

# Criteria Introduction To Avoid Possible Side Effect Of The R94 Amendment

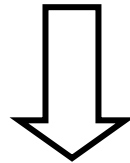
Experts from France

December 2009

- ⇒ Aim
- ⇒ Methodology / Definition
- ⇒ Conclusion

## Proposed criteria:

- to avoid unexpected very stiff front end design
- to compensate for the lack of full width test.
- To fix a minimum R94 test severity

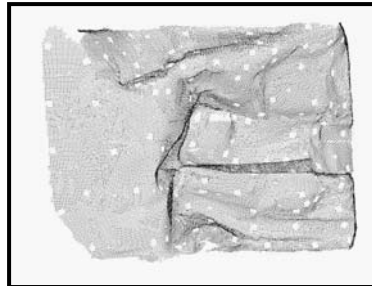


Introduce in the regulation a criteria based on barrier deformation to control the energy absorbed in the vehicle

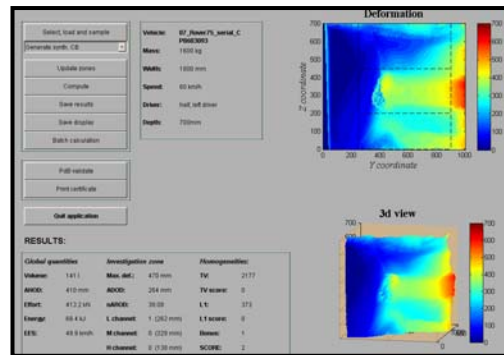
**INPUT**

- Vehicle mass
- Test speed

Barrier digitization



**PDB SOFTWARE**



**OUTPUT**

- Deformed volume
- Energy absorbed
- EES (SPAD)

**SPAD = Self Protection Assessment from Deformation**

$$SPAD = f(\text{Kinetic energy, barrier energy, mass})$$



Select, load and sample  
Generate synth. CB  
Update zones  
Compute  
Save results  
Save display  
Batch calculation

PdB validate  
Print certificate

Quit application

**Vehicle:** 07\_Rover75\_serial\_C  
P0603093  
**Mass:** 1600 kg  
**Width:** 1800 mm  
**Speed:** 60 km/h  
**Driver:** half, left driver  
**Depth:** 700mm

**RESULTS:**

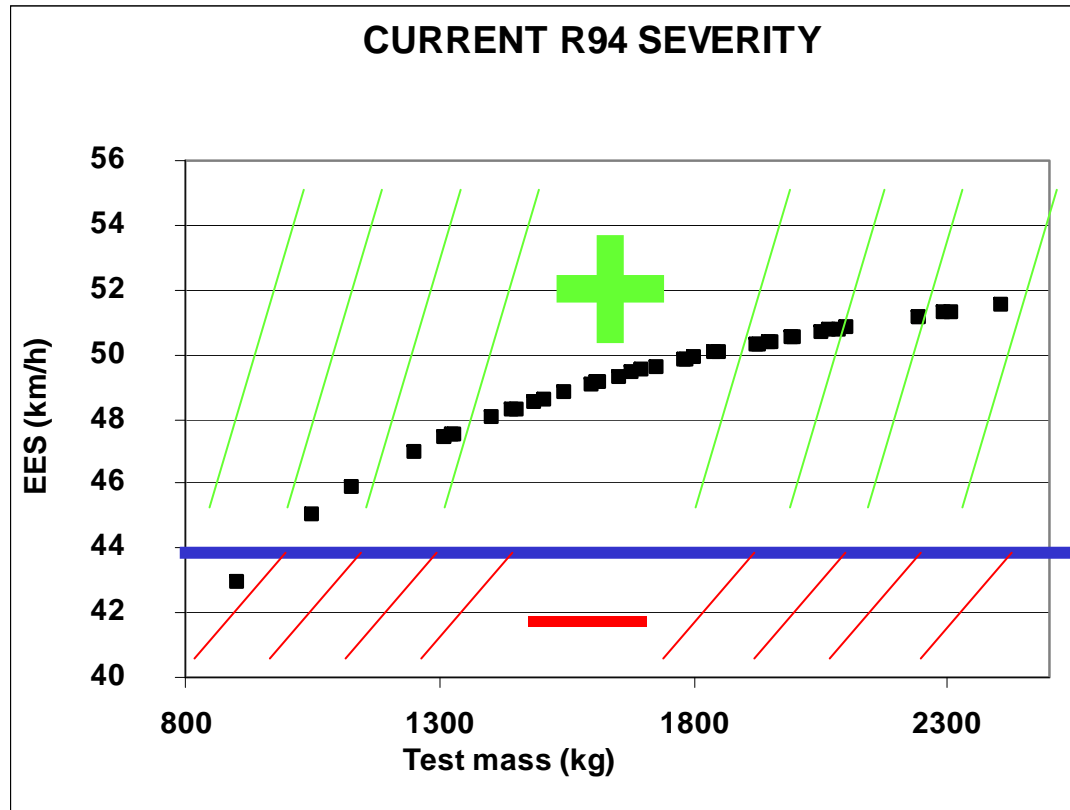
*Global quantities*

<b>Volume:</b>	141 l
<b>AHOD:</b>	410 mm
<b>Effort:</b>	413.2 kN
<b>Energy:</b>	68.4 kJ
<b>EES:</b>	49.9 km/t

**Deformation**

**3d view**

**PDB software is ready  
for calculating the  
SPAD**



**SPAD mini**

Limit could be fixed at 44 km/h, corresponding to current situation for a 1000 kg car.

	Tool	Criteria	Introduction
SELF PROTECTION ASSESSMENT	Vehicle	<ul style="list-style-type: none"><li>➤ Compartment intrusion</li><li>➤ Dummy criteria</li></ul>	Already done
	Barrier	<ul style="list-style-type: none"><li>➤ EES</li></ul>	Short term

This criteria would be a solution until the introduction of the full width test in the R94 regulation.

- SPAD criteria can be introduced to avoid possible use of the barrier side effect
- PDBSoftware is able to calculate SPAD
- SPAD criteria can be a possibility before introducing full width test in Europe
- SPAD limit is defined to avoid unexpected design, not to add a supplementary constraint in vehicle design.