PROGRESS ON PHYSICAL TESTING METHOD
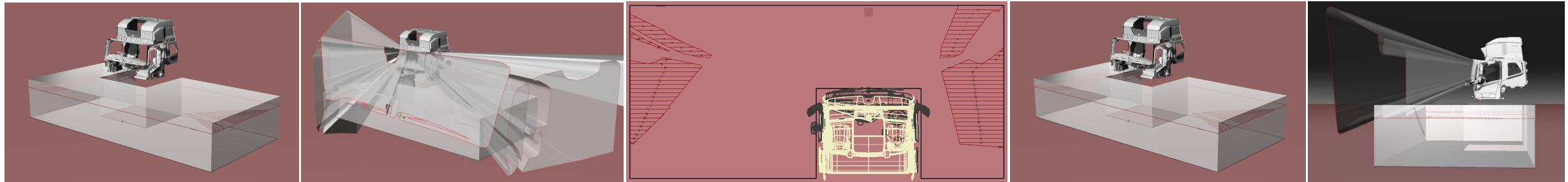
DR STEVE SUMMERSKILL, DR RUSSELL MARSHALL, DR ABBY PATERSON, ANTHONY ELAND

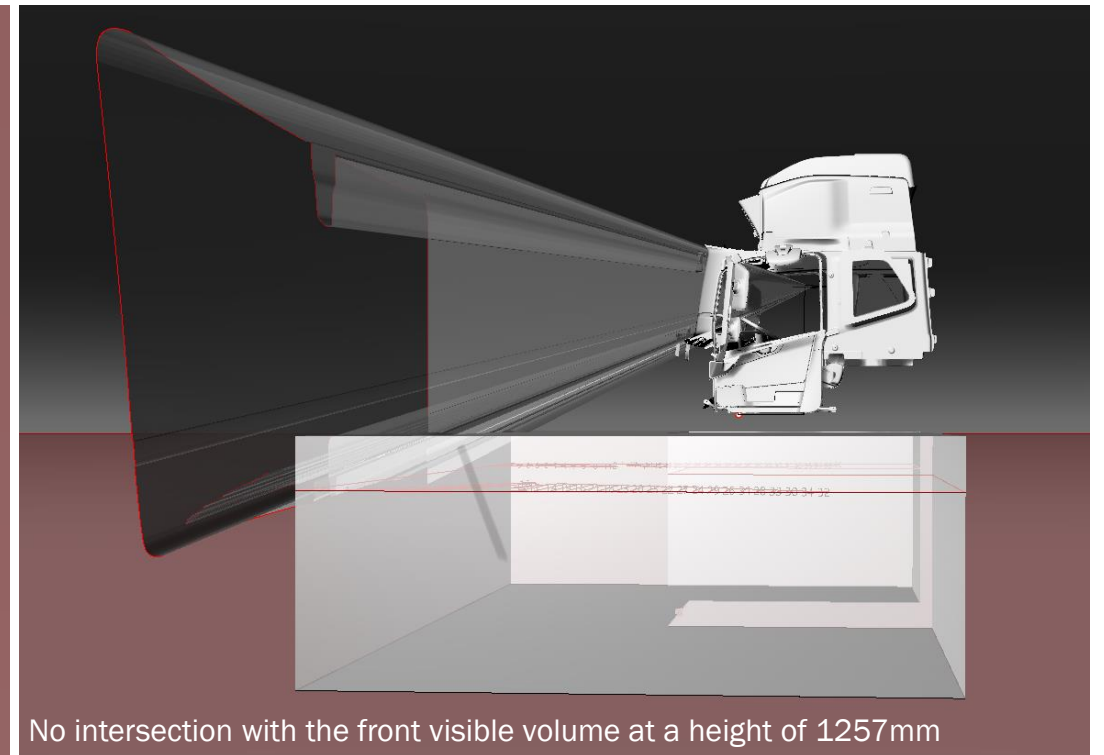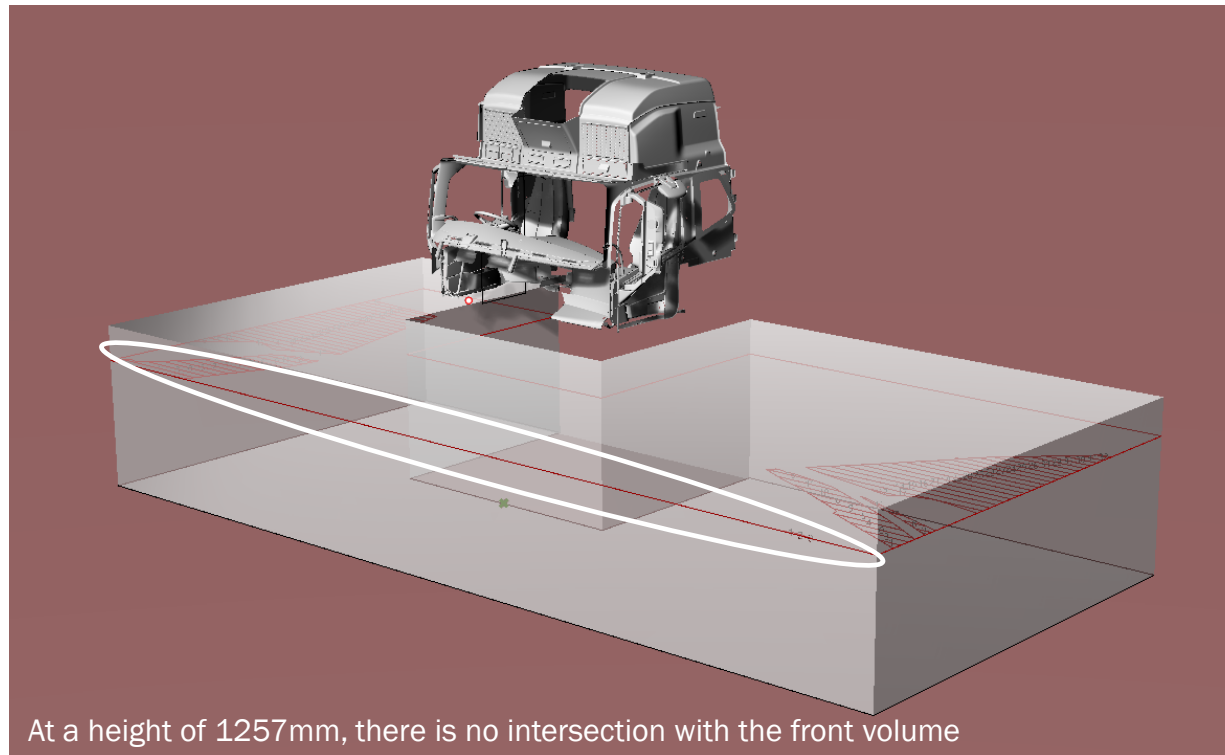Loughborough University

REMINDER OF WHERE WE ARE

- In effect the physical testing method takes a section through the part of the assessment volume that is visible to the driver

- The images show the assessment volume around the truck (1), the volume visible to the driver through the windows being intersected with the assessment volume volume (2)

- And the result for the original physical testing method (simulated which we create in the real world using a grid), a visual marker and camera mounted on a rig in the cab (3)

Version 1 of the physical testing method takes 1 section through volume
Of space visible to the driver

(1)

(2)

(3)

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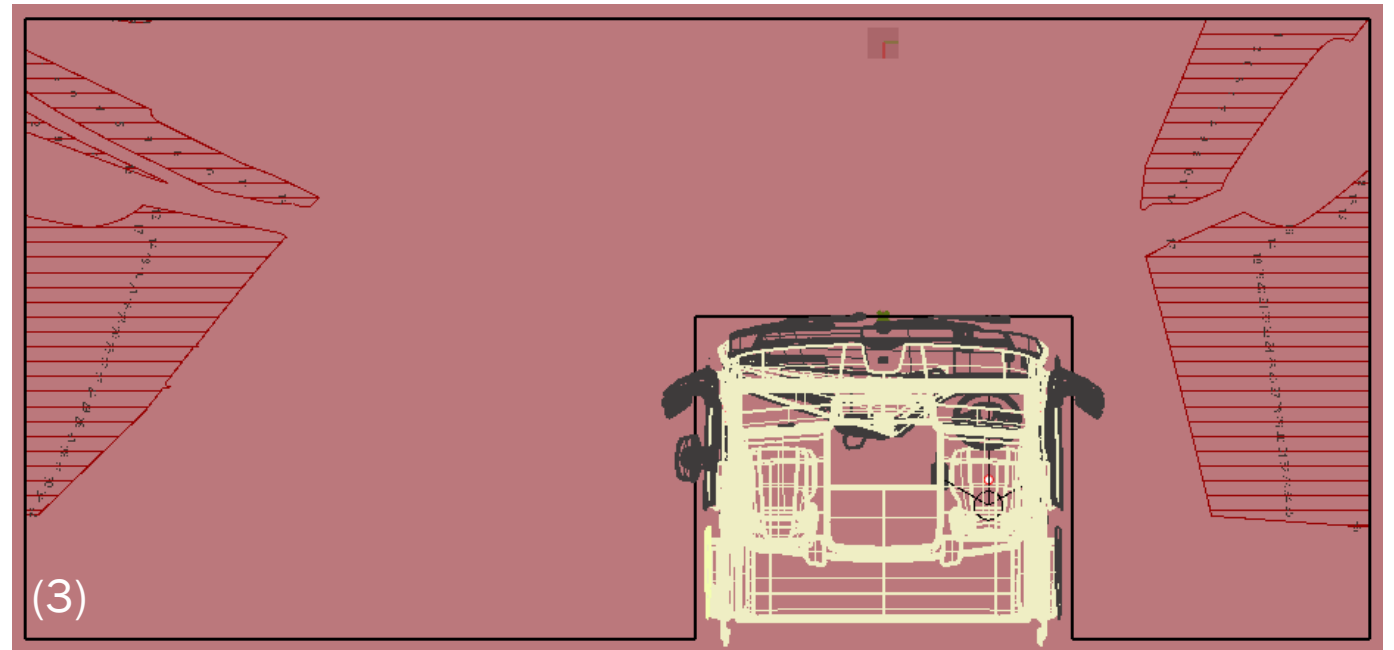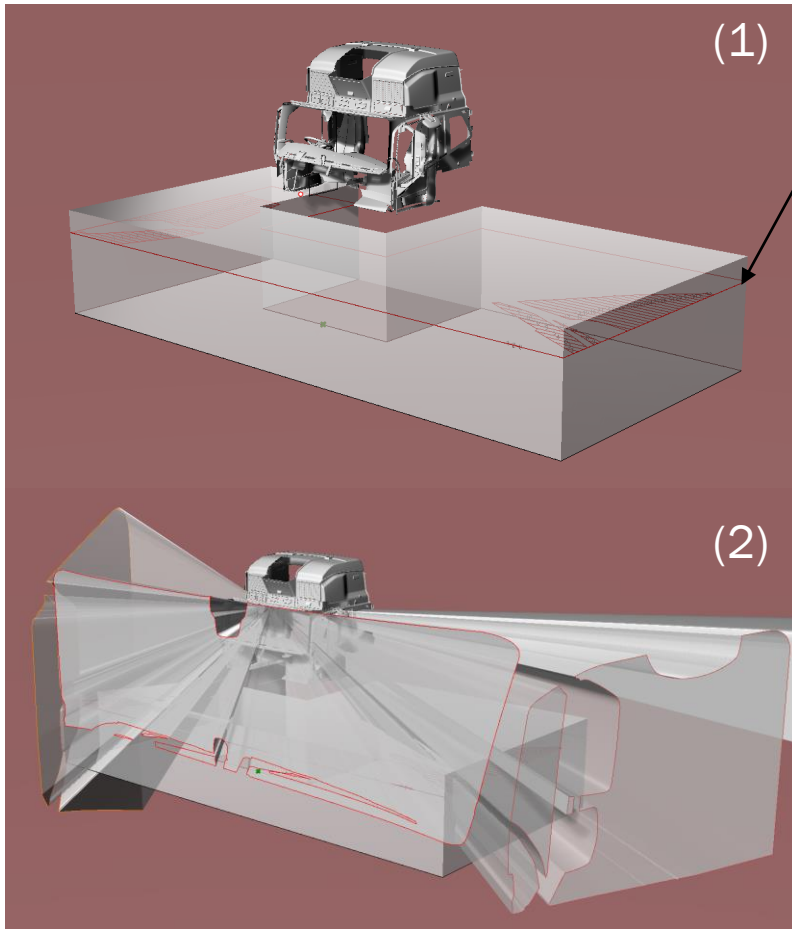
REMINDER OF WHERE WE ARE

- With the original method for the physical test we took the height of the section of the volume of the assessment that is visible to the driver at a height 1257mm, which relates to the VRU testing height where the head can be seen

- However when we take the assessment volume at this height it undercounts performance for the tallest vehicles as there is no intersection between the assessment volume and the visible volume at this height

At a height of 1257mm, there is no intersection with the front volume

No intersection with the front visible volume at a height of 1257mm

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REMINDER OF WHERE WE ARE

- When we changed the height of the physical test to 1600mm this allows the ALL of the frontal performance to be captured for the taller vehicles, but it became clear that this disadvantages the best performing lower vehicles

- So we then agreed that multiple sections are required to allow the physical test to fully represent the volumetric score for all vehicle types
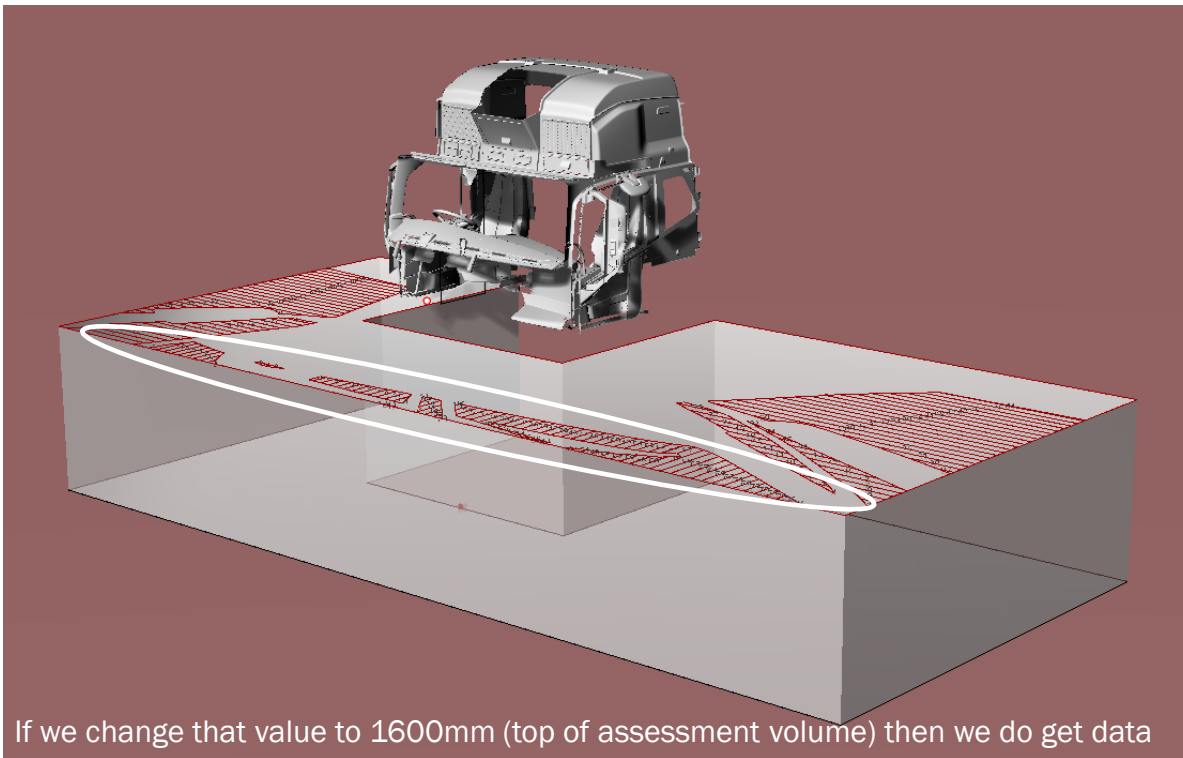
If we change that value to 1600mm (top of assessment volume) then we do get data

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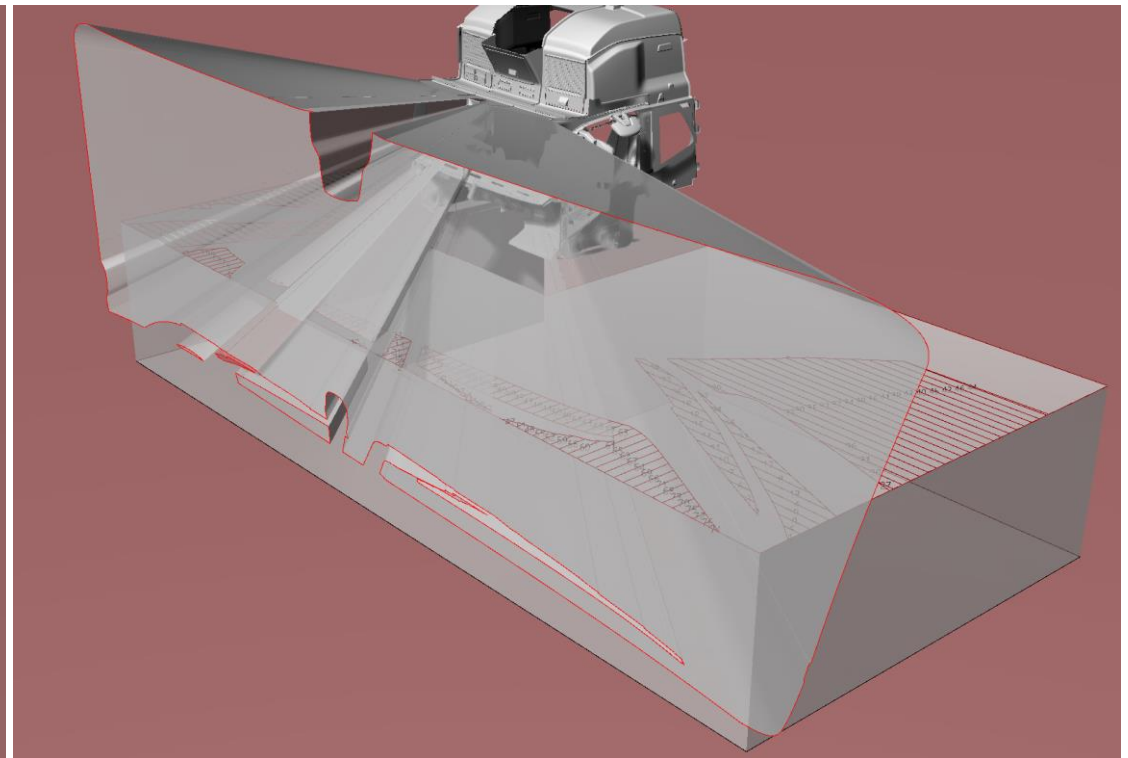
REMINDER OF WHERE WE ARE
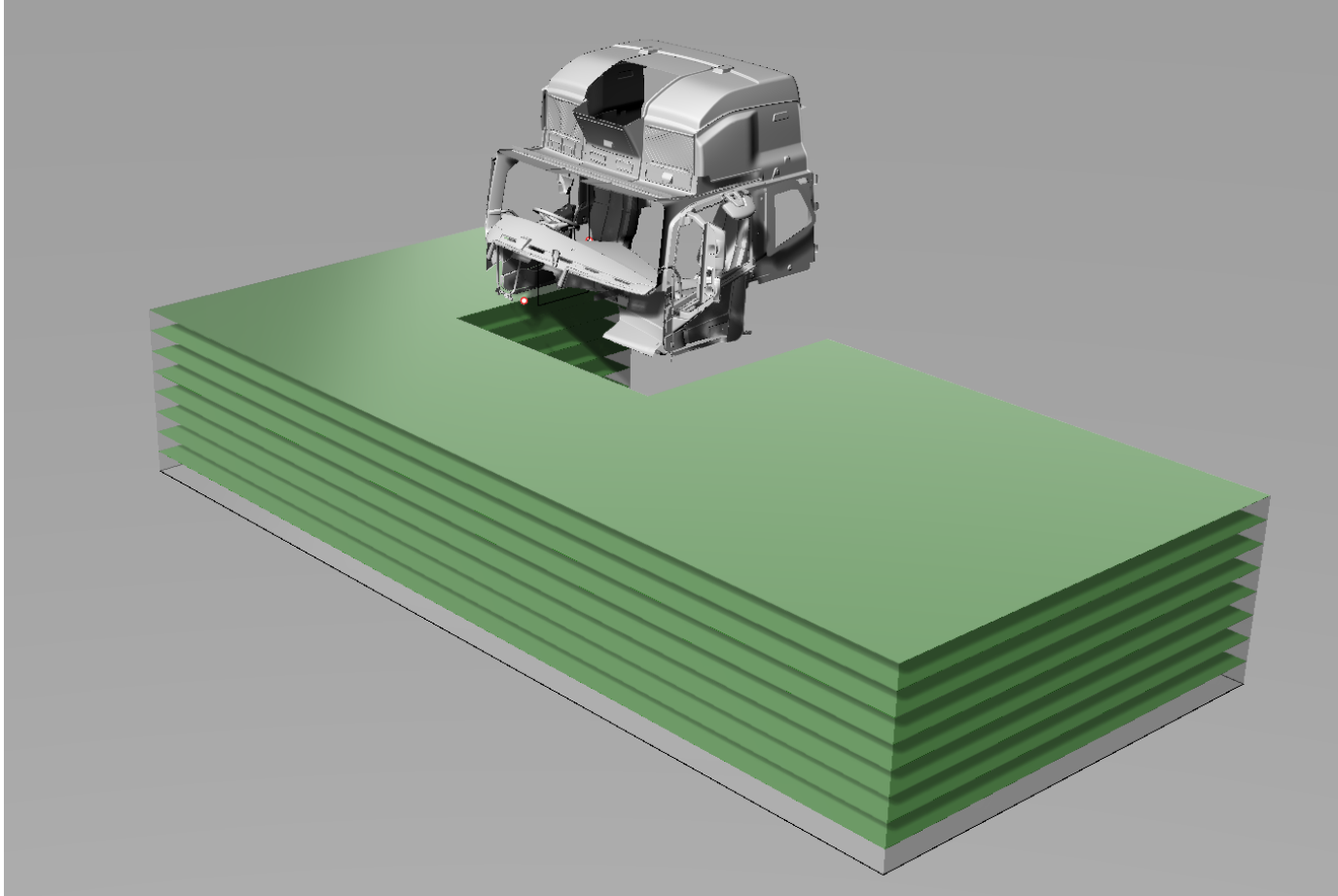
- Taking eight sections at different heights produces the most accurate results

- We then tested the correlation between the volumetric score, and the simulated physical test using 8 slices, 5 slices, 4 slices, and 3 slices

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SO, THE QUESTION IS, HOW MANY SLICES THROUGH THE VOLUME DO WE NEED TO TAKE TO GET A RESULT THAT CORRELATES VERY WELL WITH THE VOLUMETRIC TEST?

HOW MANY SLICES IS ENOUGH?
COMBINED DATA TO ALL SIDES

- Here we see the correlation between the volumetric score (X-Axis) and the simulation of the results for physical testing in CAD when using 8 slices, 5 slices, 4 slices and 3 slices

- We can see that 8 slices produces the best correlation and the least deviation for the trend line. Deviation increase as we reduce the number of sections (or slices)
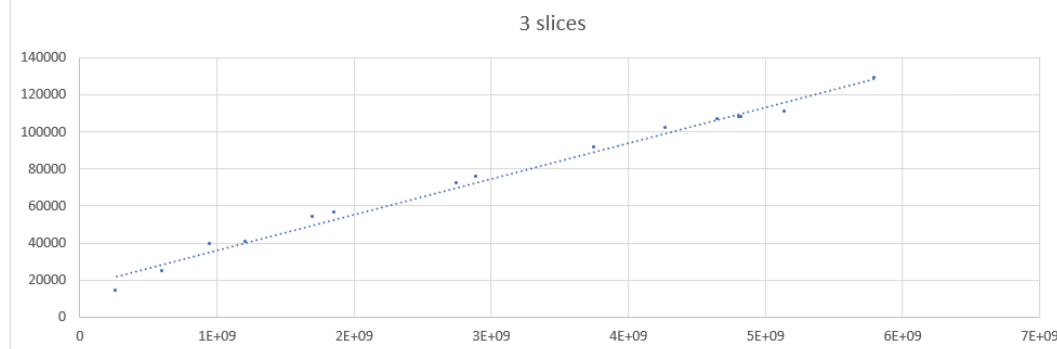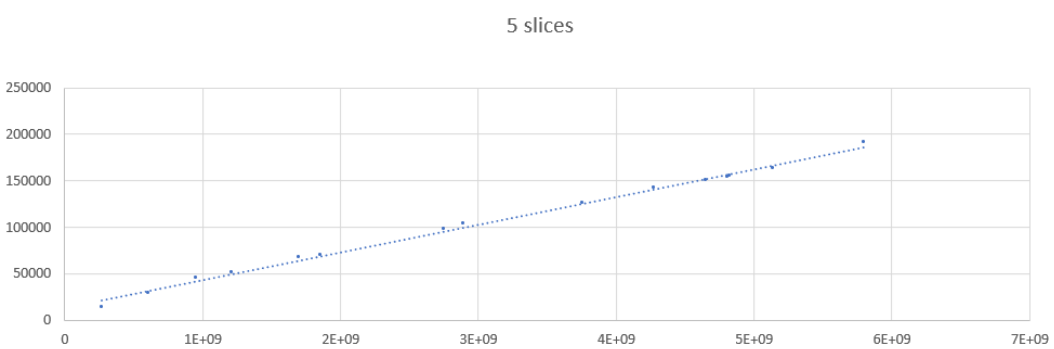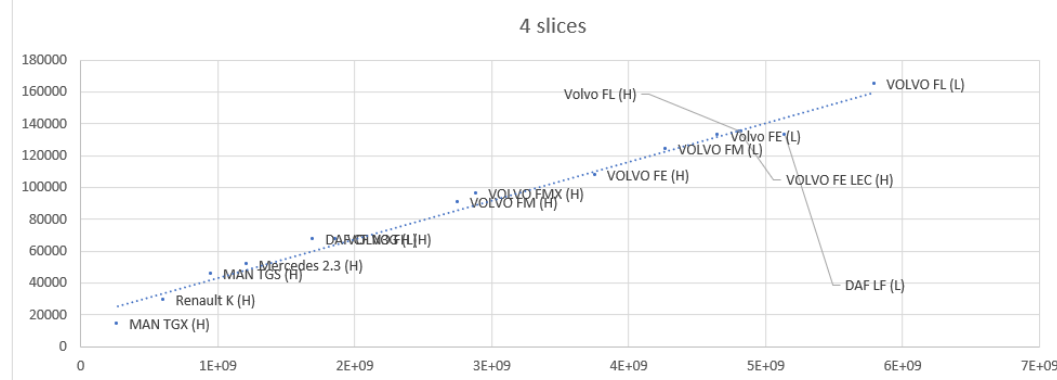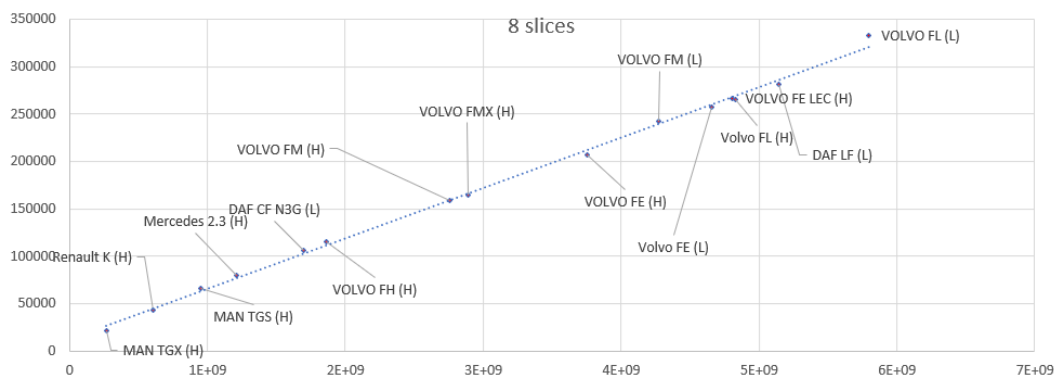
- These data are for all sides combined

Correlation values
1 is perfect
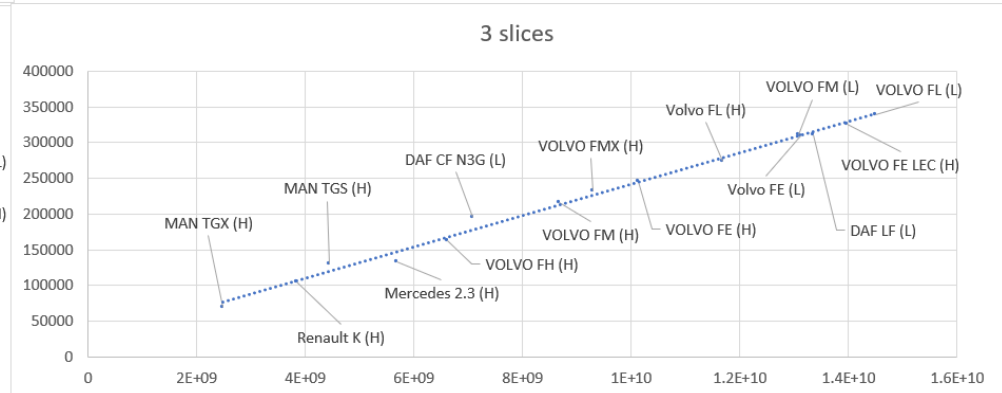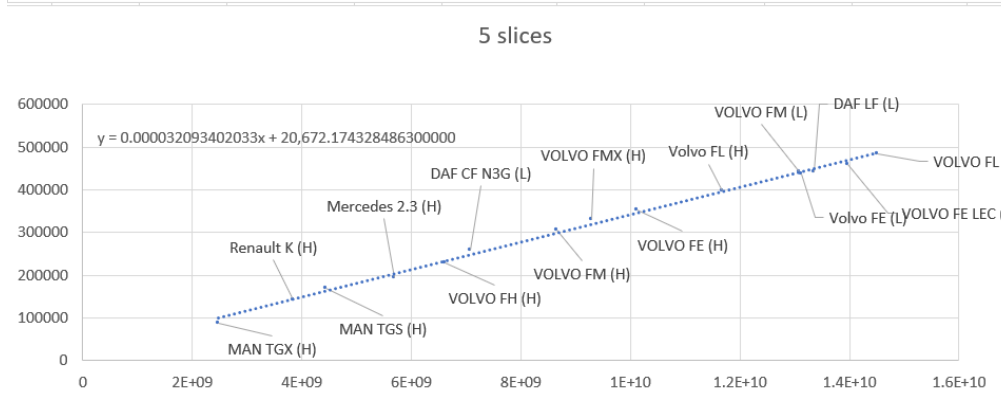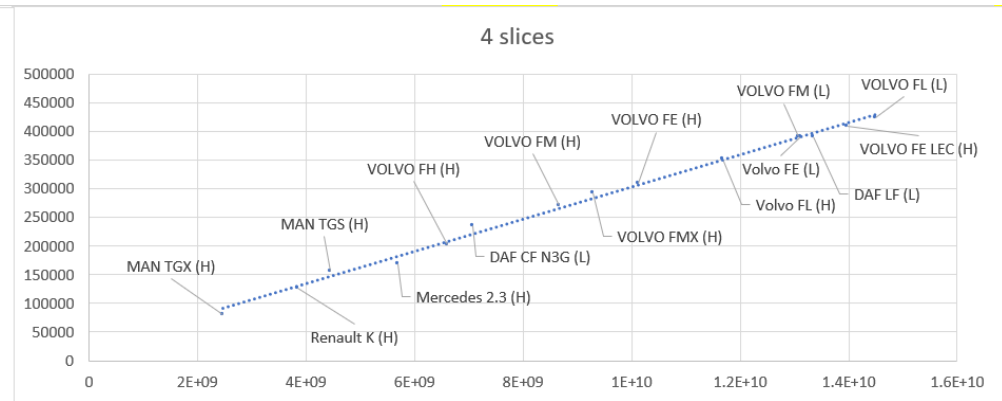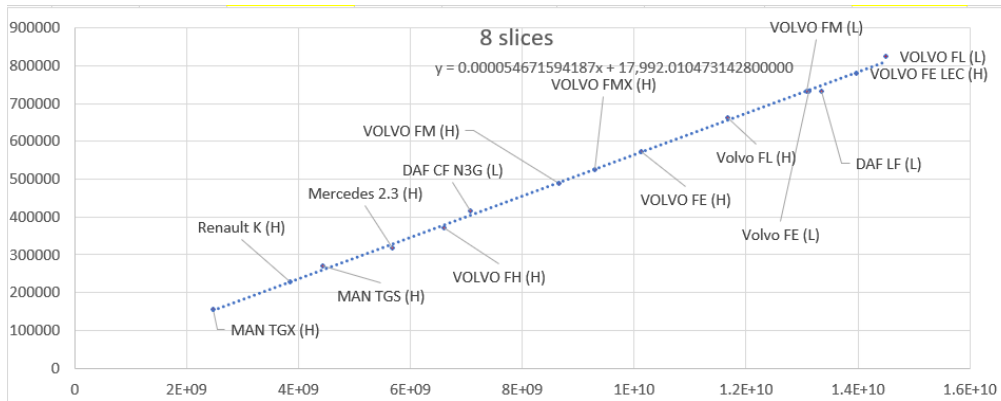
8 slices	Pearsons	0.99939
5 slices	Pearsons	0.99833
4 slices	Pearsons	0.99757
3 slices	Pearsons	0.99641

HOW MANY SLICES IS ENOUGH? DATA FOR PASSENGER SIDE ONLY

- Here we see the correlation between the volumetric score (X-Axis) and the simulation of the results for physical testing in CAD when using 8 slices, 5 slices, 4 slices and 3 slices

- We can see that 8 slices produces the best correlation and the least deviation for the trend line.

- These data are for all sides combined

Correlation values
1 is perfect

8 slices	Pearsons	0.99882
5 slices	Pearsons	0.99824
4 slices	Pearsons	0.99754
3 slices	Pearsons	0.99458

HOW MANY SLICES IS ENOUGH? DATA FOR DRIVER SIDE ONLY

- Here we see the correlation between the volumetric score (X-Axis) and the simulation of the results for physical testing in CAD when using 8 slices, 5 slices, 4 slices and 3 slices

- We can see that 8 slices produces the best correlation and the least deviation for the trend line.

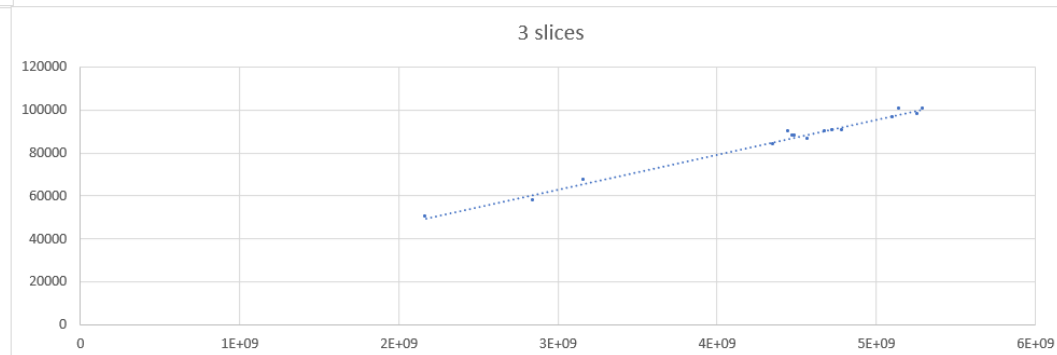- These data are for all sides combined

Correlation values
1 is perfect

8 slices	Pearsons	0.99866
5 slices	Pearsons	0.9991
4 slices	Pearsons	0.99728
3 slices	Pearsons	0.99399

HOW MANY SLICES IS ENOUGH? DATA FOR FRONT SIDE ONLY

- Here we see the correlation between the volumetric score (X-Axis) and the simulation of the results for physical testing in CAD when using 8 slices, 5 slices, 4 slices and 3 slices

- We can see that 8 slices produces the best correlation and the least deviation for the trend line.

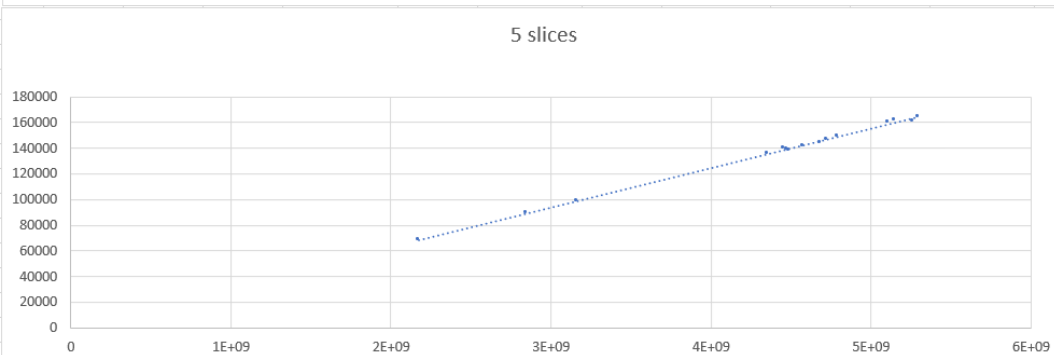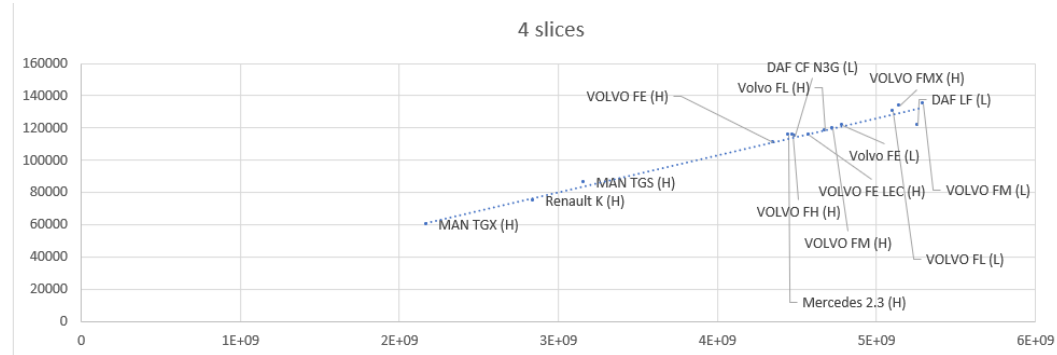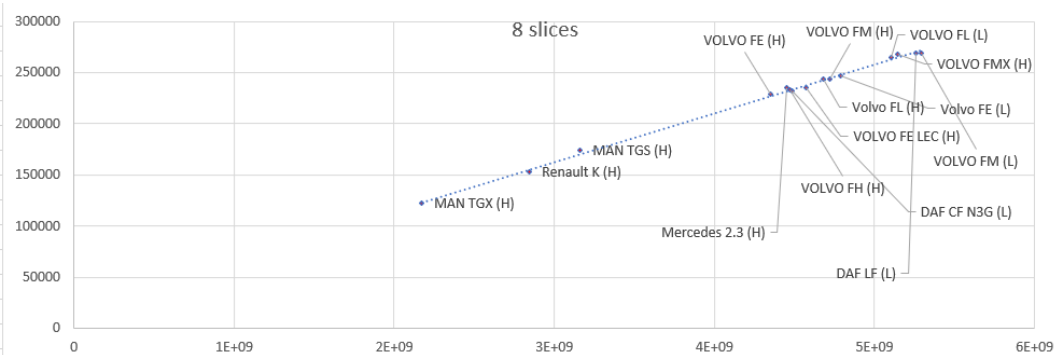- These data are for all sides combined

Correlation values 1 is perfect

8 slices	Pearsons	0.99781
5 slices	Pearsons	0.99118
4 slices	Pearsons	0.98922
3 slices	Pearsons	0.98754

SUMMARY AND NEXT STEPS

- We now have a process that produces a very high correlation between the digital and simulated physical testing results

- Currently 8 slices produces the best correlation

- We will now add more vehicles to the sample, and also consider how to improve the correlation and the treatment of the tolerance that should be applied to the use of the physical testing.

- For example, in the graph below the MAN TGS result should be on the trend line (orange dot), but isn't, due to the lower resolution of the physical test compared to the volumetric test. In this case this makes a difference of 0.1m³

- This could be the basis of tolerance for the physical testing method

- We will explore methods for defining this tolerance and discuss with stakeholders
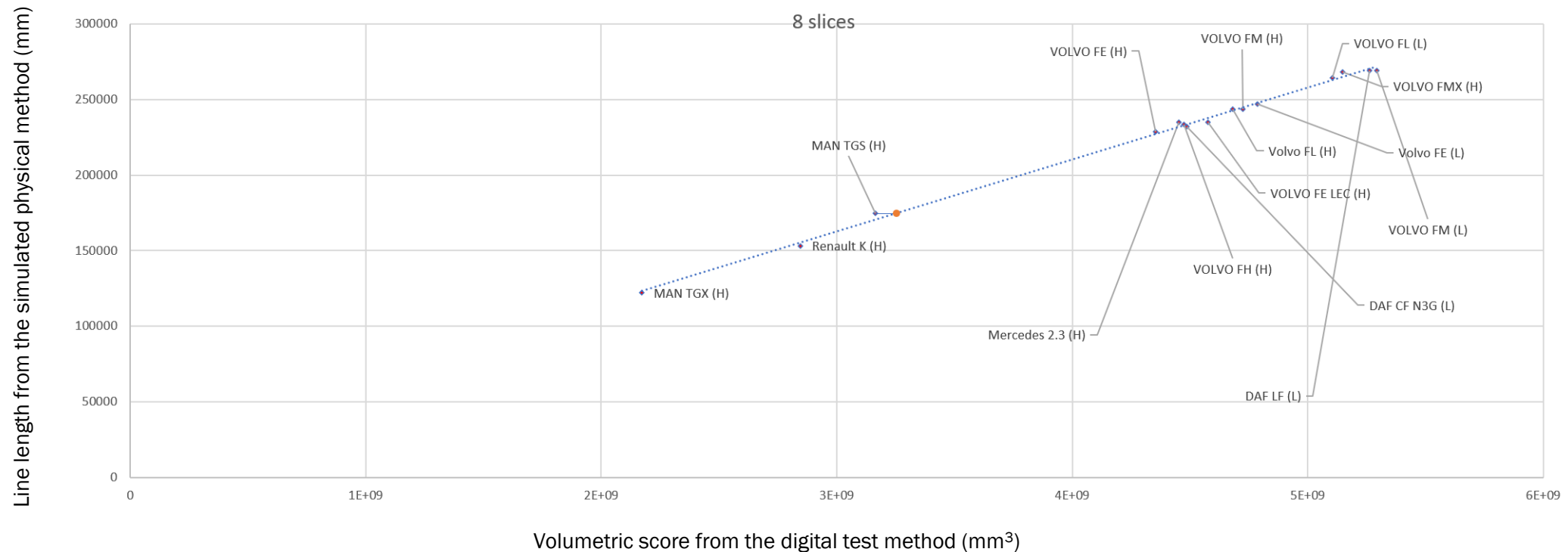
Project information

Thank you for your attention, are there any questions?

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