



Polytechnic University of Bari
DICATECh
prof. Pasquale Colonna

SUMMER SCHOOL SIIV 2012
Road Safety Management

Road Network Safety Management
Practical Application and Research Needs

Working Hypothesis of the Directive

These working hypotheses are correct?

In particular:

upgrading of road infrastructure project:

- **significantly increases the level of road safety?**
- **represents the priority actions to be implemented for road safety?**

Critical Considerations

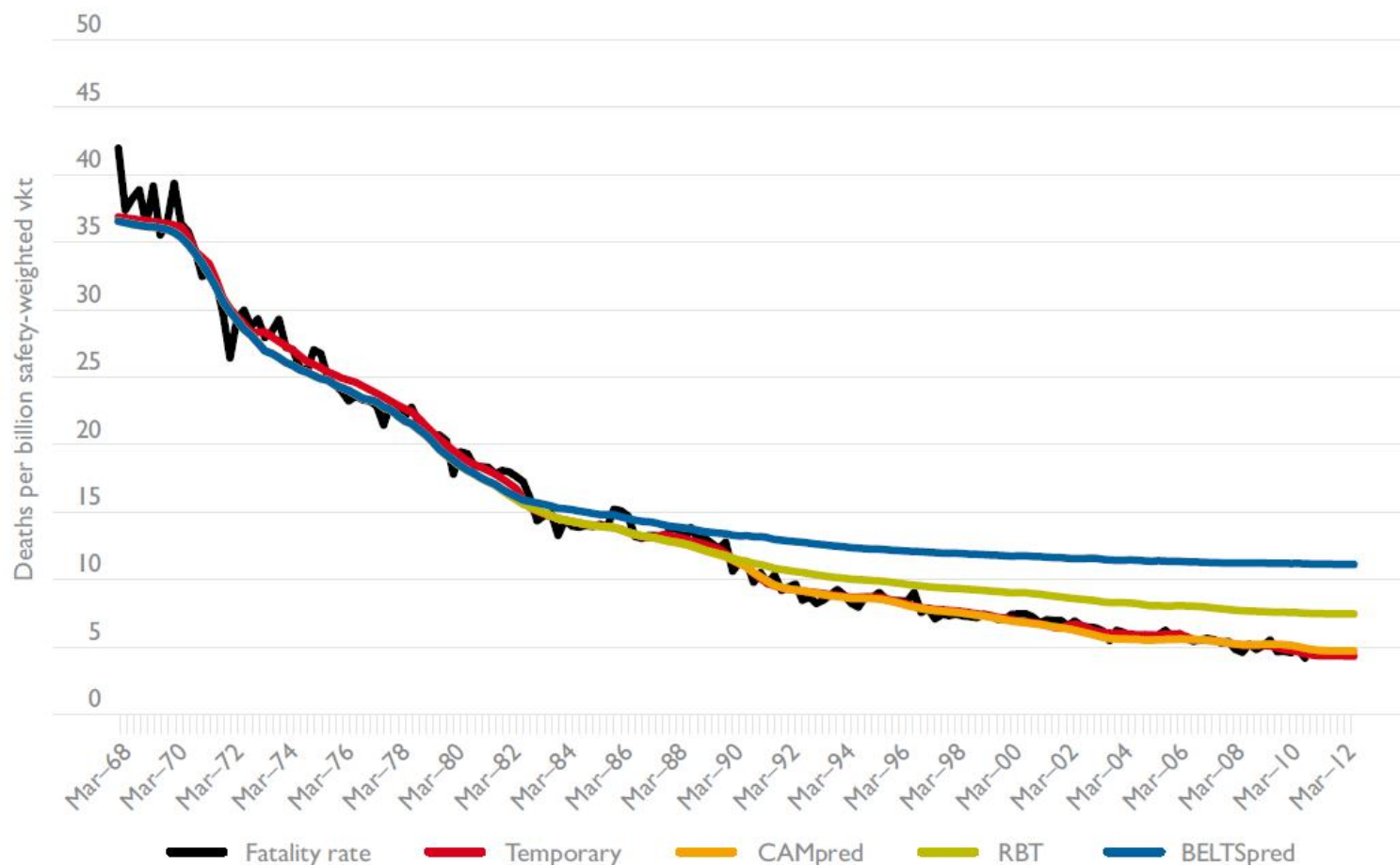
Margins of decision of different transport systems			Mode	Accident Rate
Design of the Route	Control Systems	User Behavior		
XXXXXX	XX	XX	Railroad	XXX
XXXXXXXXXX	XX	XX	Airway	X
XXXXXXXXXX	XXXXXXXXXX	XXXXXXXXXX	Road	XXXXXXXXXXXXXXXXXX

- In this thriller we must seek the guilty, the murderess. Where the clues lead us? towards the control systems and user behavior
- But in the case of the roads to reduce accident rates where we focus? On the Design of the Route! >>> Is it reasonable?

Critical Considerations

- Importance of Control Systems

Effects of seat belt wearing, RBT and speed cameras on **Australia's** fatality rate



Critical Considerations

- User Behavior

The increased risk of road system is due to the different behavior (degrees of freedom) of the different users.

The possible degrees of freedom are the speed and the position in the cross section

Critical Considerations

- User Behavior

The Behavior of Non-Habitual User can be very different from that of Habitual User

The behavior characteristics of Non-Habitual User are quite independent of the type of risk

Critical Considerations

- User Behavior

External risk: risk not known by the driver or not foreseeable in the specific circumstances of time and place. The other risks are defined Internal Risks.

The Behavior is different if the User encounters an External or Internal Risk

Critical Considerations

- User Behavior

But when the Behavior Compensation is impossible?

Certainly only if the driver doesn't know the risk or is not able to predict it and therefore only if the Risk is an External Risk.

Instead the behavior compensation can occur if the risk is an Internal Risk.

Critical Considerations

- User Behavior

the countermeasure is effective if

a) it does not internalize the risk

or

b) it internalizes the risk without inducing compensation at the level of speed and trajectory

Further clues (round table on Friday)

Critical Considerations

- User Behavior

Really the possible degrees of freedom are the speed and the position in the cross section?

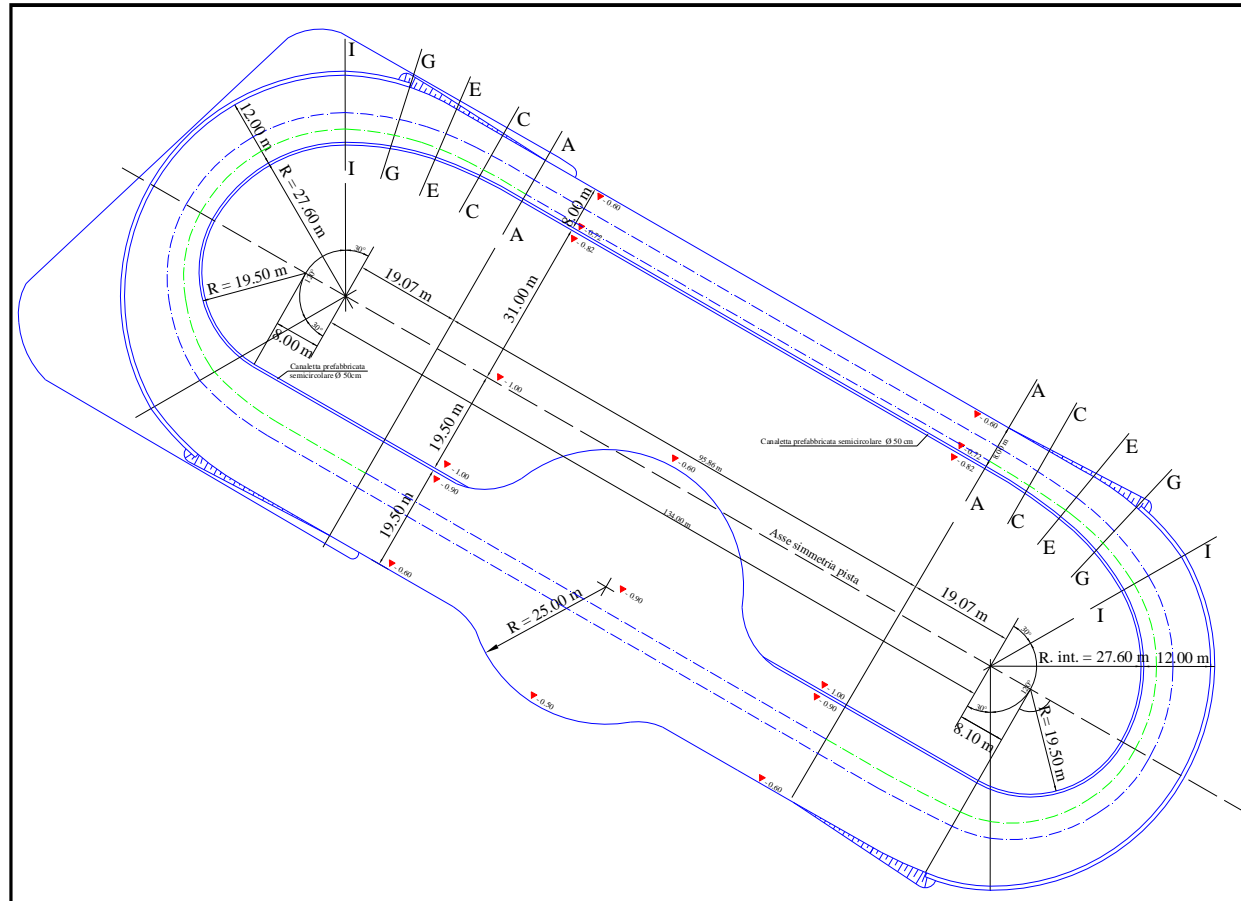
Really the Behavior of Non-Habitual User can be very different from that of Habitual User?

Critical Considerations



A group of users has been subjected by Polytechnic University of Bari to a driving test of a circuit of known geometry on board of a vehicle instrumented with high precision GPS.

Were processed data relating to speed and trajectory. Were analyzed the data of drivers as a function of the geometry and the number of laps already paths.



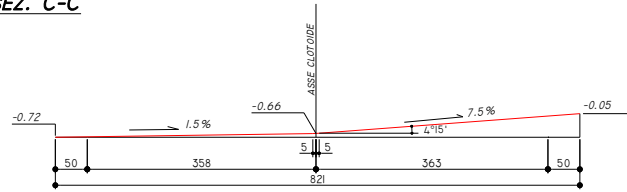
Larghezza 8 metri



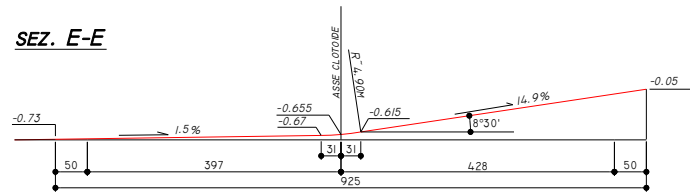
START

RETTIFILO 1 : Larghezza 19,5 metri

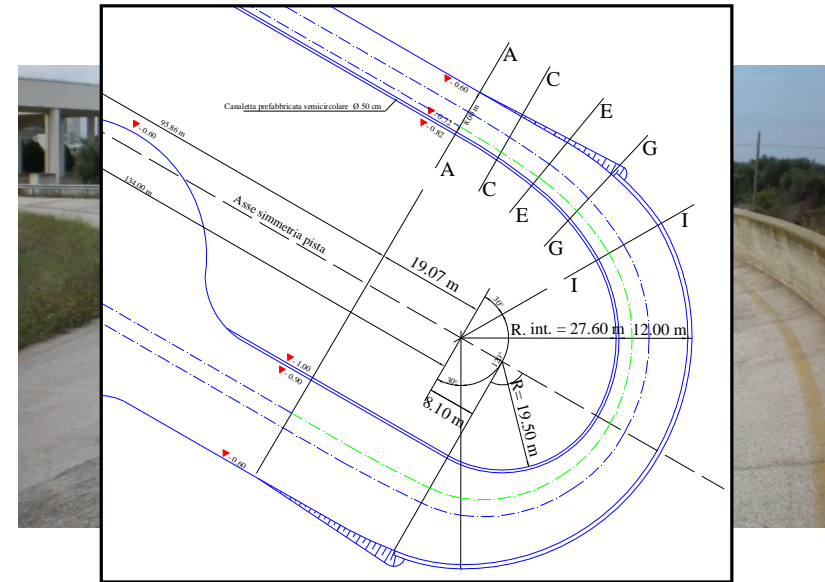
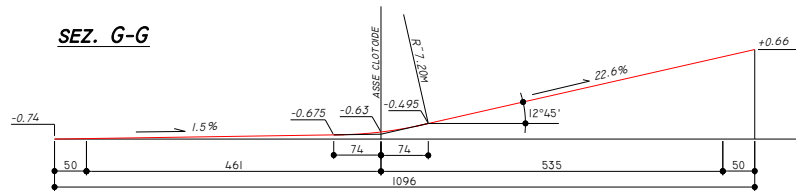
SEZ. C-C



SEZ. E-E

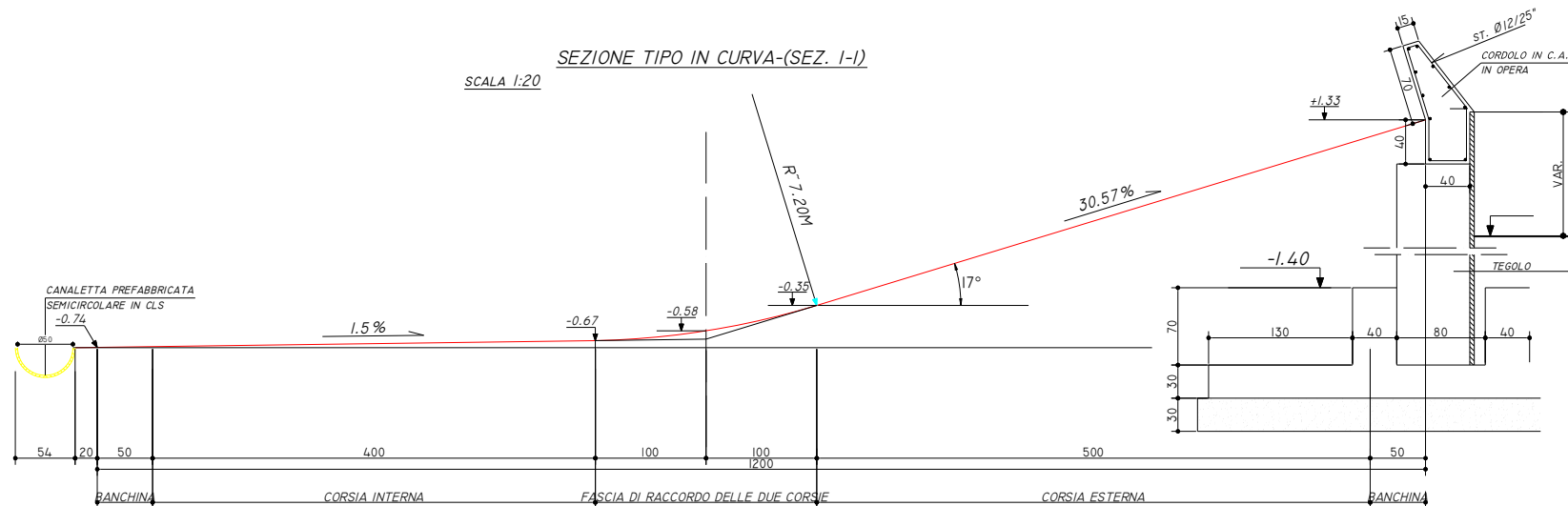


SEZ. G-G

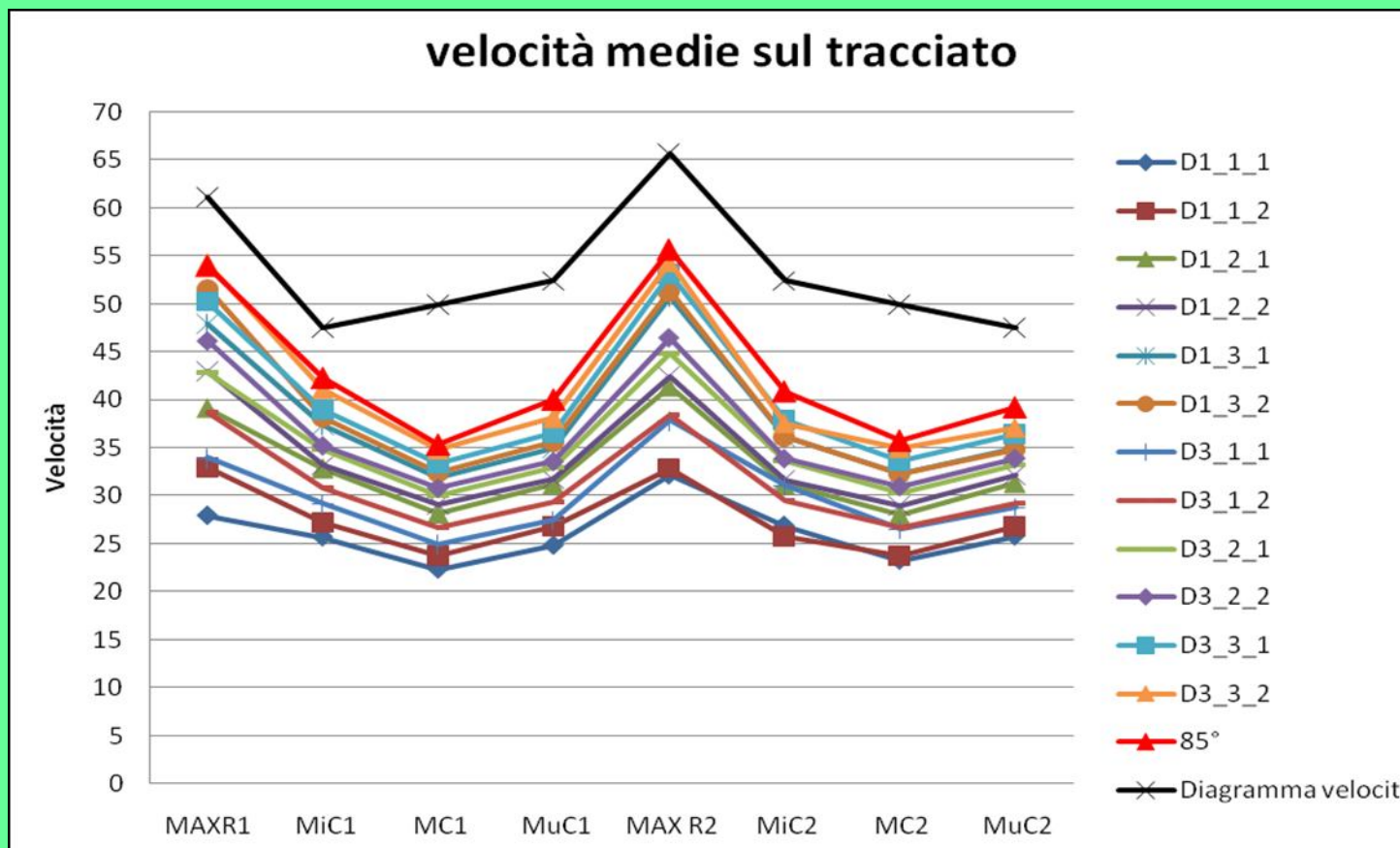


SEZIONE TIPO IN CURVA-(SEZ. I-I)

SCALA 1:20

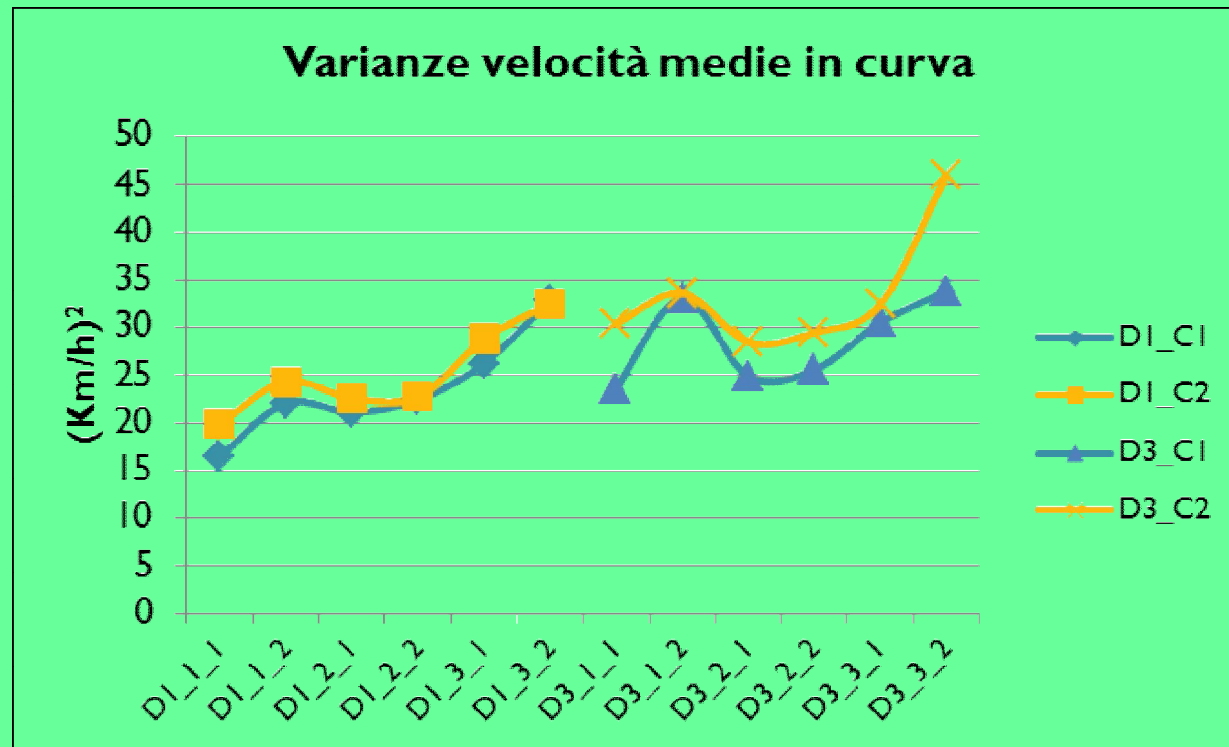


Critical Considerations



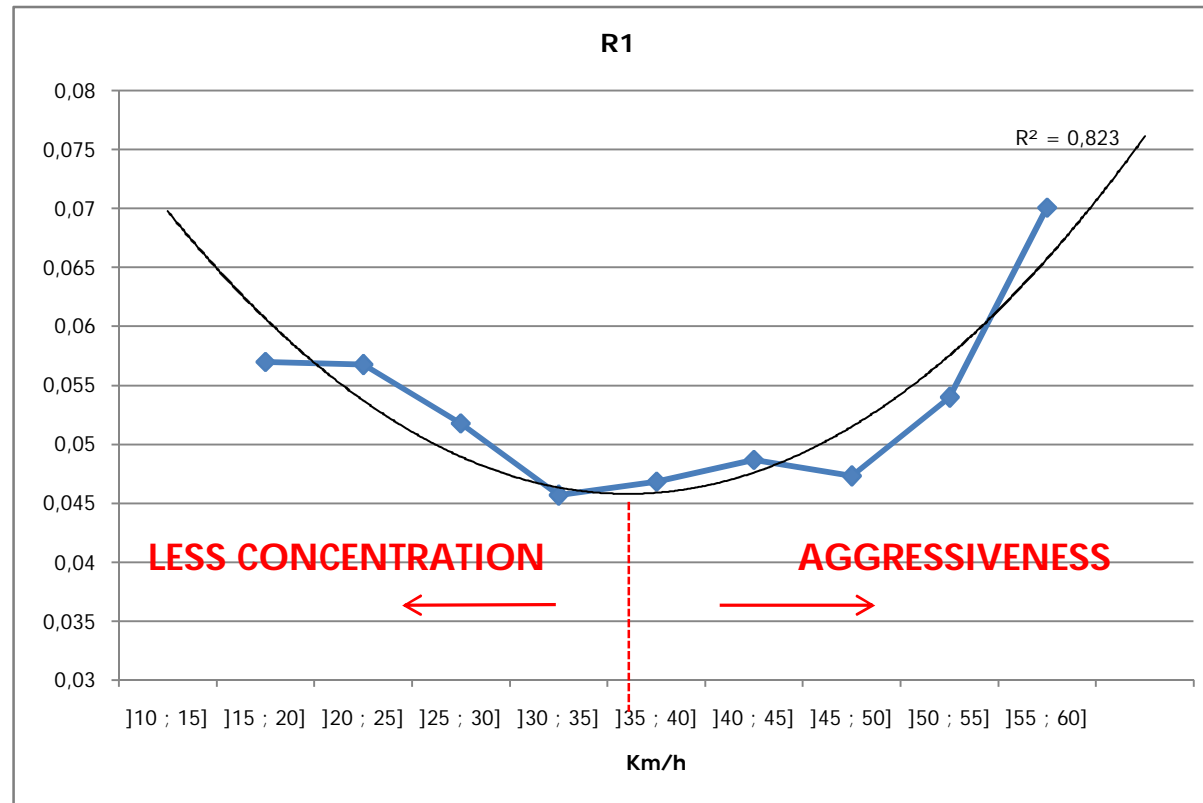
In general **the speed of the drivers is increased with the number of laps completed.**

Critical Considerations



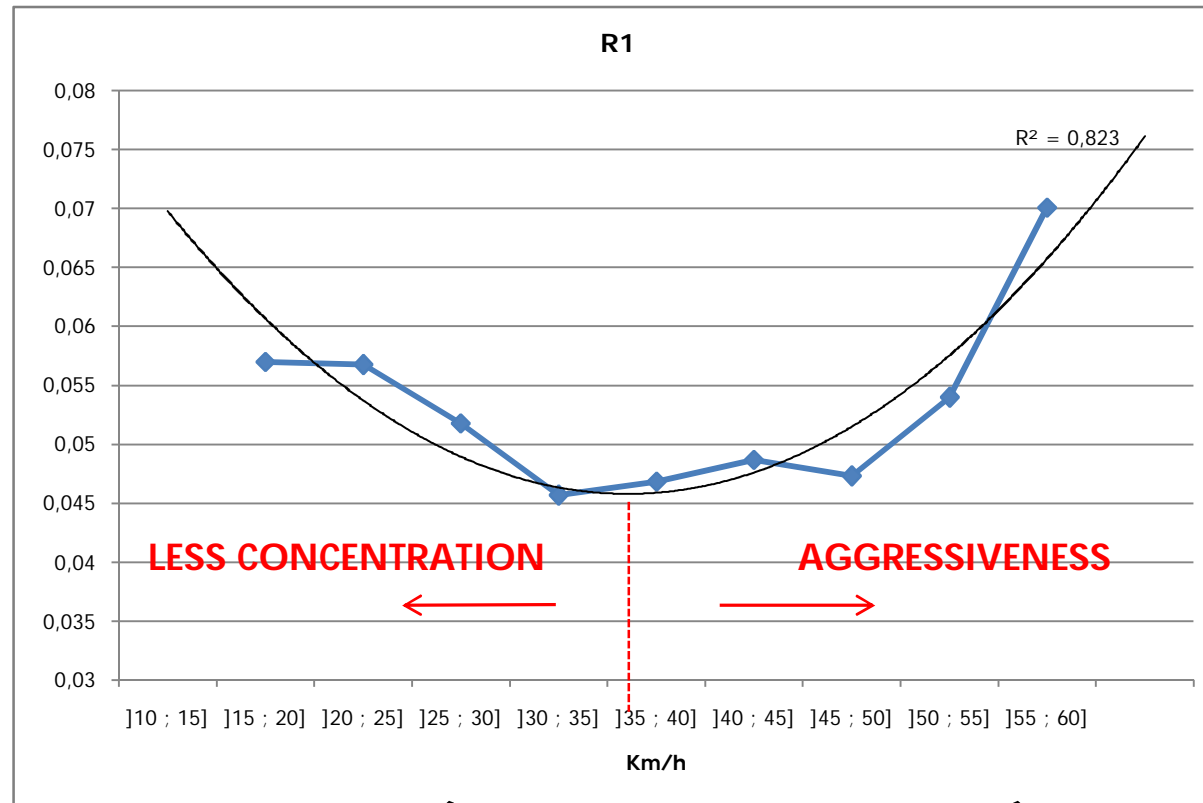
In general **the variance of the speed of the drivers is increased with the number of laps completed.**

Critical Considerations



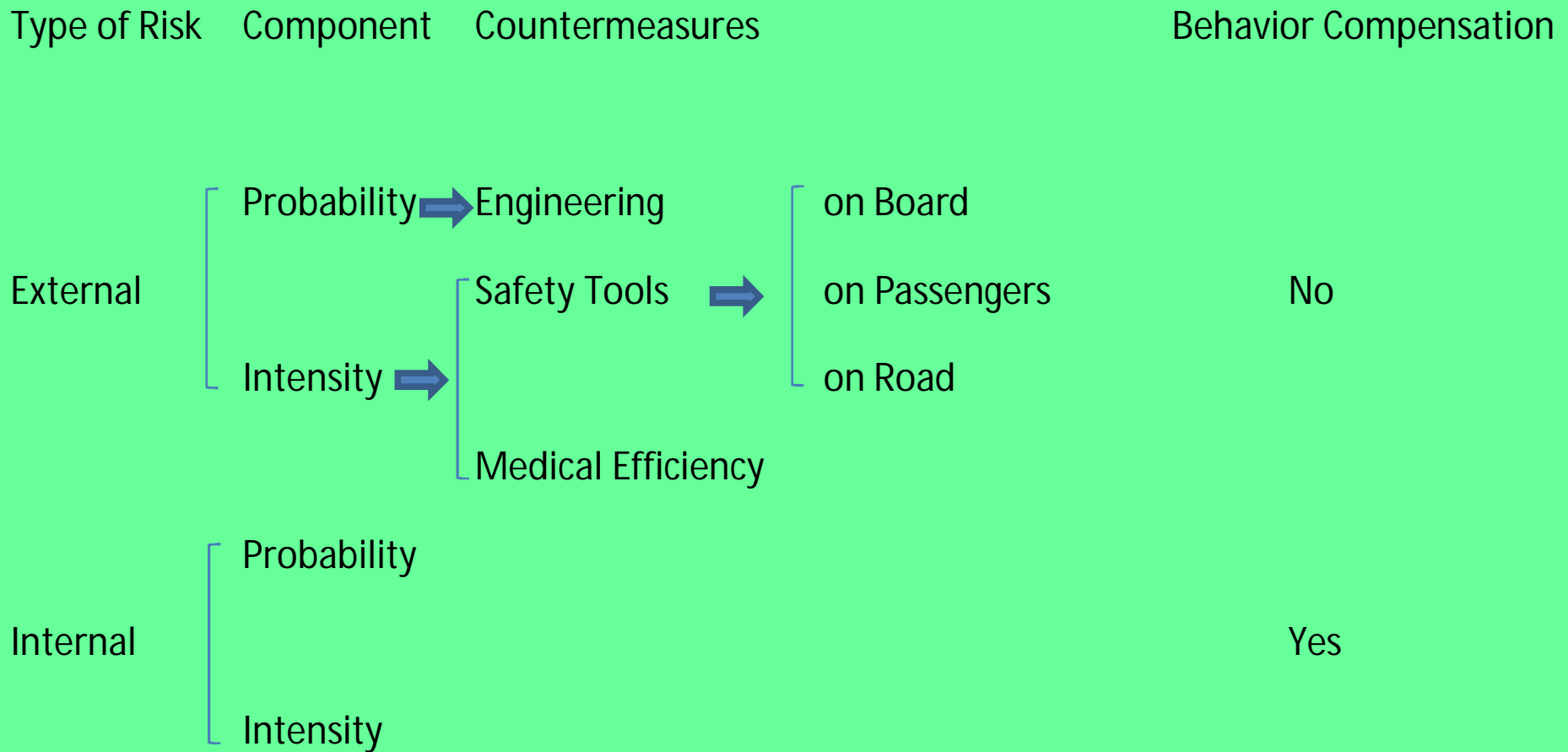
The average displacement of the trajectories depends on the speed: there is a particular value of the speed for which the displacement is minimal (**optimum of feeling**).

Critical Considerations



For lower speeds (distracted user) the displacement is smaller and for higher speeds (aggressives user) the speed is higher.

Critical Considerations



A possible new interpretation on WHY road accidents happen

**Thank you very much to
all participant to Catania
2012 SIIV Summer School
for stimulating exchange
of ideas**