GTR-HR

19-20-21 April 2006
London

Consideration of active HR

Needed consideration

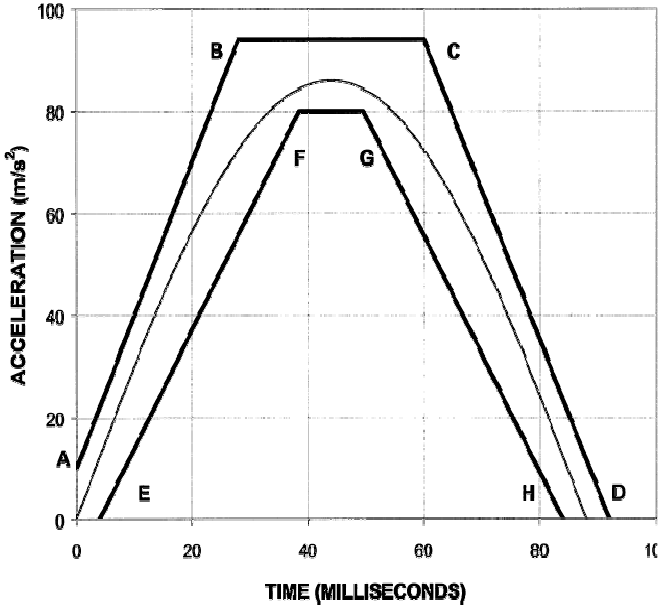
- Backset is the distance covered by the head during a rear impact before contacting the head restraint
- Backset should be measured when active system has been activated
- Anti-whiplash systems are motion of the HR or motion of the back of the dummy. They are reactive, active, using foam or structural deformations

Principles

- For active systems
  - Measurement of the backset after activation of the system. For non permanent system, need a camera to evaluate the displacement
- For reactive systems
  - Activation by applying load
    - Biofidelity of the backpan to apply the load ?
    - Angular deformation of the seatback difficult to manage
    - Inertia of the system is not considered
  - Dynamic tests to determine the cinematic backset

Dynamic tests done

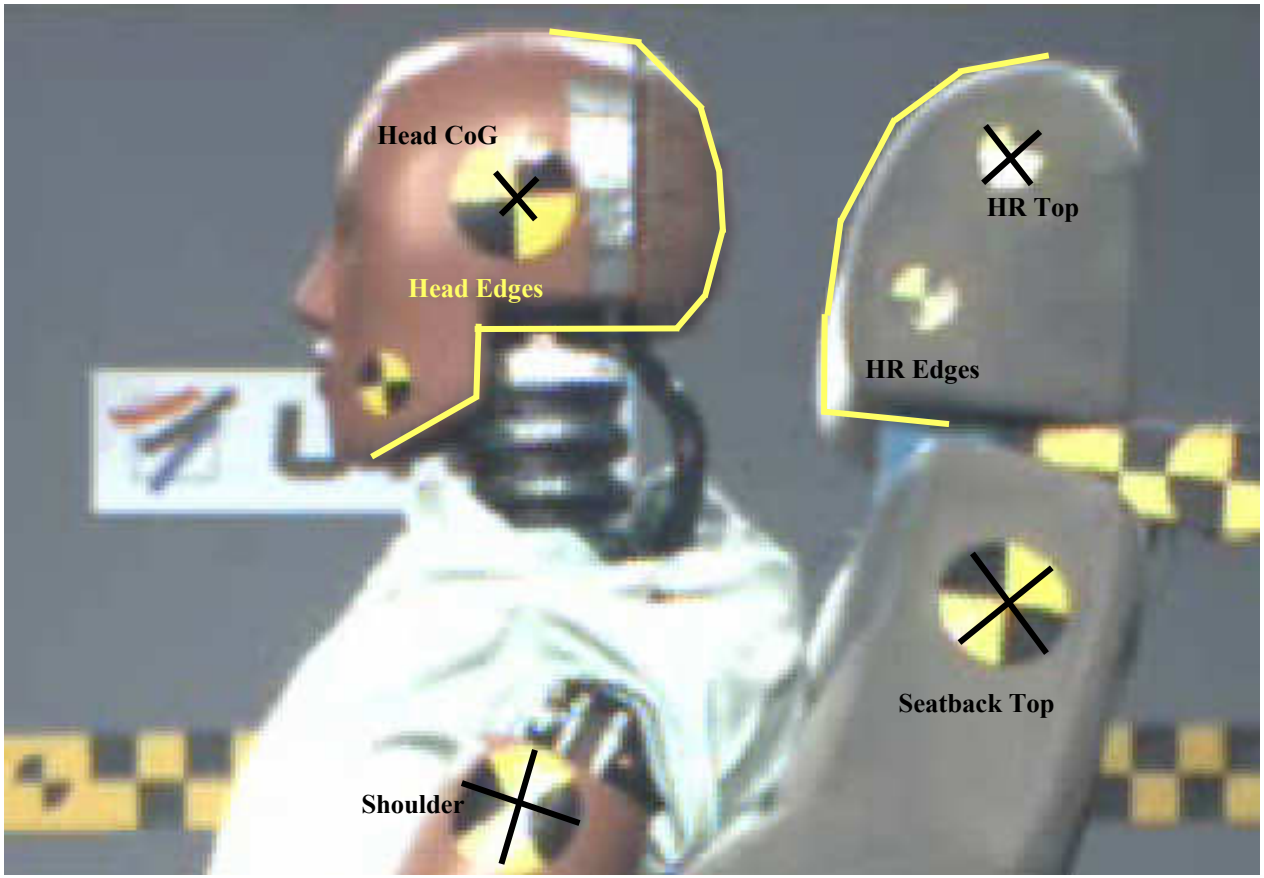
- Tests with H3 50% and BIORID
- FMVSS 202 Pulse
- Tests on 3 seats
  (2 reactives and 1 “passive”)
- Two seats on same shot



- 17.3 ± 0.6 km/h ΔV
- 86 m/s² (8.8 g) peak acceleration
- 88 ms duration

proposal

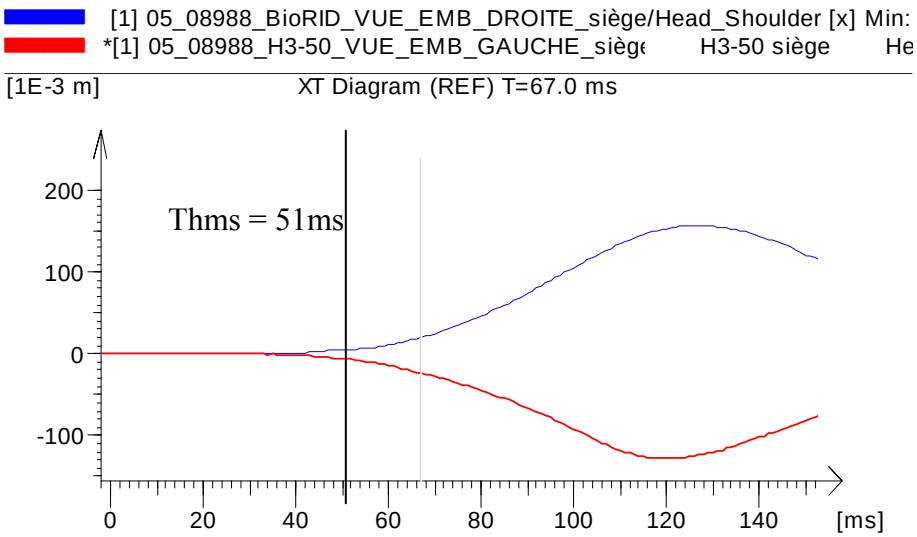
- Based on tracking

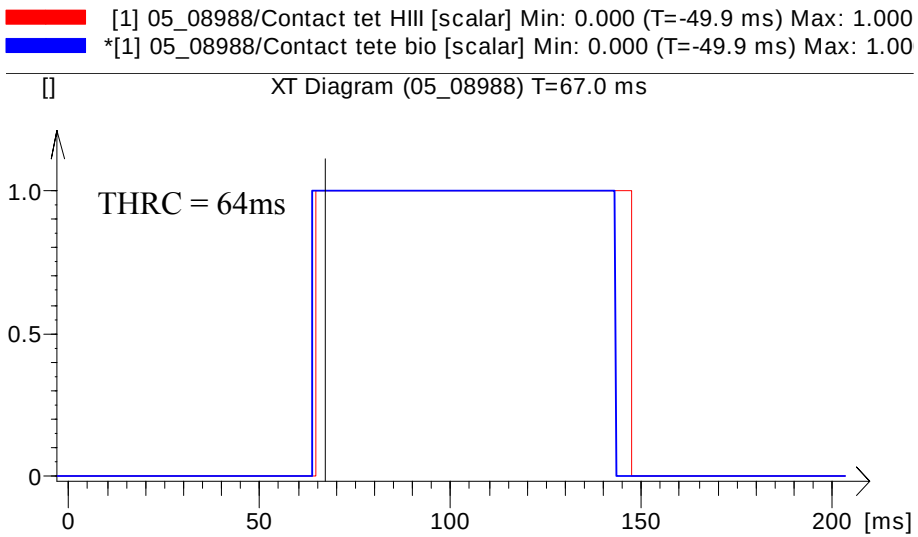


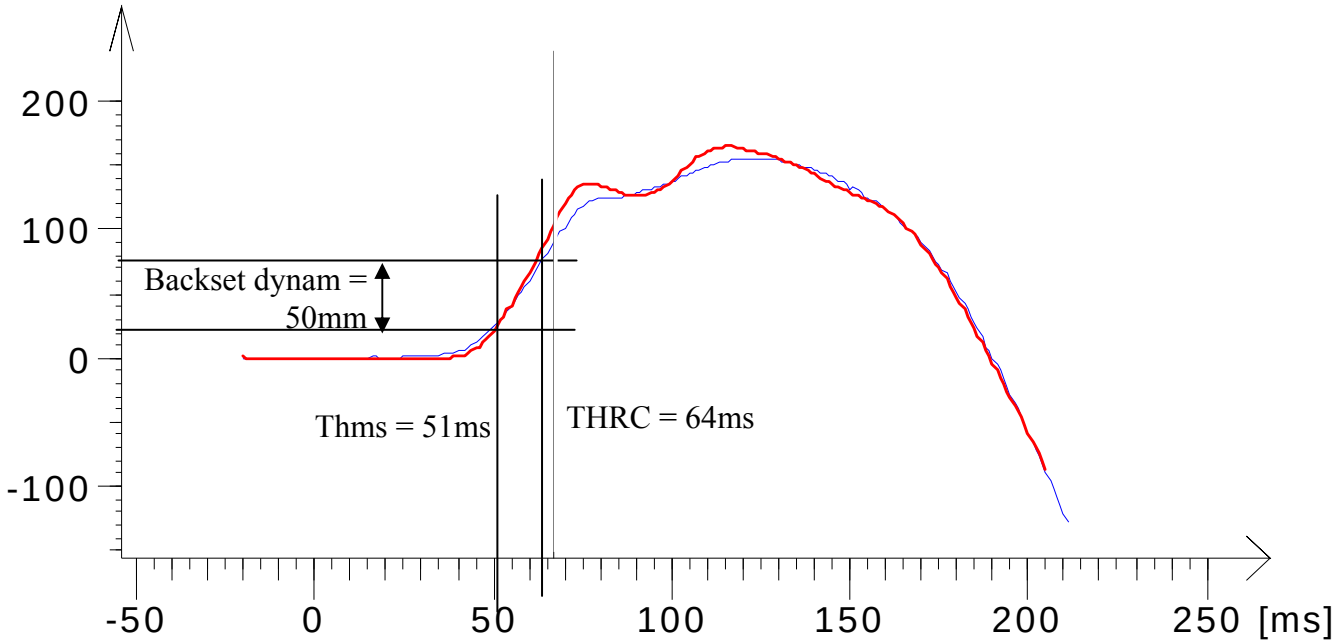
Values to measure

- Determine the Time of Head Motion relatively to the Shoulder (Thms). To consider only timing during which shearing of the neck occurred (considered to be dangerous) and to be incentive for foam deformation systems (toyota avensis) or structural one (whips)
- Determine the Time of contact of the Head with the Head Restraint (THRC)
- Measure the distance covered by the Head to the Head Restraint during that period.

Values to measure



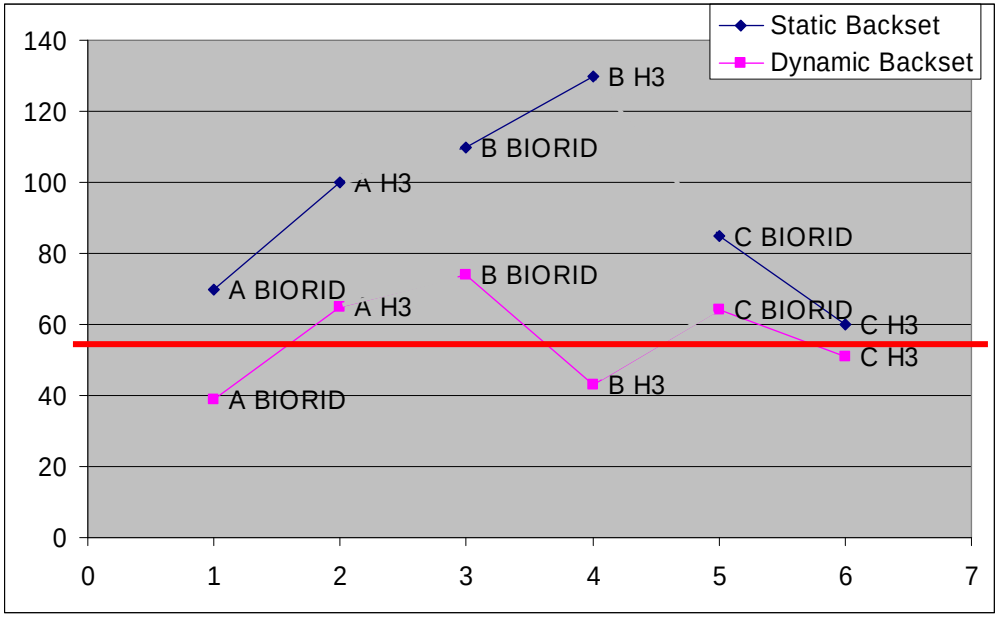




Timing analyses

	Dummy	Static Backset	Activation React HR	Thms	THRC	Dynamic Backset	HIC
Seat A	BIORID	70 mm	50 ms	53 ms	64 ms	39 mm	67
	H3	100 mm	50 ms	51 ms	65 ms	65 mm	48
Seat B	BIORID	110 mm	45 ms	55 ms	75 ms	74 mm	114
	H3	130 mm	30 ms	61 ms	68 ms	43 mm	61
Seat C	BIORID	85 mm	NA	55 ms	87 ms	64 mm	117
	H3	60 mm	NA	47 ms	63 ms	51 mm	58

- Dynamic backset always lower than static one
- On seat B H3 actuate really efficiently
- No rule for tendency. Different technologies tested



Conclusions

- Dynamic backset is coherent with technical solution used.
- Positioning of H3 is not define and should be if it has to be use (explanation of the behavior on seat B)
- Need to validate accuracy of the method
- Non-permanent shape system not considered