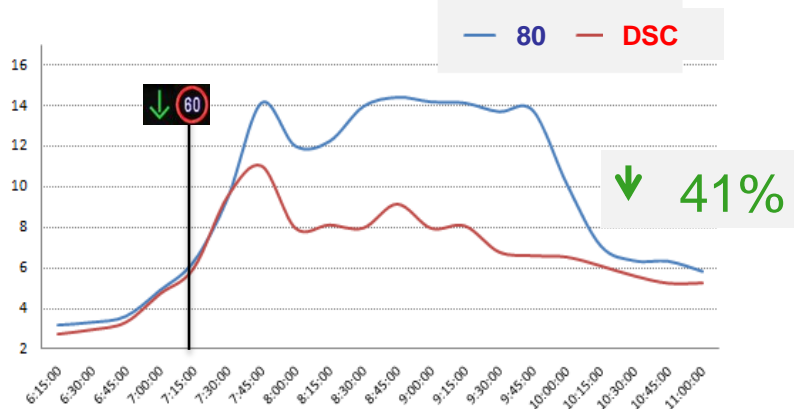
demand 2: "low demand"

Depending on the demand situation, the travel time could be reduced or increased. This fact should be taken into account for management strategies

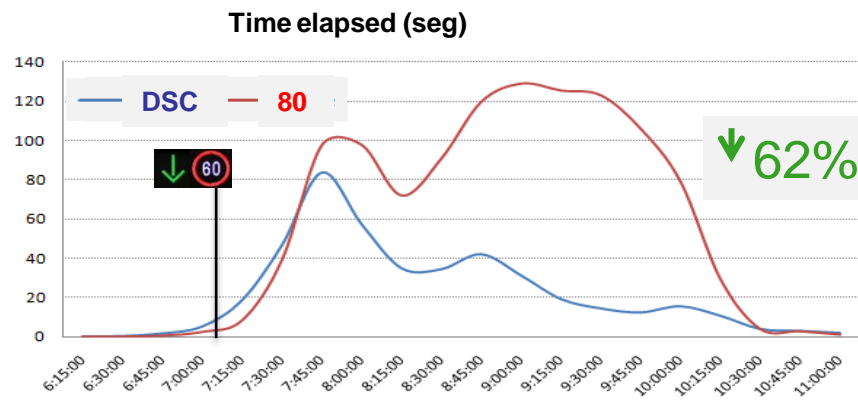


Fluidity: THE SIMULATION. The results

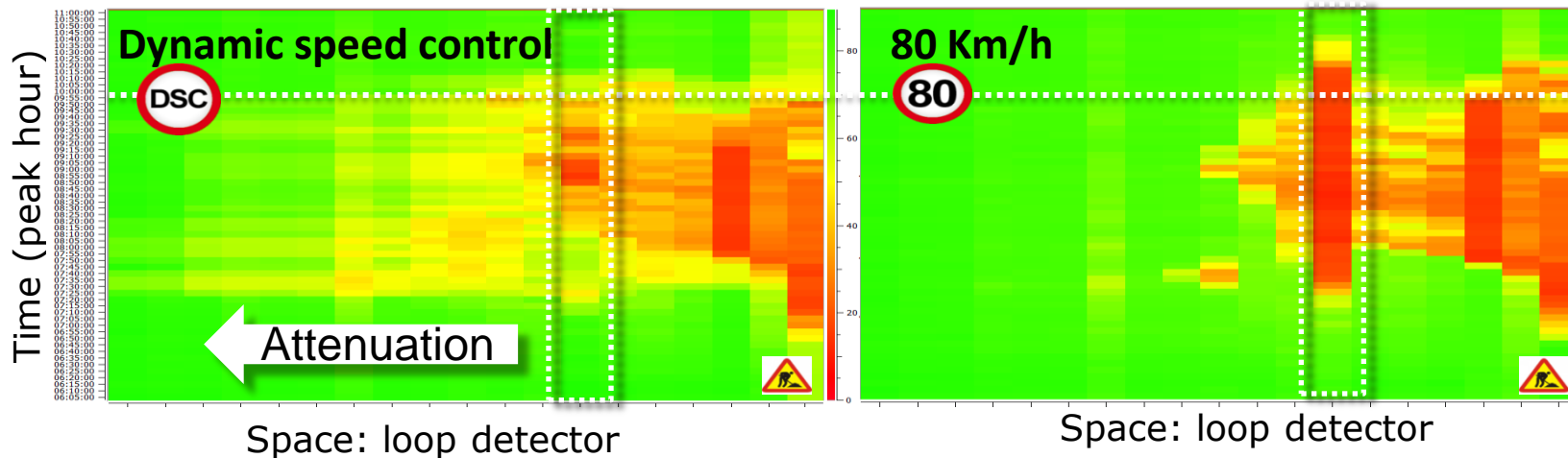
Number of "stops and goes"



Time elapsed during the "stops and goes"



Speed distribution (homogenization)





The future

1. Congestion algorithm: on some specific stretches with a big difference between the lane speeds, the calculations are made per LANE and not per SECTION.

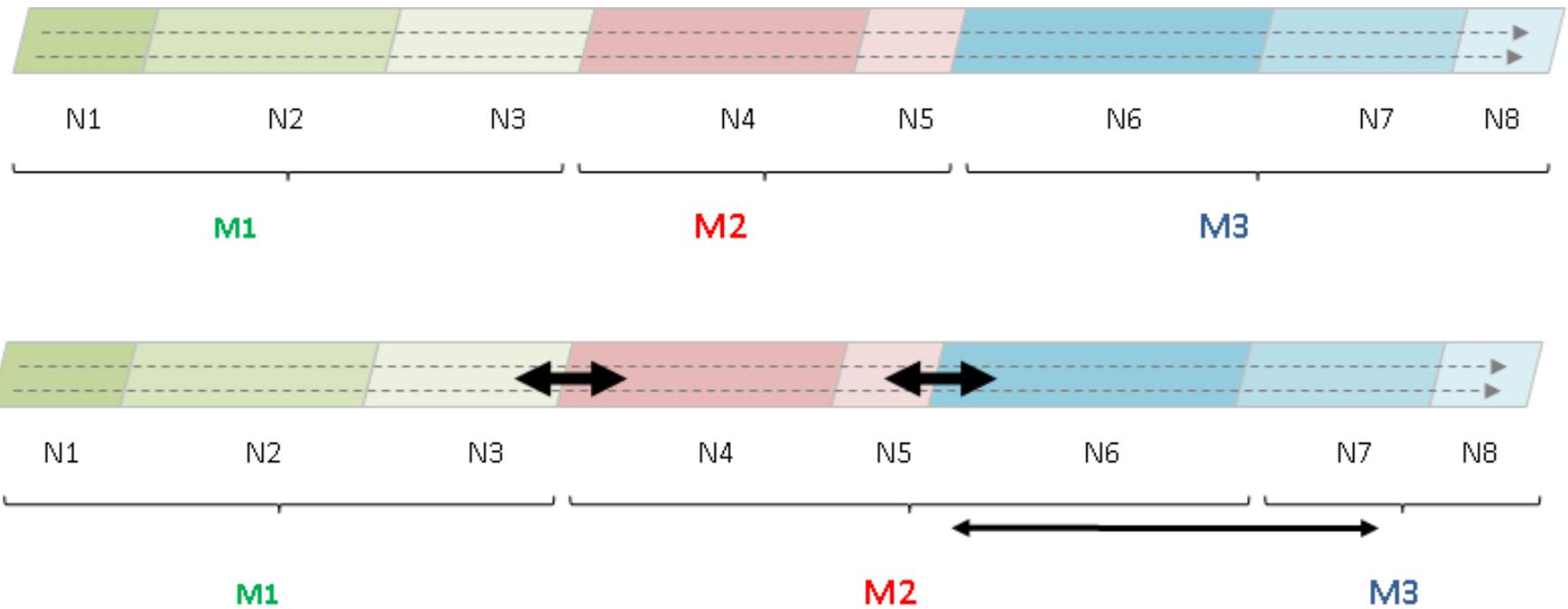


Then, we will use different speed signals on the same gantry. Probably no more than 20 Km/h of difference between the lanes, as confirmed during our visit to Italy.



The future

2. Dynamic assignment of sections inside stretches:



The sections that are on the border of two stretches, could belong to one of them depending on the traffic situation.

3. The use of additional measures as hard shoulder running,...as used in England, Germany, The Netherlands...

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Thank you for your attention

