

SAE Government Industry Meeting | January 25-27, 2017

Evaluation of OMDB Honeycomb Barrier Size Reduction



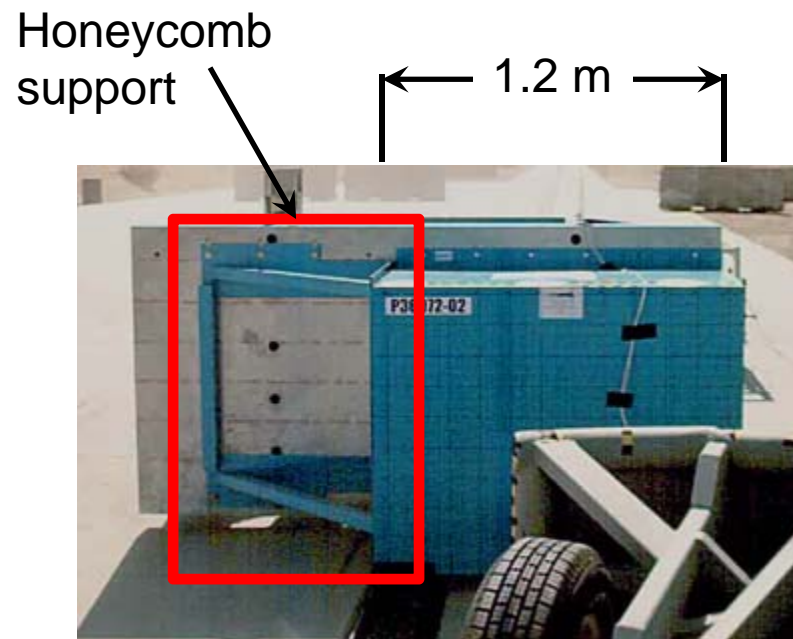
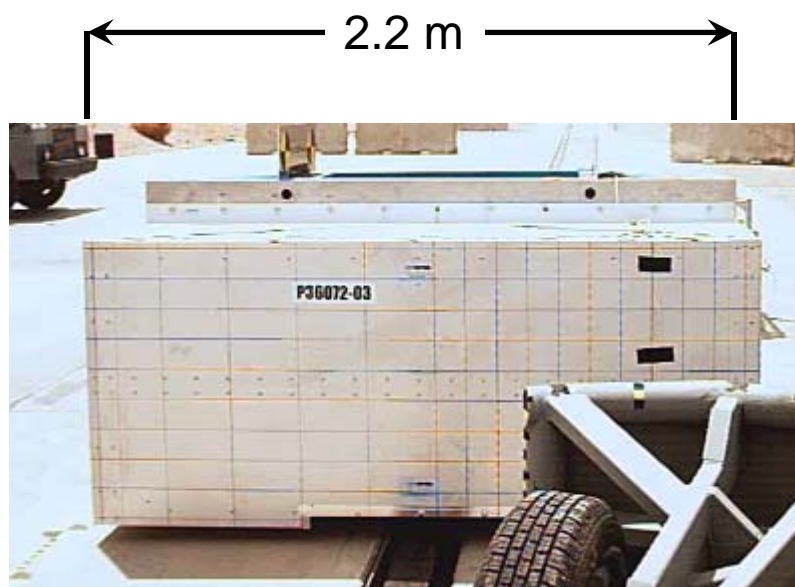
NHTSA
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION



Objective

- Determine if the full honeycomb face used in the Offset Deformable Barrier Test Procedure can be replaced with a smaller version of the honeycomb

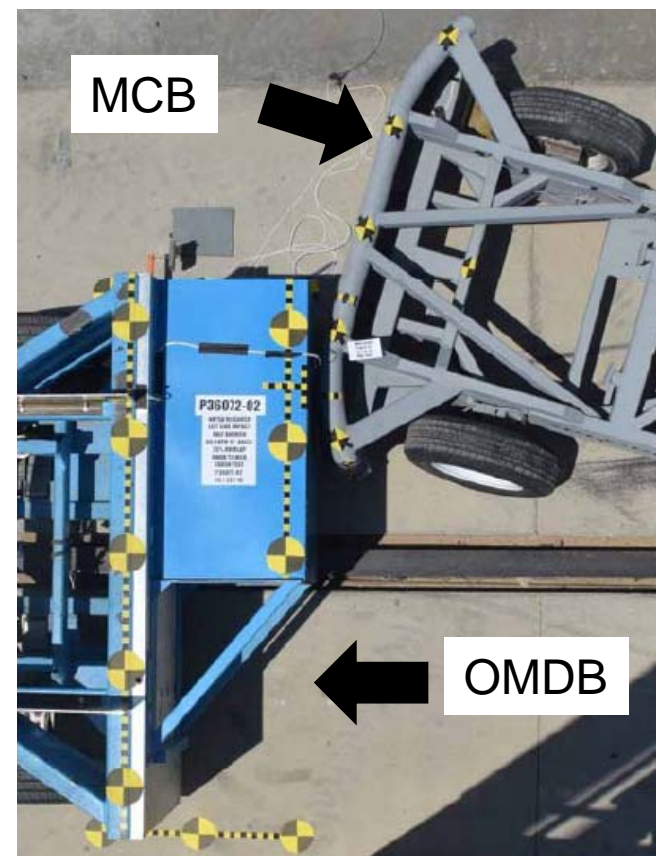
Half Honeycomb Barrier



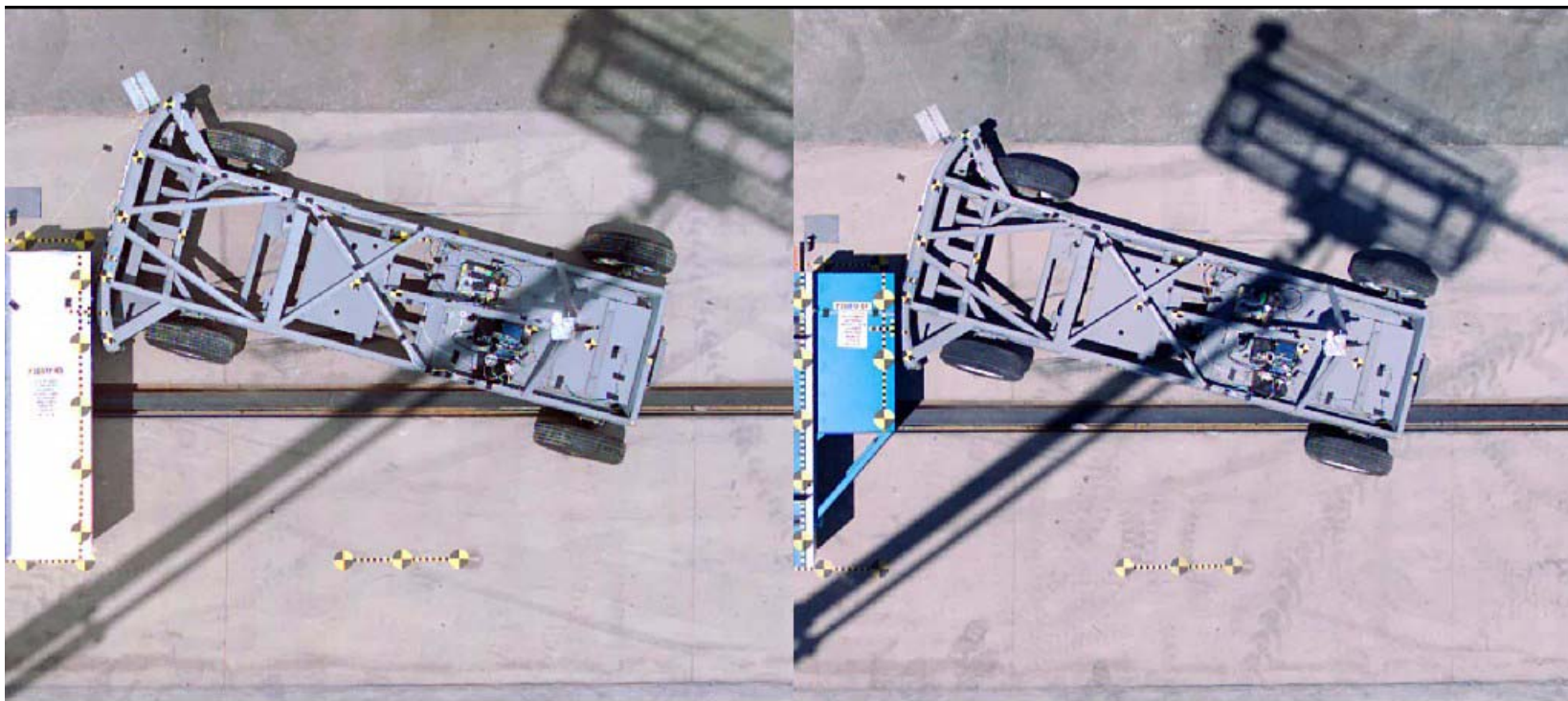
- To make manufacturing easier the honeycomb was not reduced by 50% exactly

Test Procedure

- The OMDB test procedure was followed with the following exceptions
 - Vehicle is replaced with the FMVSS No. 301 Moving Contoured Barrier (MCB)
 - OMDB impact speed 60 kph
 - Three axis accelerometer triad installed at the vehicle's CG and on the left side frame rail for both the OMDB and MCB



Video





Methodology

$$\text{coefficient of variation (CV)} = \frac{\text{standard deviation}}{\text{mean}}$$

- Used $CV \leq 10\%$ to determine if the response is repeatable
- Velocity is calculated
 - filtering X and Y
 - Resultant of X and Y
 - Integrate resultant to get velocity

D. Rhule, H. Rhule and B. Donnelly, "The Process of Evaluation and Documentation of Crash Test Dummies for Part 572 of the Code of Federal Regulations," *The 19th International Technical Conference of the Enhanced Safety of Vehicles (ESV)*, 2005



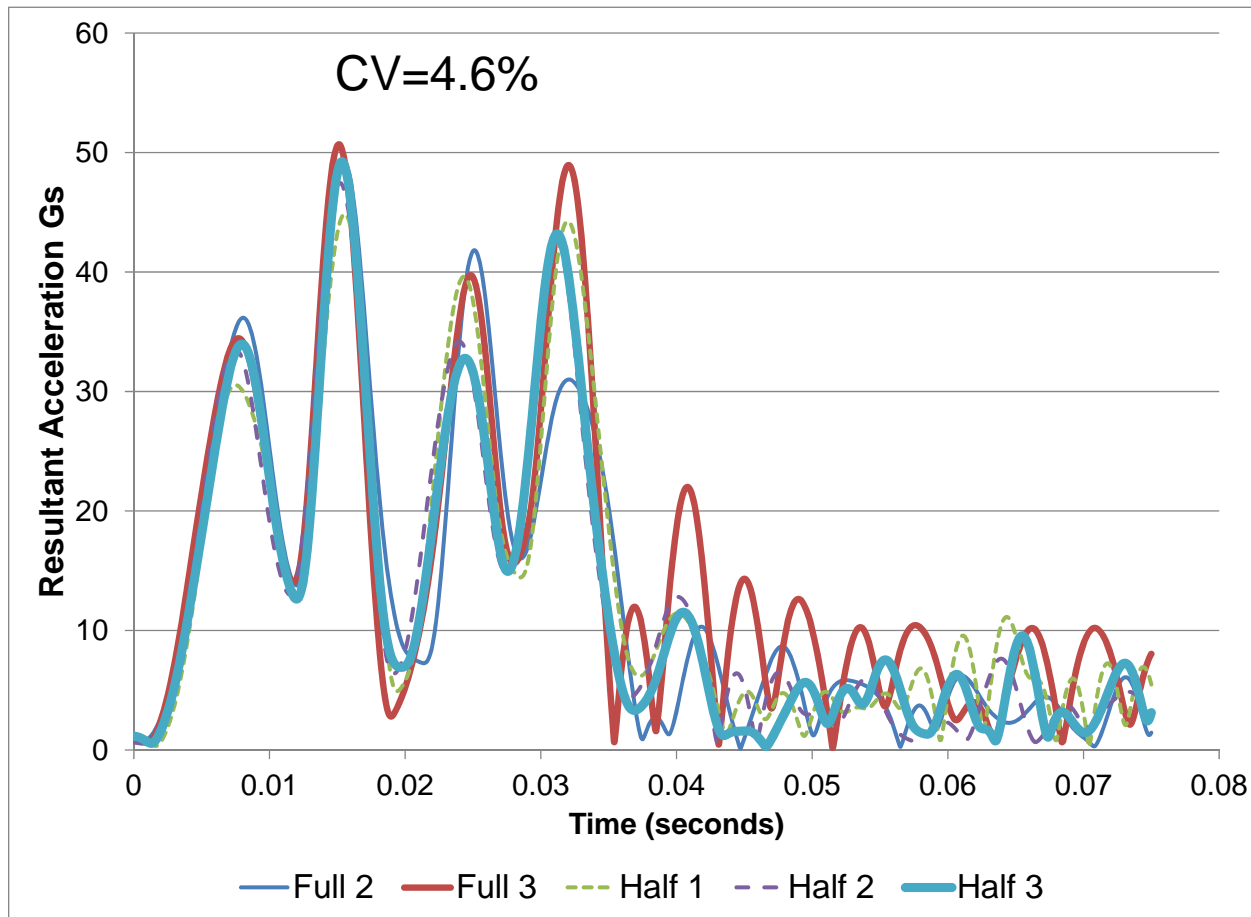
Test Matrix

Barrier Type	NHTSA Test Number	Name
Full	9795 *	Full 1
	9797	Full 2
	9799	Full 3
Half	9796	Half 1
	9798	Half 2
	9800	Half 3

* 301 MCB was damaged, test not used for analysis

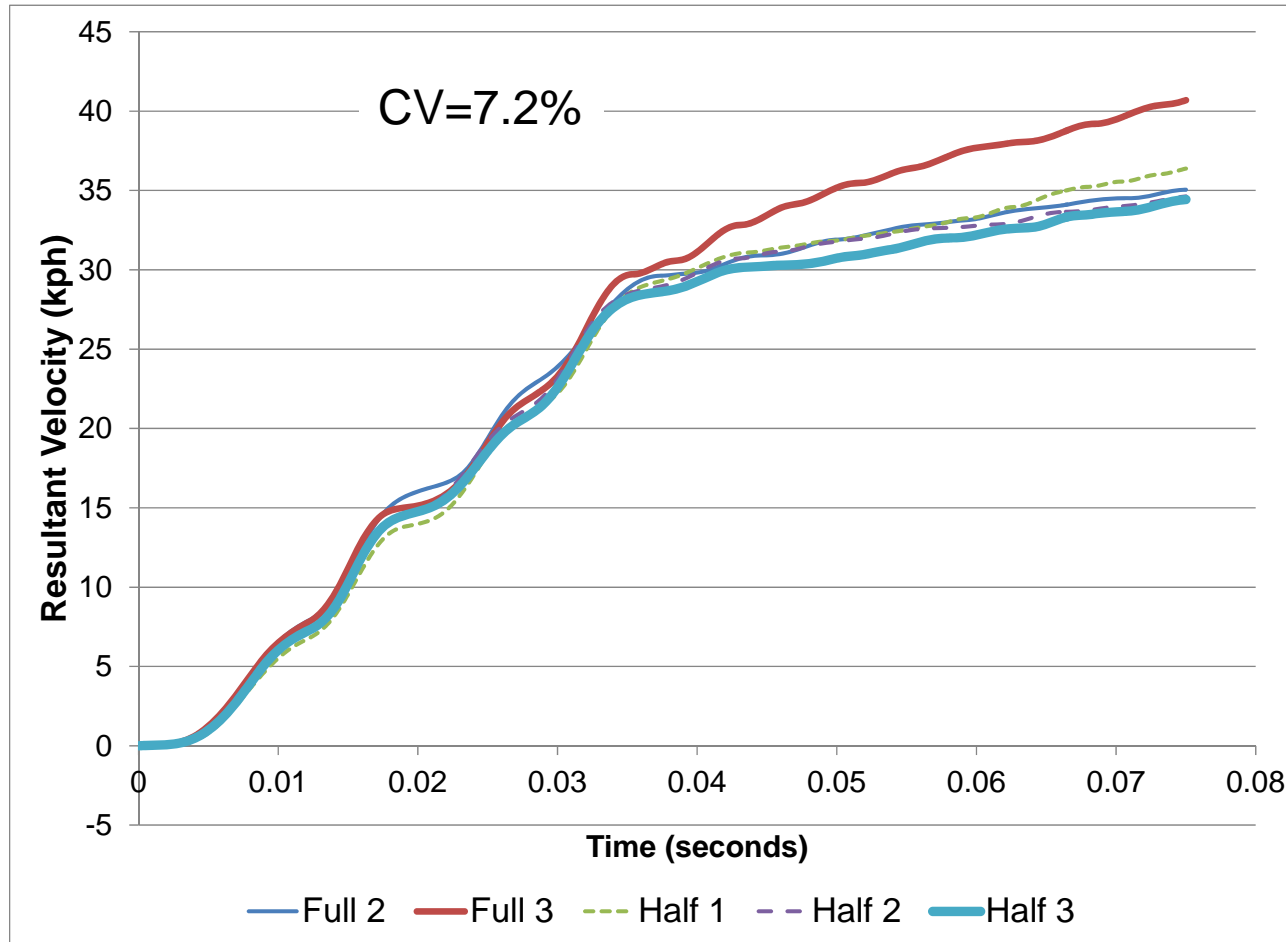


OMDB CG Resultant Acceleration



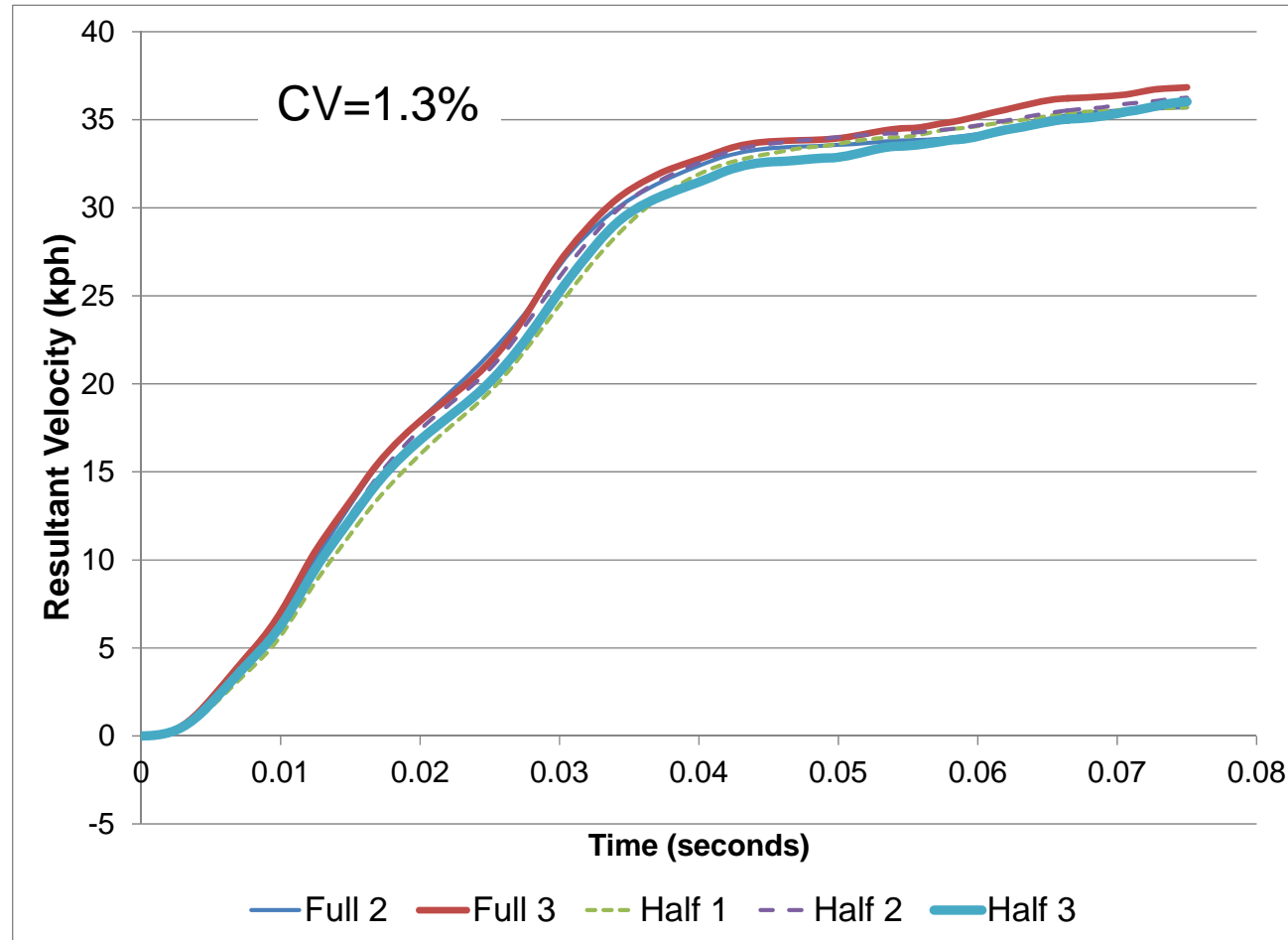


OMDB CG Resultant Velocity



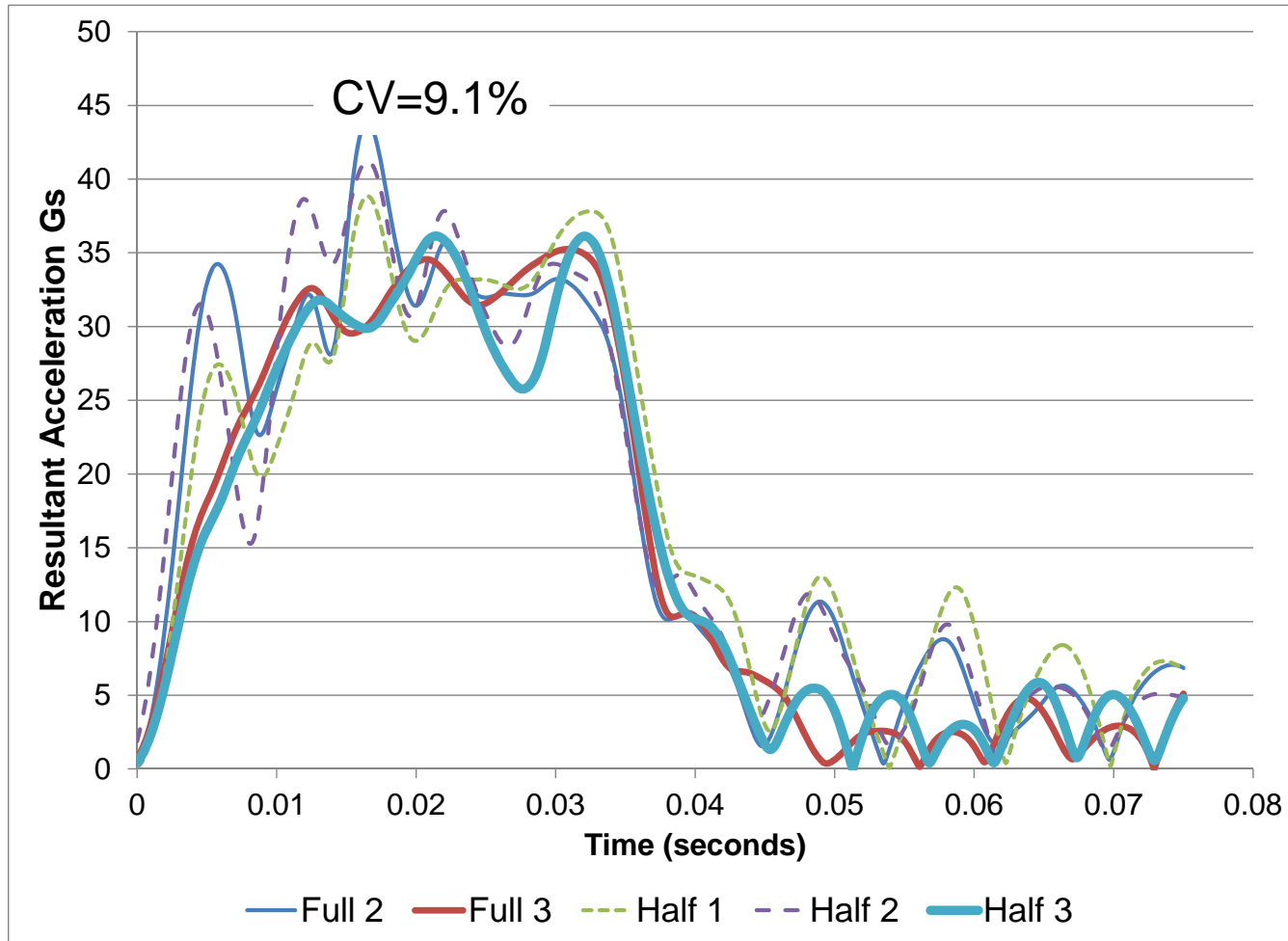


OMDB Left Side Resultant Velocity



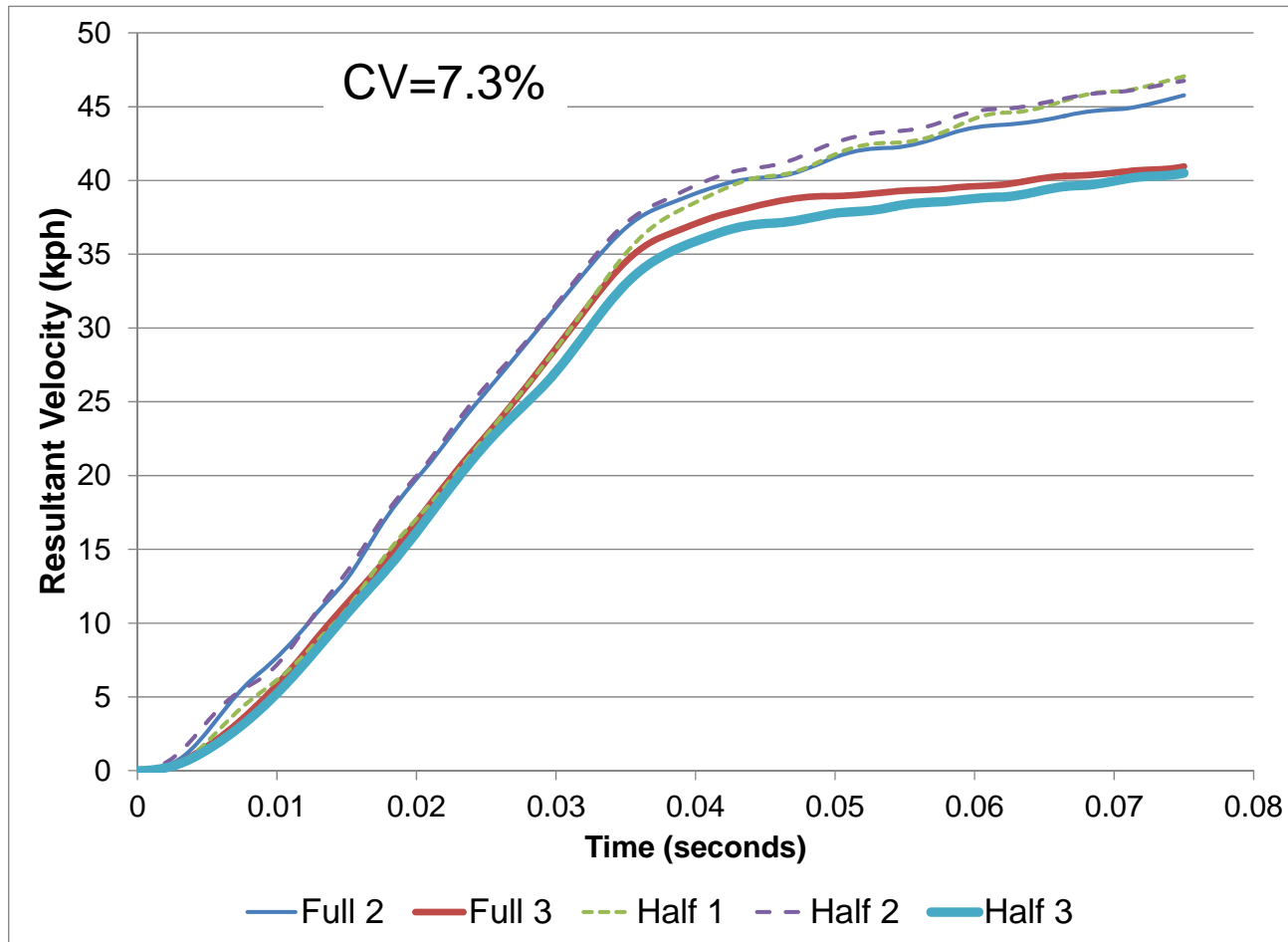


MCB CG Resultant Acceleration



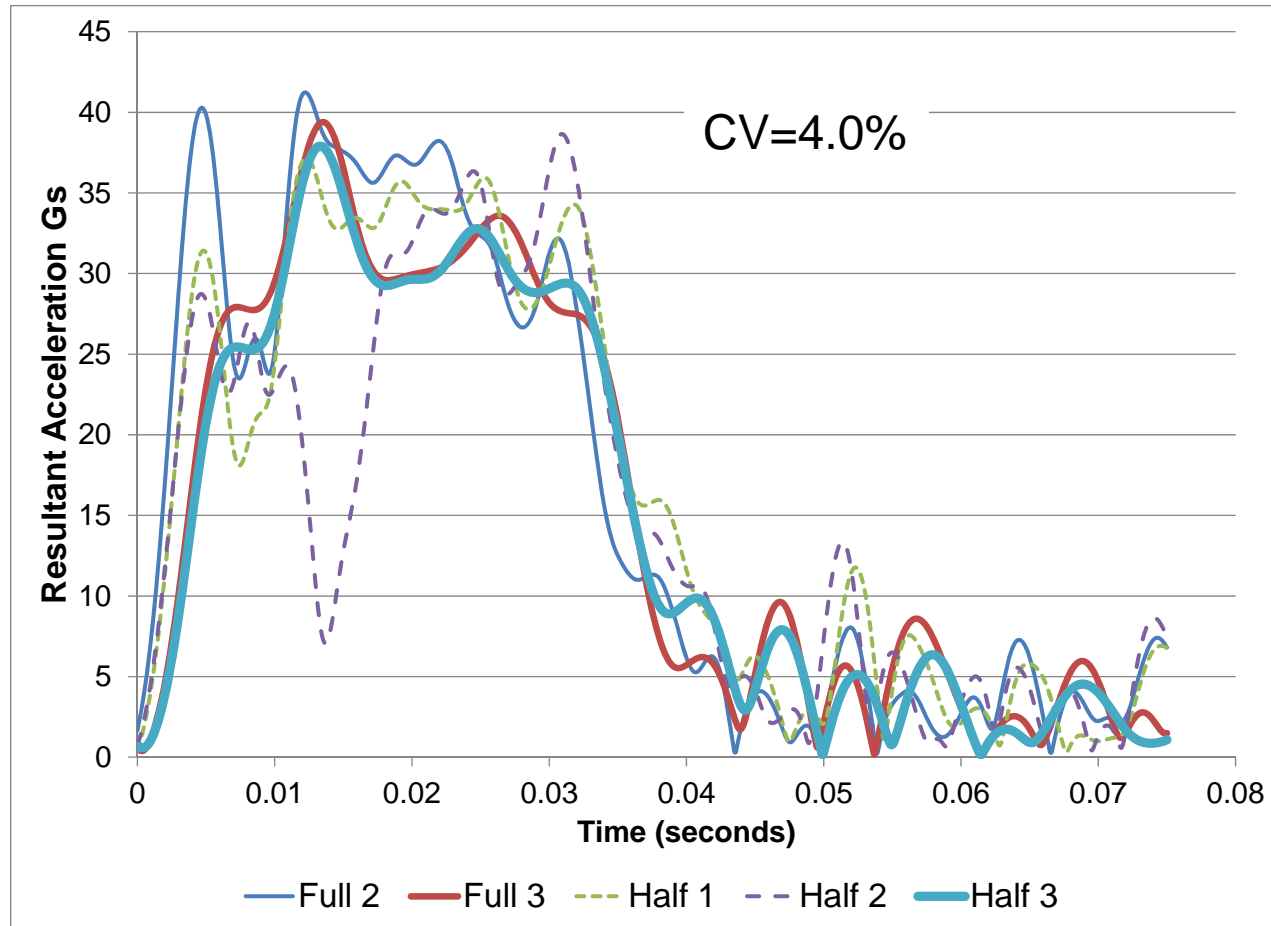


MCB CG Resultant Velocity



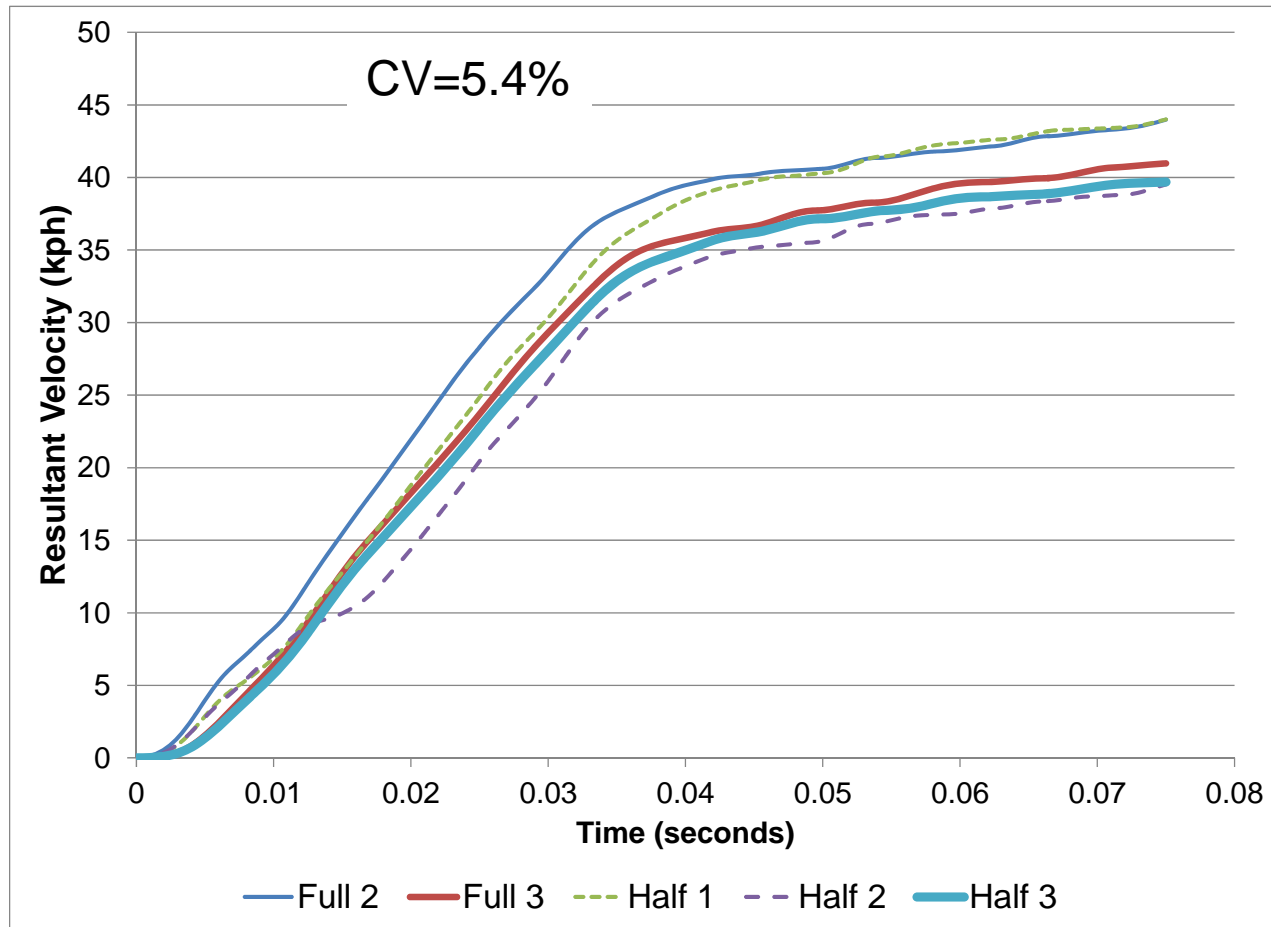


MCB Left Side Resultant Acceleration



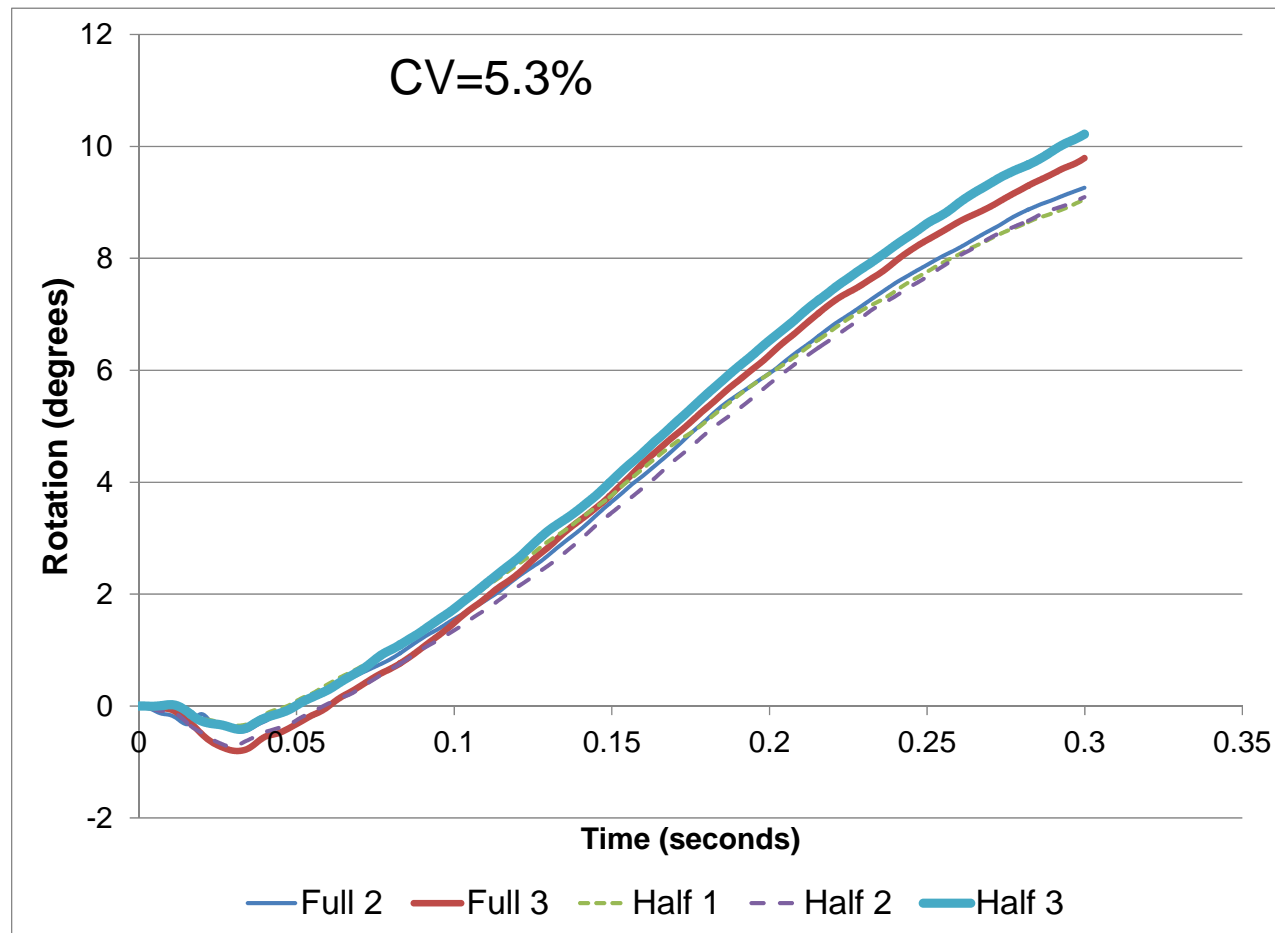


MCB Left Side Resultant Velocity



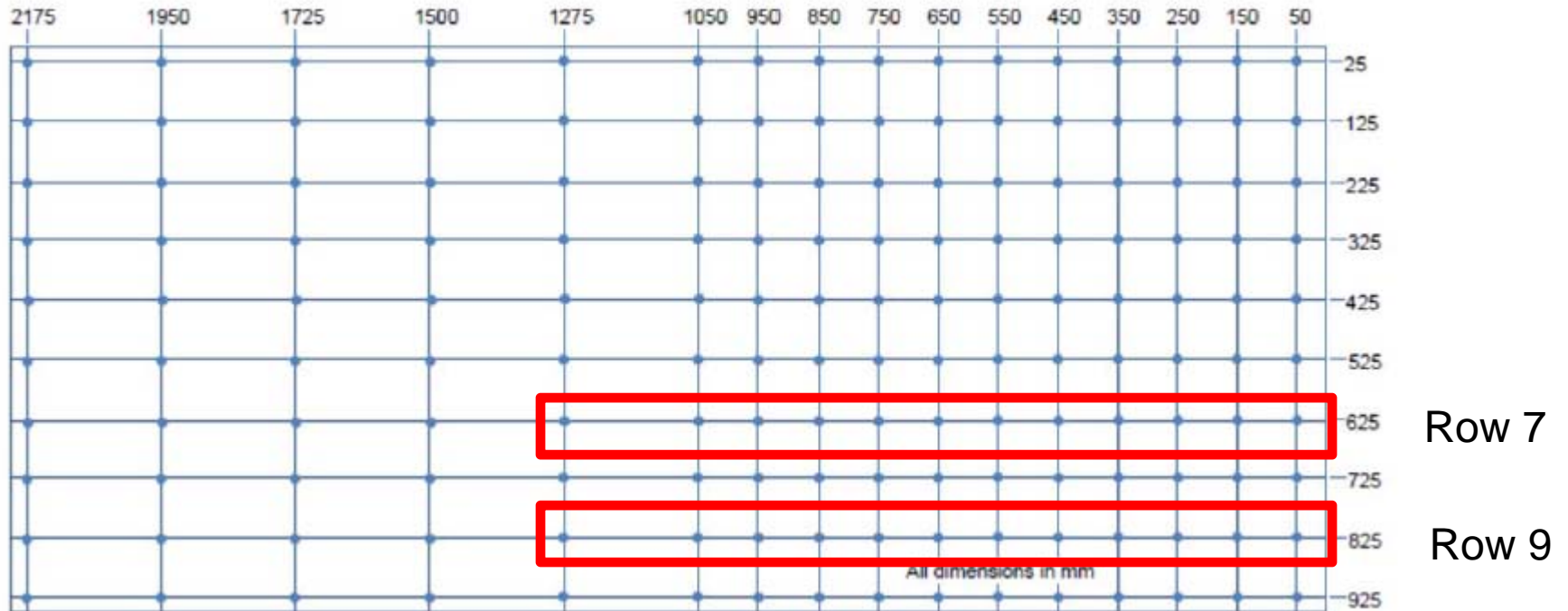


MCB Rotation About the Z-axis



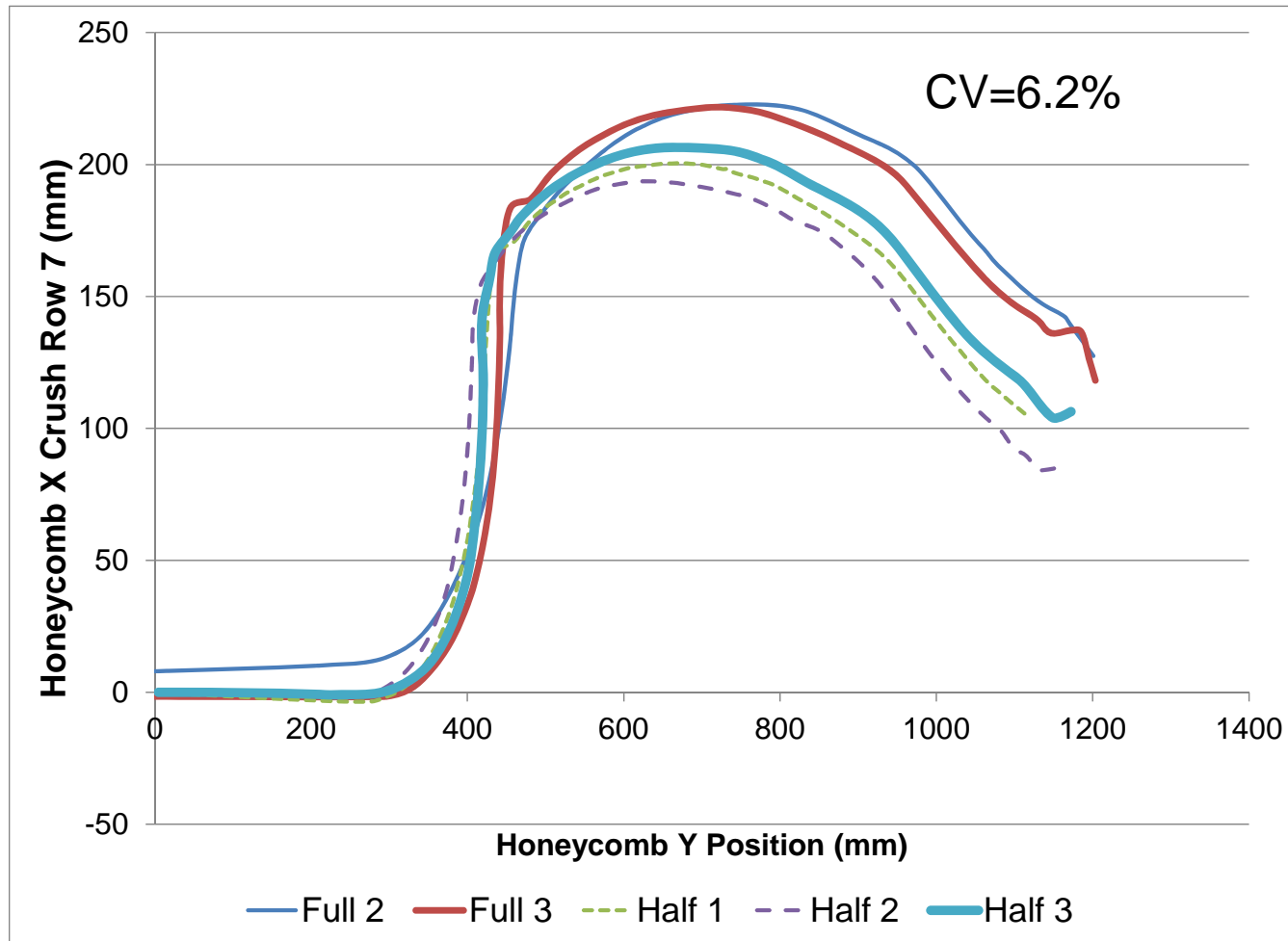


Honeycomb Crush Measurements



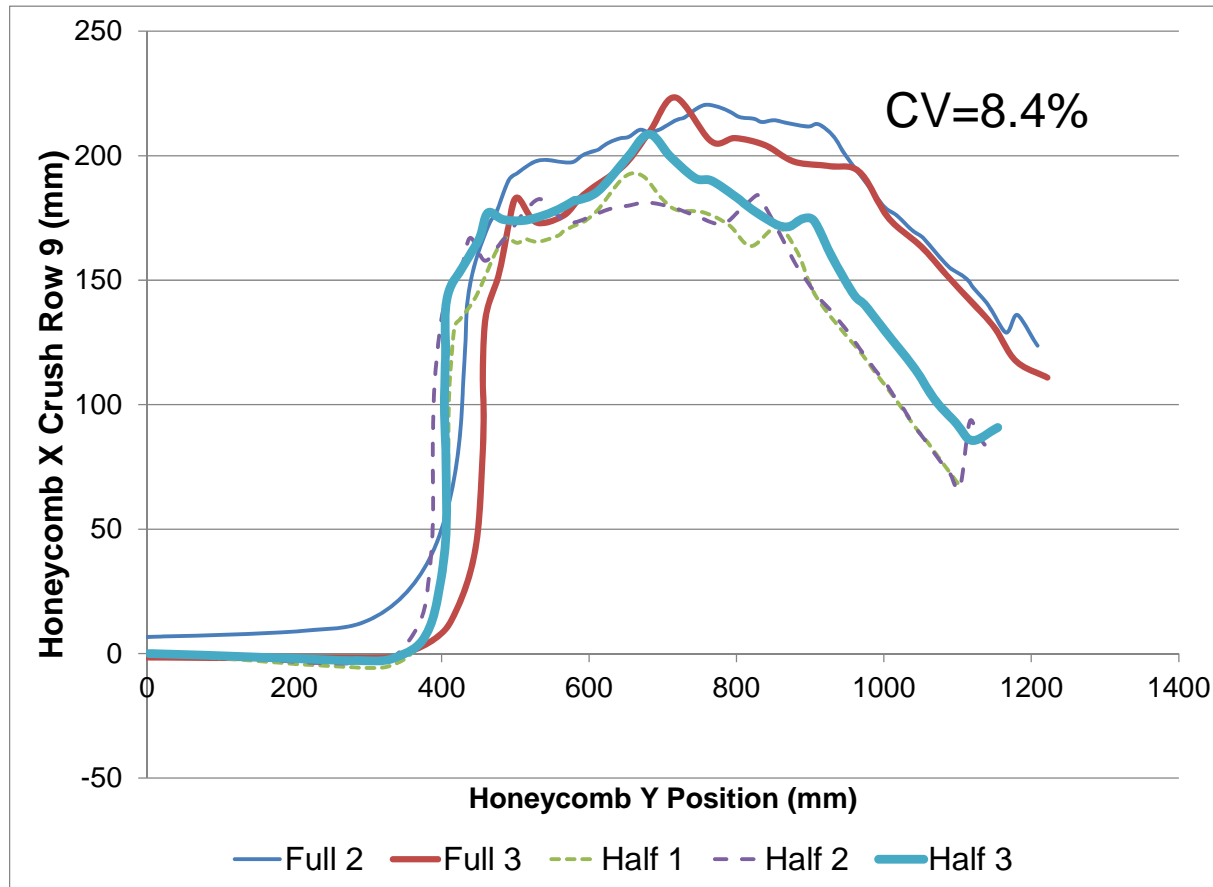


Honeycomb Crush Row 7





Honeycomb Crush Row 9





Summary

- Half barrier results are acceptable to the full barrier
 - OMDB and MCB CV's are below 10%
- Need further research
 - Compare vehicle and THOR results in full vehicle test