# THE DESIGN OF THE UNECE HGV DVS FOR TECH NEUTRAL CAB DESIGN

## OPTION FOR EQUIVALENCE

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# CONTENT

- A new option for equivalence between the 00 series regulation and the proposed amendment to ADD the tech neutral method.

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# HOW CAN WE ENSURE EQUIVALNCE BETWEEN THE TWO METHODS?

- We have been working on the challenging issue of ensuring equivalence between the series 00 and the planned amendment to address the tech neutrality issue

- It was suggested in the last meeting that using VRU distance objects to maintain equivalence was not ideal and so we have defined a potential volumetric approach.

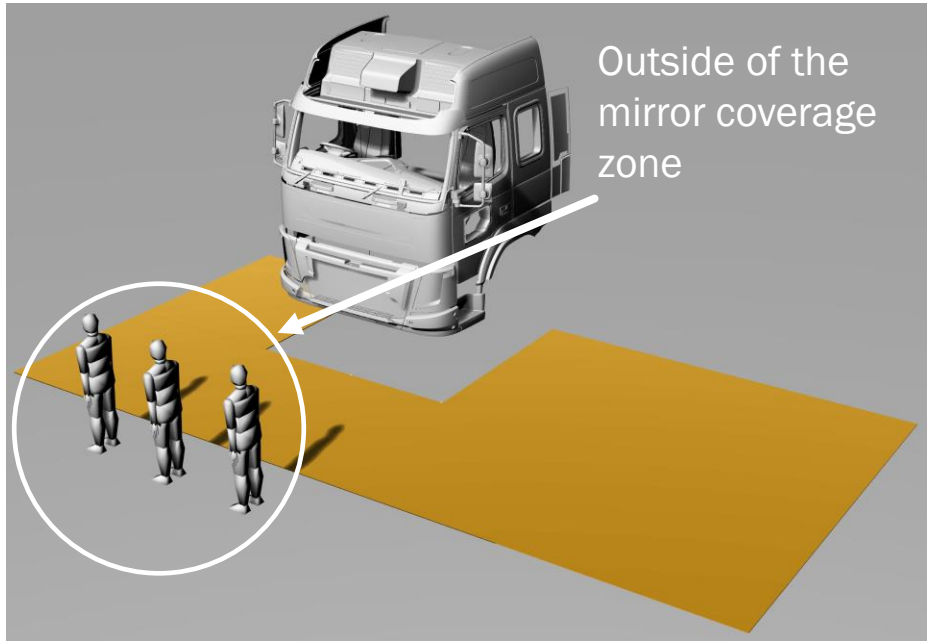
- See the LDS presentation from the 27th meeting for the context of VRU distance as a measure that is used to quantify the performance of the volumetric approach.

- As a reminder, the following slides shows the issue that needs to be addressed.

# THE EQUIVALENCE ISSUE

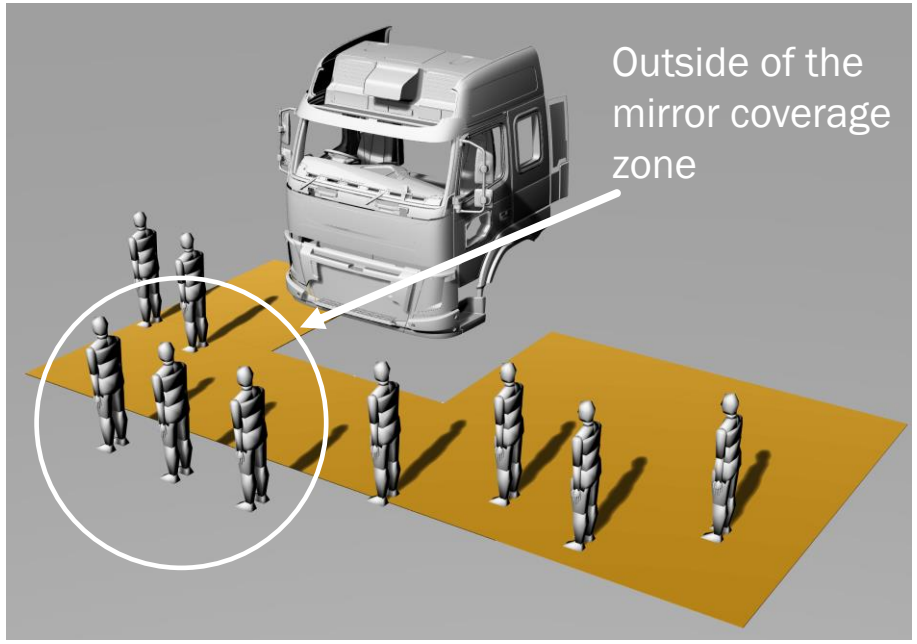
- The new version once again allows manufacturers to gain volume by making changes to the **side of the vehicle** and this means that the original method in the current standard and the amendment version **are not equivalent**
- This can be demonstrated in the example below, in both cases the 3 VRUs directly in front of the cab are in a blind spot between direct vision and indirect vision

## Series 00 method - Front




The vehicle **fails** the minimum requirement to the front and must be improved – e.g. lowered overall – lower windscreen and dashboard

## Amendment version - Option 3 method - Front

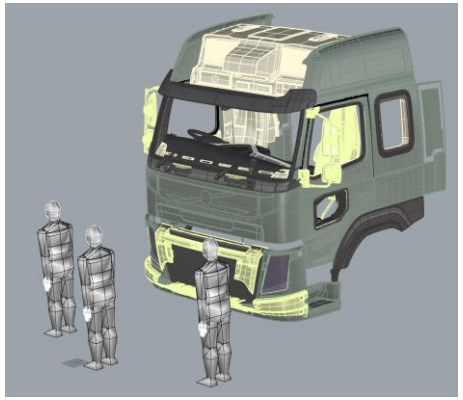



The vehicle fails the minimum requirement to the front and must be improved – however manufacturers can gain volume by improving performance to the sides and not the front in this version and can then pass
**NO improvement to frontal direct vision blind spots**

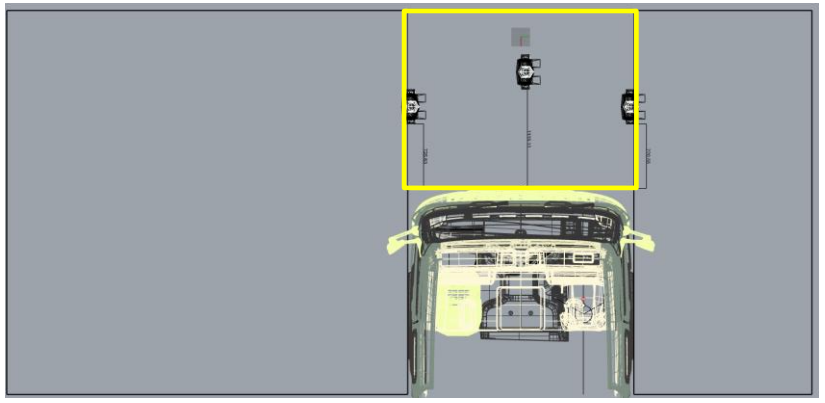
# HOW CAN WE ENSURE EQUIVALENCE BETWEEN THE TWO METHODS?

The premise is as follows;

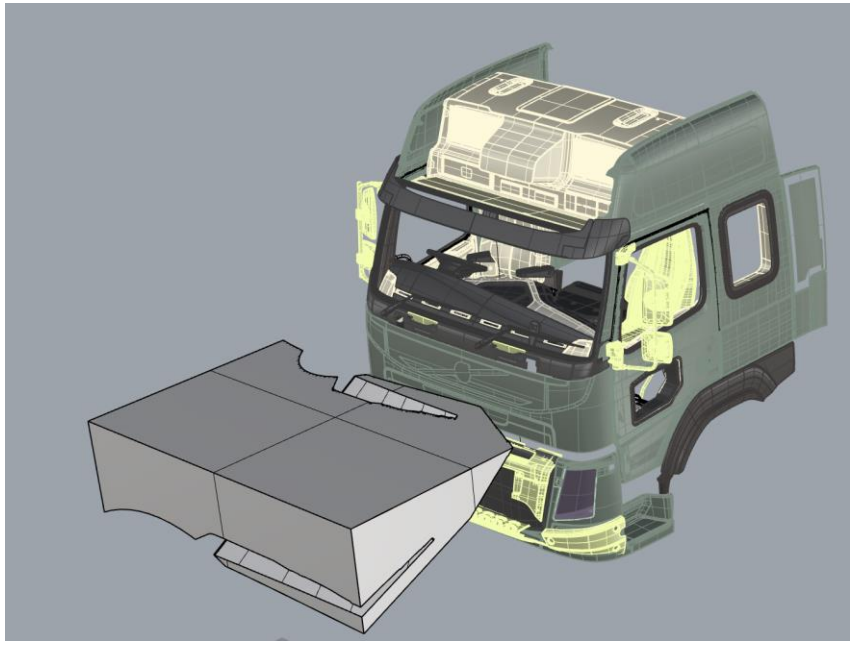
- What volume is equivalent to the need to see three VRUs directly in front of the vehicle?
- We need a way to define a frontal volume
- We have taken the lateral extents of the vehicle to define the volume directly in front of the vehicle as this is the area that contains the three VRUs for the Series 00 method. Frontal Extents Volume (FEV).
- Therefore plotting the VRU distance against the Volume gives a trend line that can be used to calculation the volume that should be seen at a certain VRU distance



Three VRUs in front of the cab as defined in Series 00



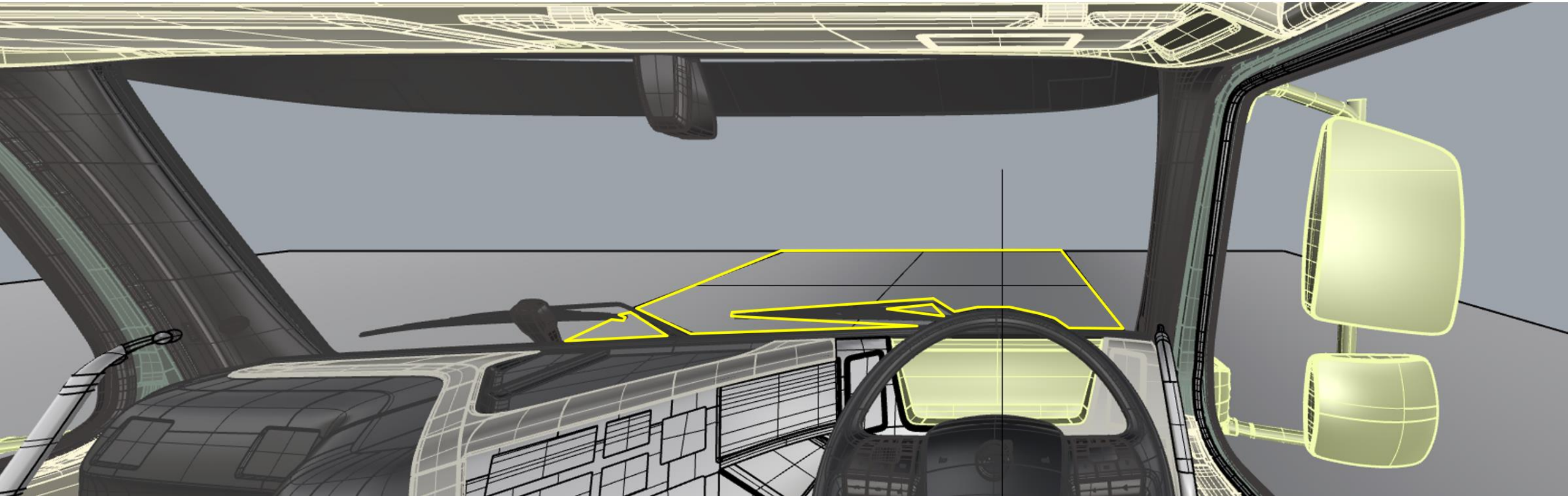
Plan view of the area within which the VRUs are contained, therefore VRU distance should corelate well with volume as per the previous uses of this method



Volume that is visible between the lateral extents of the vehicle

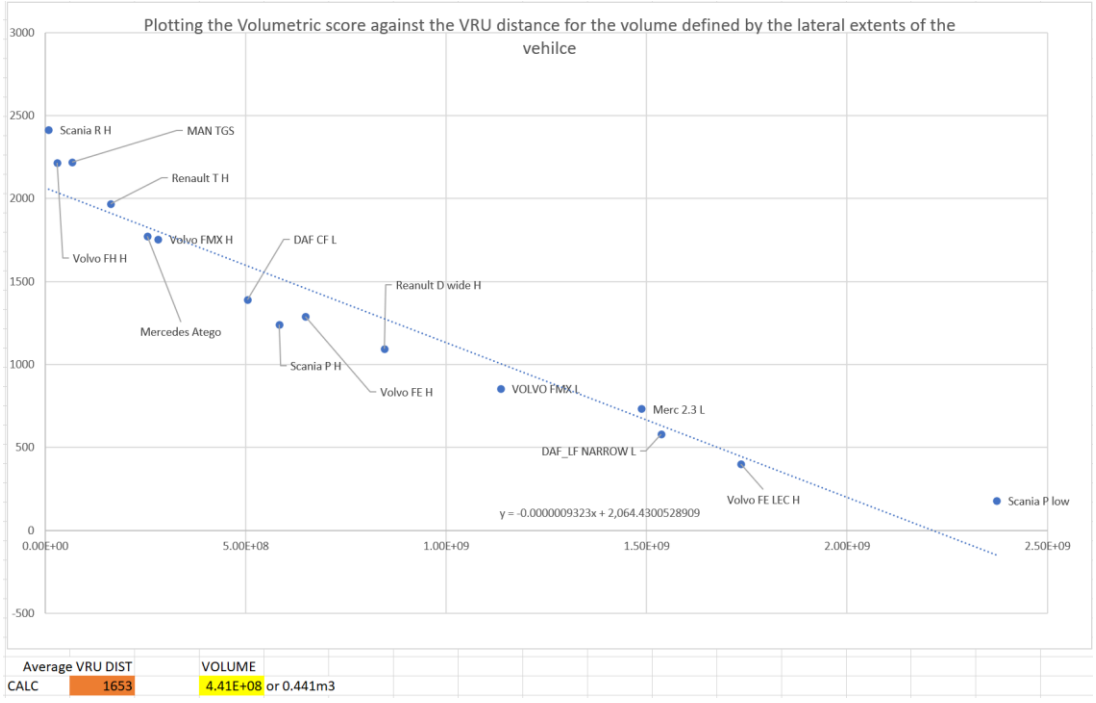
# HOW CAN WE ENSURE EQUIVALENCE BETWEEN THE TWO METHODS?

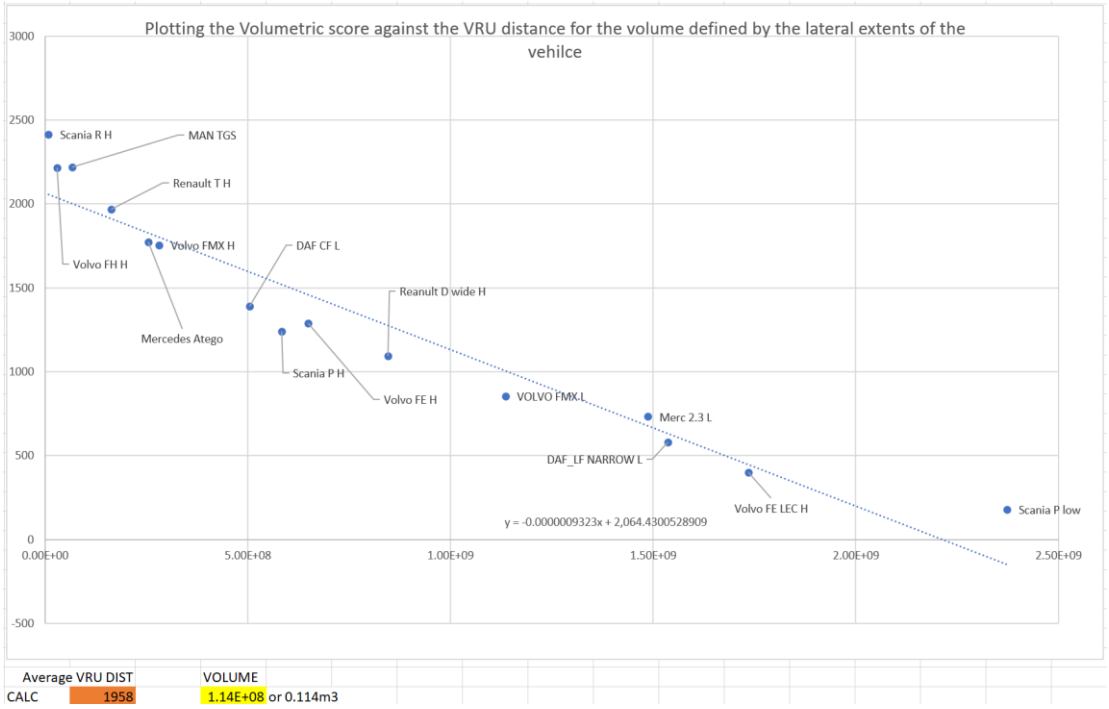
- The premise is as follows
  - The yellow highlighted area is the area directly in front of the vehicle from the drivers eye point view
  - A vehicle would need to meet the minimum requirement for the yellow area, AND an option 3 volume to be determined.



# HOW CAN WE ENSURE EQUIVALENCE BETWEEN THE TWO METHODS?

- So far we have performed this process for 15 vehicles across the sample of 50+
- We propose adding the full sample before setting final figures for the VRU distance equivalent volume
  - Therefore the suggested figures for the volume requirement are PROVISIONAL
  - As an indicative value for review by manufactures based upon the VRU distances agreed in the Series 00 version table
    - Level 1 vehicles (urban) would need to be able to see 0.441m$^3$ in the FEV area (average VRU distance 1653mm)
    - Level 2 (construction) and 3 (long haul) vehicles would need to be able to see 0.114m$^3$ in the FEV area (average VRU distance 1958mm)



# MOVING FORWARD

- This new method provides a way to solve the equivalence issue
- It ensures that both versions are equivalent in terms of the challenge set for allowing direct vision to the front of the vehicle whilst still allowing a tech neutral approach
- It is acknowledged that we need to consider the effect of vehicles with narrower cab widths for this approach