CAVA - OVERALL VEHICLE ARCHITECTURE

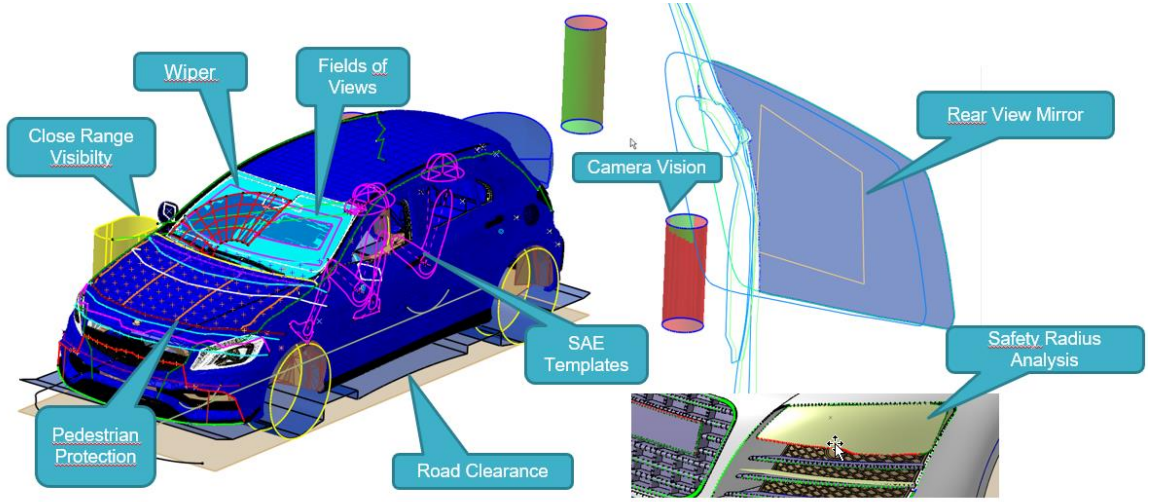
Functional Overview

2023-04-20

CAVA – Vehicle Homologation

Vehicle Compliance is a compulsory part of Automotive design. CAVA (CATIA Automotive Extensions Vehicle Architecture) provides the solution to efficiently and confidently validate the compliance of your vehicle design and architecture against international standards and regulations.

Available as a CATIA V5 or 3DEXPERIENCE enhancement, CAVA is successfully used by OEMs and suppliers world-wide and can be installed as a complete solution or as individual sub products for specific application areas.



CAVA Product Portfolio

- **CAVA OVA:** Verify the overall vehicle packaging
- **CAVA Manikin:** Verify seating positions, pedals and headroom
- **CAVA Vision:** Analyze the direct and indirect vision of the driver
- **CAVA Safety:** Analyze safety of occupants and pedestrians
- **CAVA Wiper:** Analyze wiper kinematic and wiping quality
- **CAVA Tools:** Project the silhouette outlines of a complete vehicle with one click using Silhouette Tools

CAVA – General Features

Integration into CATIA

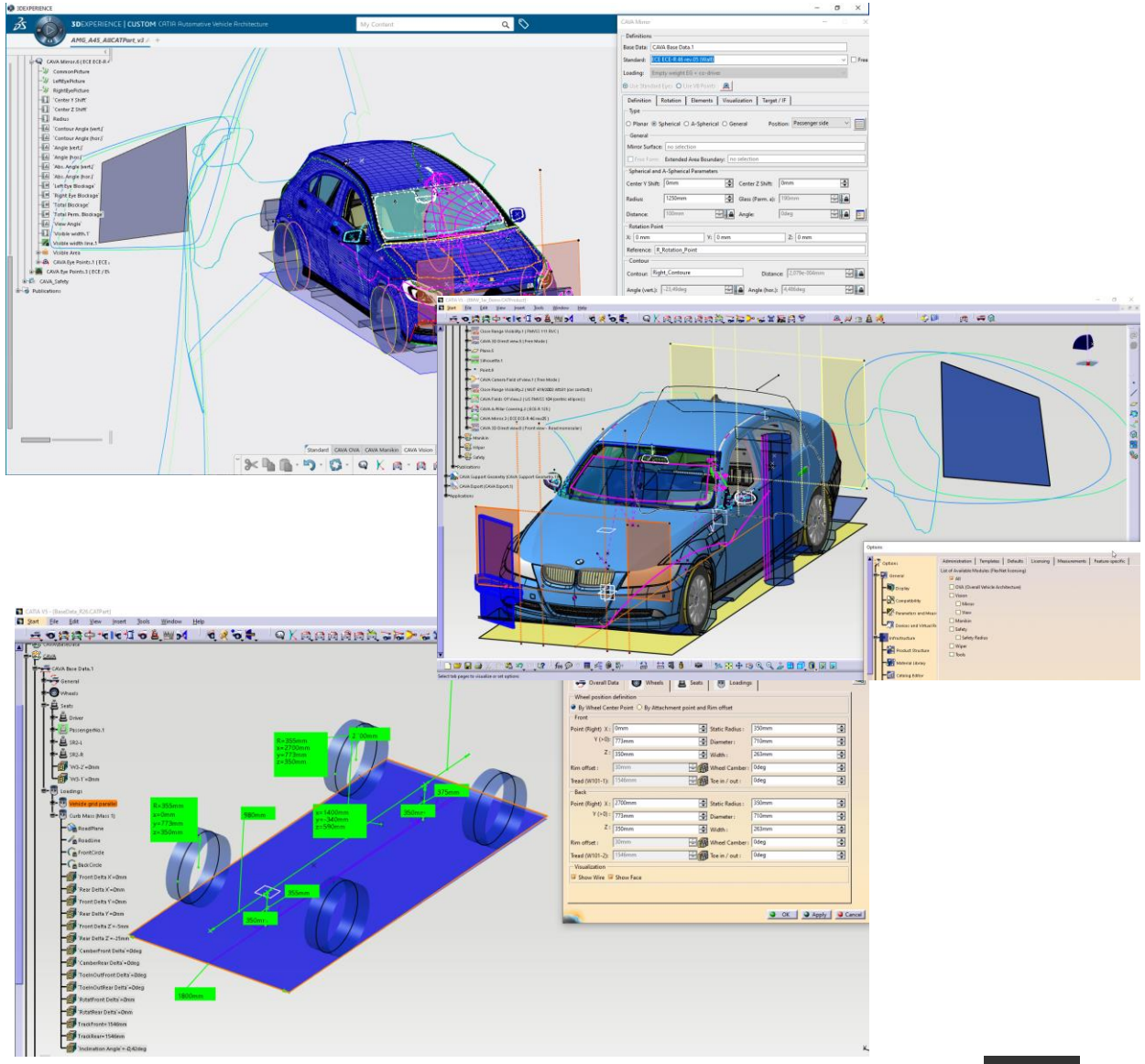
- CAVA is integrated into CATIA as a separate workbench or App.
- CAVA features are stored directly with the CAD data.
- Working in part and product context.
- Automatic feature update on change of any input parameters or changed geometry.

Configurable and Open

- Supported standards are available as readable xml file.
- You can create your own adapted company-specific standards easily.
- Export your results as regular CATIA geometry for downstream applications, readable without CAVA.
- Create textual, excel and drawing reports using customizable report templates.

Base Data Concept

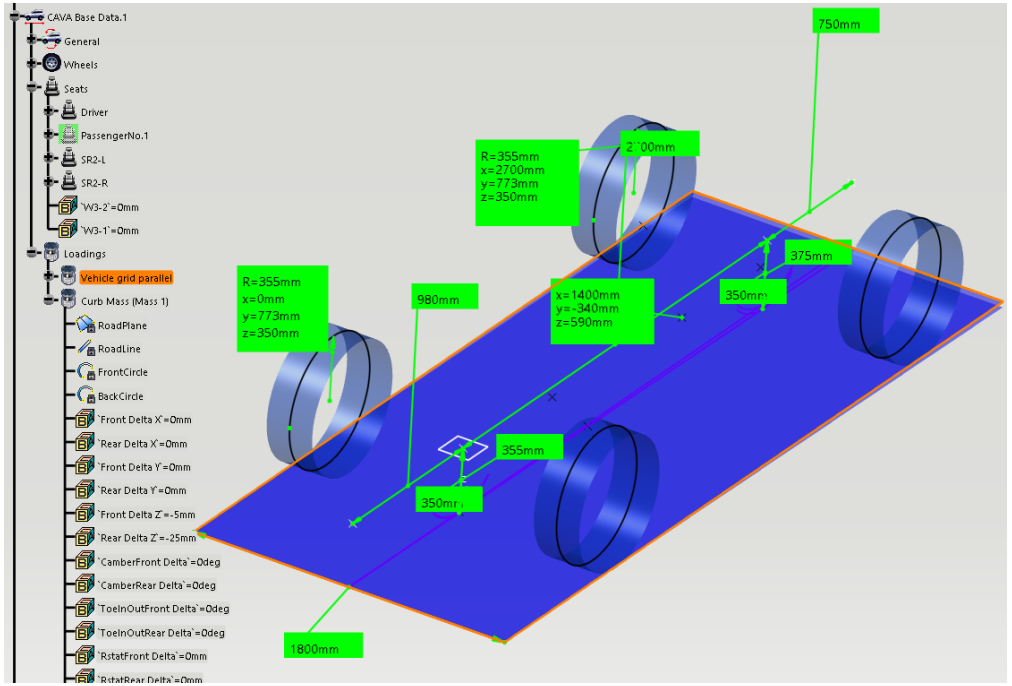
- Organize relevant parameters in a central location.
- Define vehicle size, wheel size, driver and occupant placement.
- Define different ground reference planes to accommodate loading configurations.

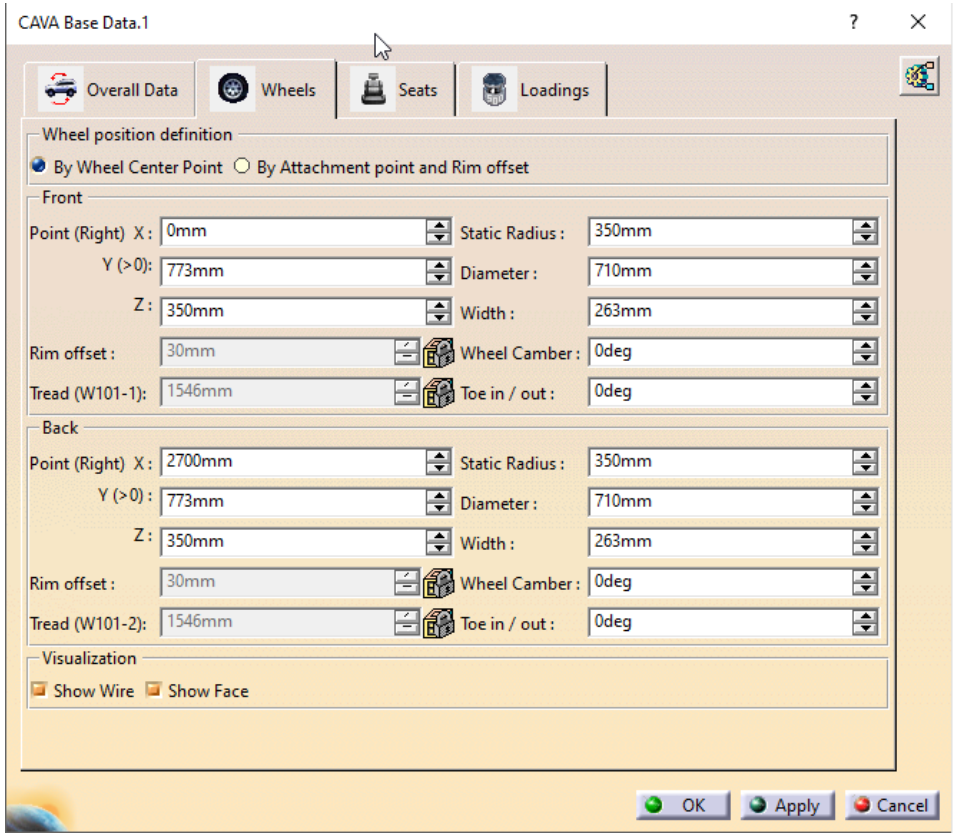


CAVA OVA - Base Data

Manage basic input data to be used for CAVA calculations

- Organize relevant parameters for a project in a central location
- Define vehicle size, wheel size, seating of driver and occupants
- Define different ground reference planes to accommodate required loading configurations



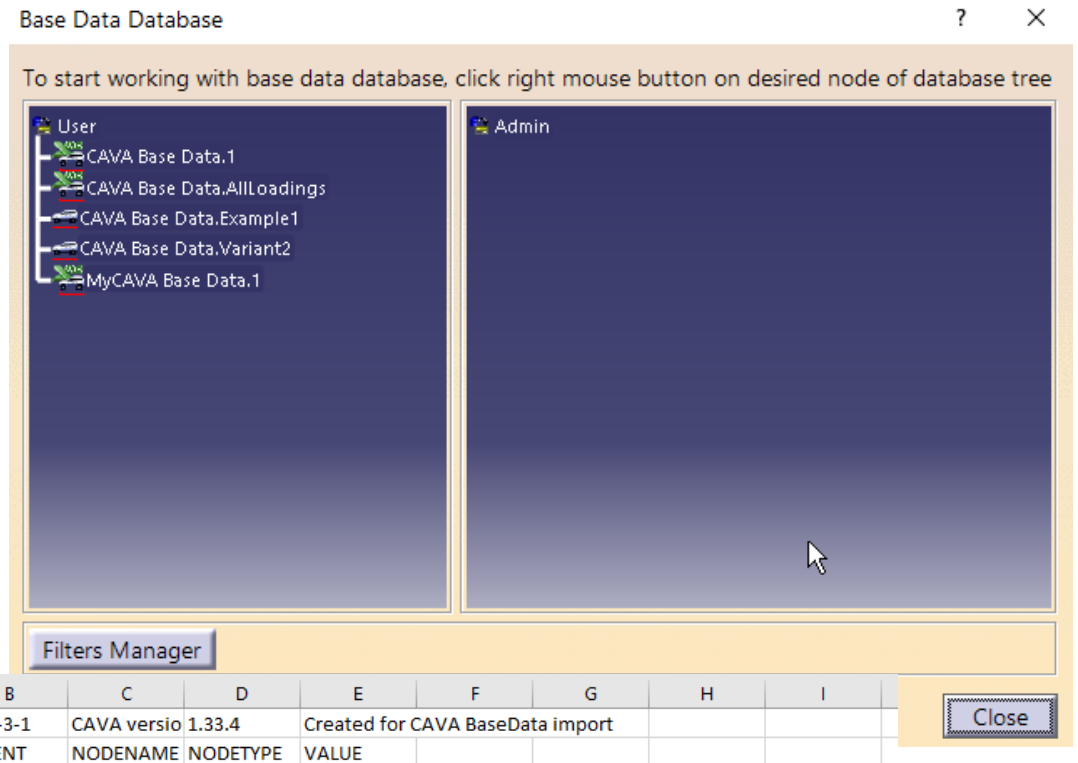


CAVA OVA - Base Data Database

Function to manage Base Data for different projects and vehicle variants

Features

- Copy, Edit and Rename
- Export data to xml or xlsx
- Import data from xml or xlsx
- Interface to customer's own database



	A	B	C	D	E	F	G	H	I
1	Created:	2022-3-1	CAVA versio	1.33.4	Created for CAVA BaseData import				
2	ID	PARENT	NODENAME	NODETYPE	VALUE				
3	1	-1	basedata	element					
4	2	1	overalldata	element					
5	3	2	CarWidth	attribute	2000mm				
6	4	2	BodyWidth	attribute	0mm				
7	5	2	CarCategory	attribute	Limousine				
8	6	2	CarDescripti	attribute	Limousine				
9	7	2	ForwardDist	attribute	1000mm				
10	8	2	BackwardDis	attribute	1000mm				
11	9	1	wheeldata	element					
12	10	9	ShowWheel	attribute	false				
13	11	9	ShowWheel'	attribute	true				
14	12	9	ShowCenter	attribute	false				
15	13	9	WheelDistar	attribute	2760.01mm				

CAVA OVA - Underfloor Clearance

This feature verifies the underfloor clearance of the vehicle and measures slope angles, static and dynamic curb clearance, inner angle, oil tub, water wading and wheel fixing clearance.

Supported standards

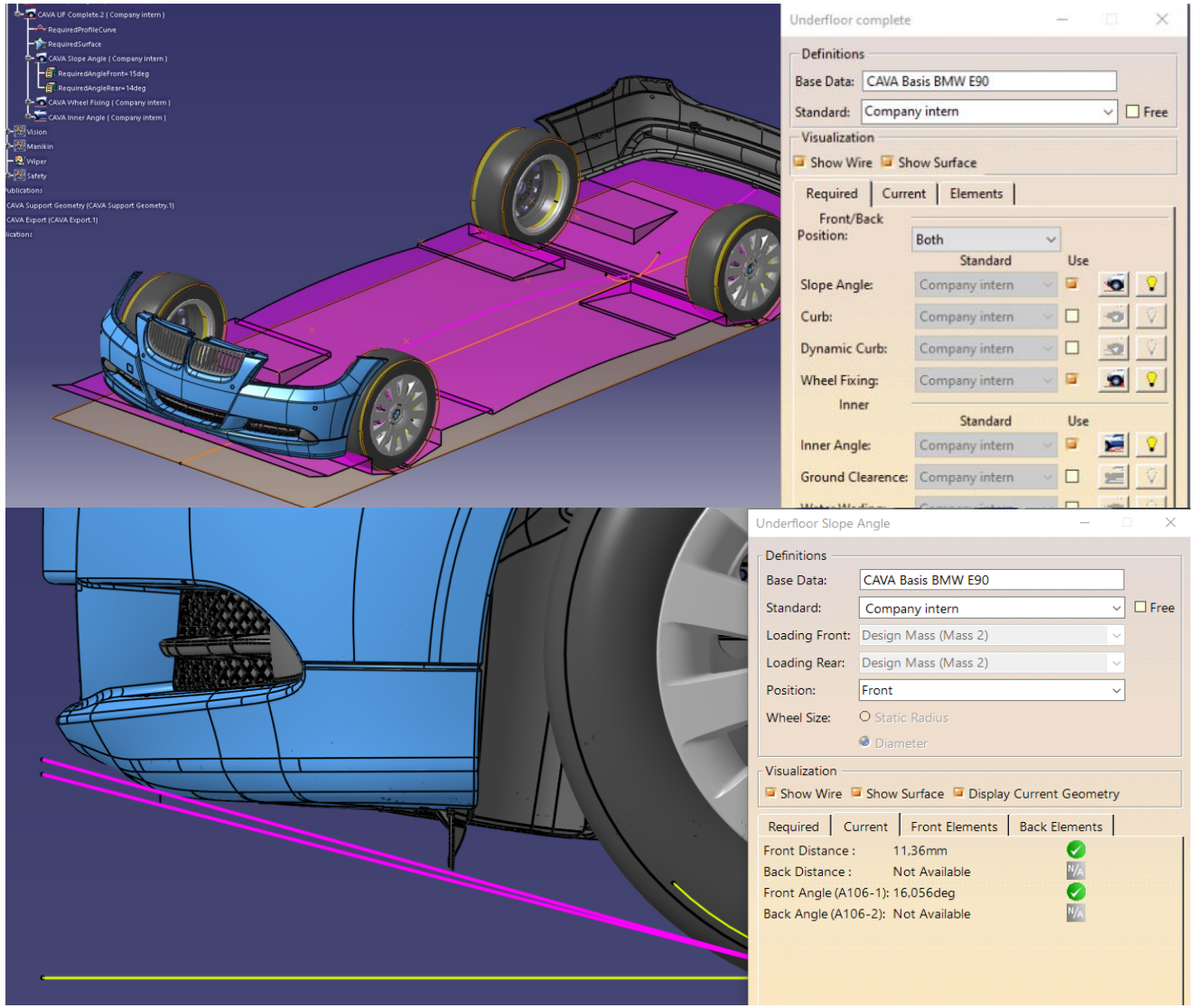
- Company specific example
- Offroad EU, US, AUS
- KMVSS Art. 5

Features

- Calculates combined overall ground clearance surface
- Measures and shows clearance values to selected vehicle geometry
- Optionally uses wheel diameter or static radius

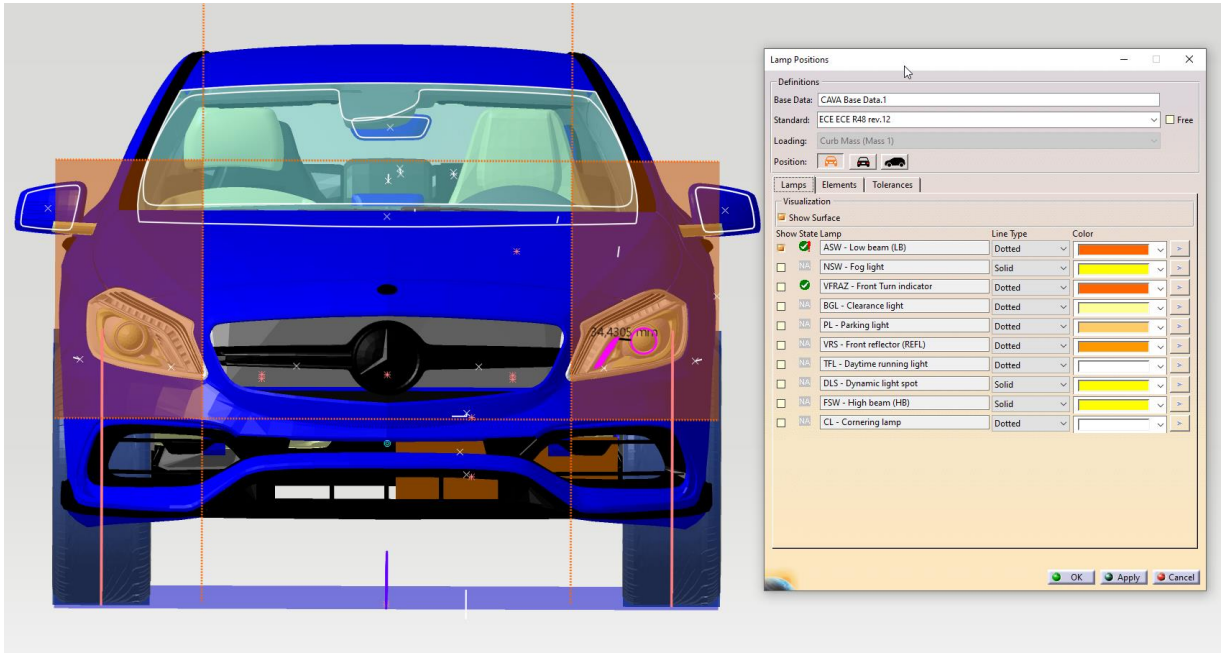
Result

- Visualization of target and achieved values and surfaces
- Measured values



CAVA OVA - Lighting Position

This feature gives guidance and verification about lamp types and their required absolute and relative positions.



Supported standards include

- ECE-R 48, US FMVSS 108
- Japan Safety Regulations Nr. 67, Korea KMVSS
- Australia ADR 13, India AIS-008//2001
- Taiwan MOTC 2004, China GB 4785-1998

Features

- Shows a grid of limiting borders for each lamp type
- Measures if lamp geometry is within allowed limits
- Creates additional lamp-lamp distance measurements
- Checks the visibility of specific lamp types

Result

- Visualization of allowed limits
- Report of performed checks
- Measured values

CAVA OVA - Lamp Visibility

Check the visibility of red lamps from a defined zone in front of the car and white lamps from a zone back of the car as required by the ECE regulation.

Supported standard

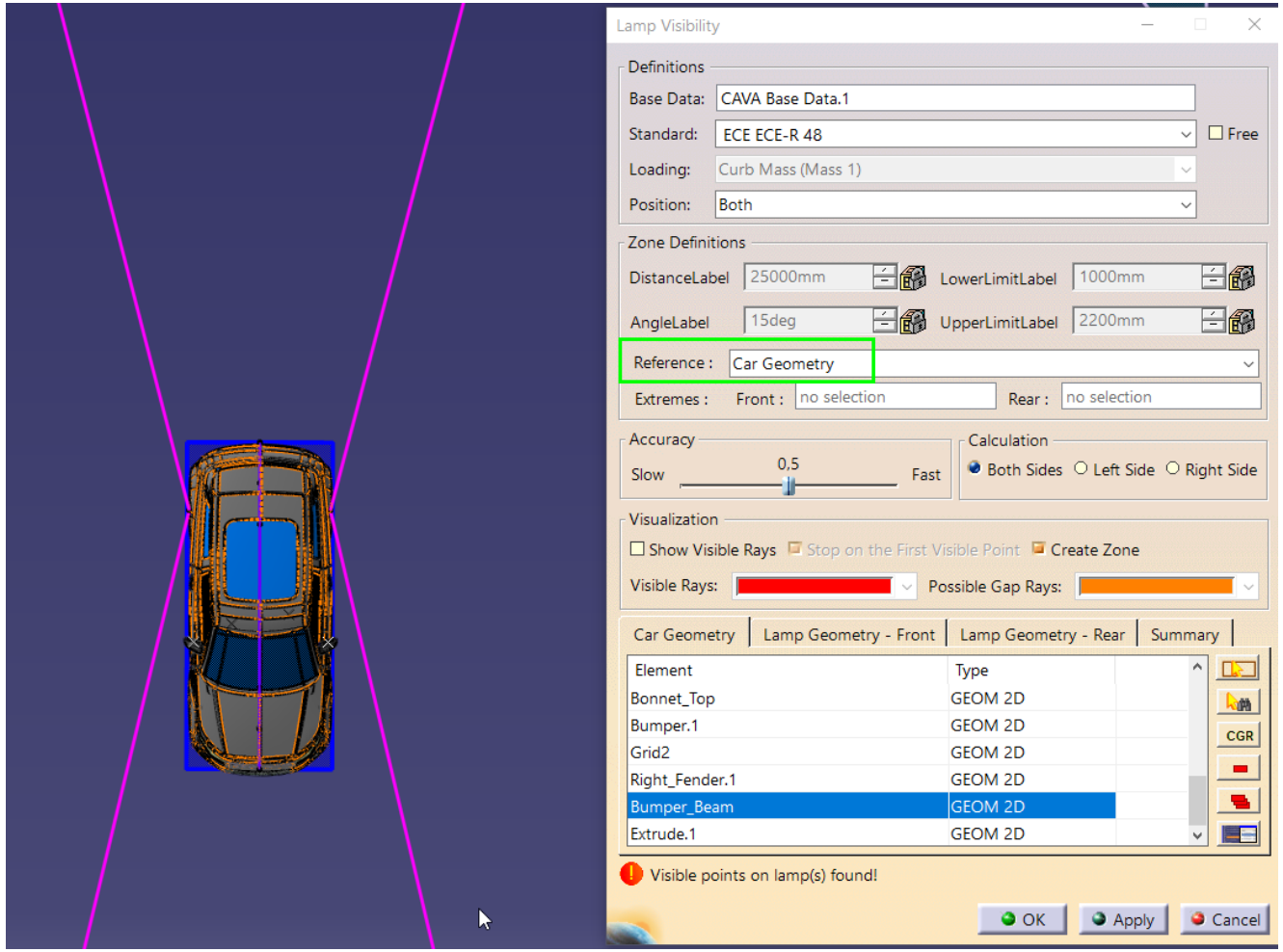
- ECE-R 48

Features

- Creates and shows the visibility check zone in the front and back of the vehicle
- Finds and shows the sight rays to incorrectly visible lamps
- Options to use width of base data or width of selected geometry

Result

- Visualization of the vision check zones
- Visualization of sight rays to lamps with incorrect visibility



CAVA OVA - Number Plates

This feature is a tool for the verification of the size, position, visibility and illumination of number plates as required in a variety of regional regulations.

Supported standards include

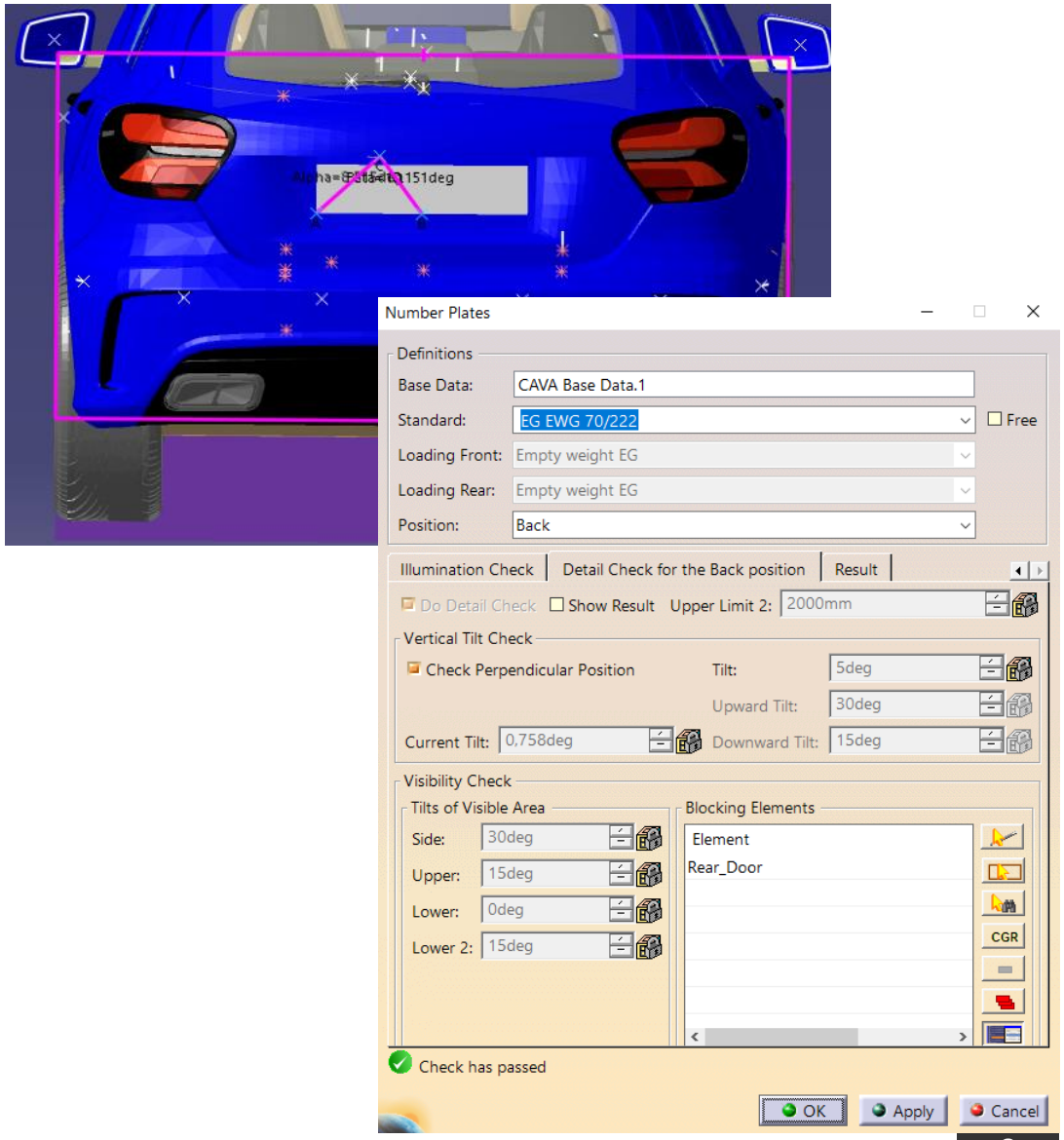
- EG EWG 70/222, EU 1003-2010
- AUS ADR 61/02
- USA, CDN Traffic Act 1964 22 ff.
- China GB 15741-1995

Features

- Checks the size and position of the selected number plate
- Including specific checks for the rear plate like tilt, visibility and position of the illumination
- Options to help finding an appropriate position on the vehicle

Result

- Measured values for size and other properties
- Visualization of positioning area and measurements



CAVA OVA – Bumper Pendulum

This feature provides the bumper shape and correct bumper contact position according to the applicable regulations.

Supported standards include

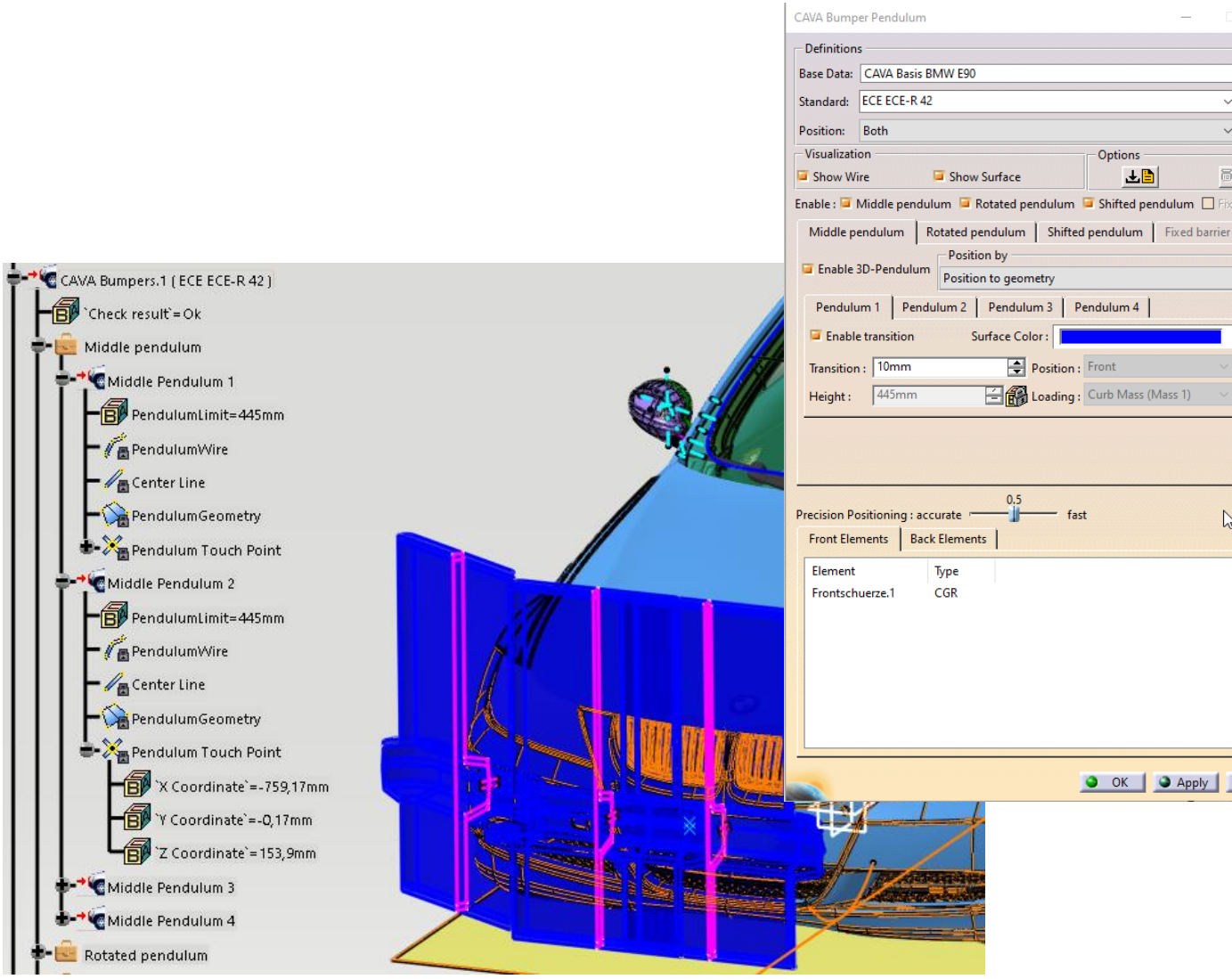
- ECE-R 42
- US 49 CFR 581
- CDN (CVMSS 215)

Features

- Positioning of middle, rotated and shifted pendulums
- Positioning on front and rear
- Calculates contact point with the vehicle
- User defined pendulum profiles

Result

- Visualization of bumper pendulum geometry and contact points for two different loadings



CAVA OVA - Crash Barriers

This feature facilitates the positioning of crash barriers on the front and back of the vehicle.

Supported standards include

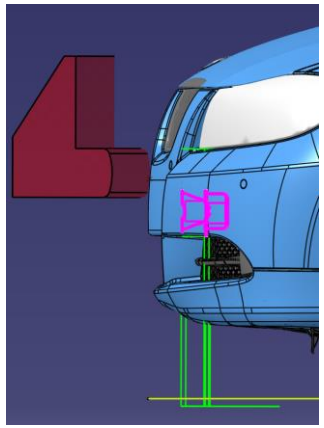
- RCAR (2004, 2006)
- IIHS (2009, 2016 small overlap)
- MPDB (2020) overlap

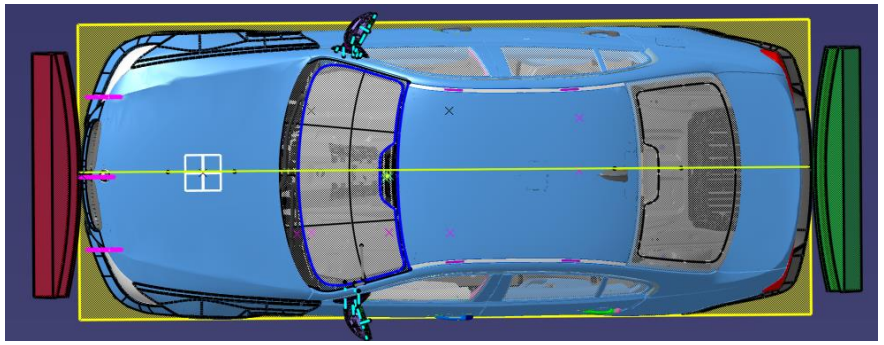
Features

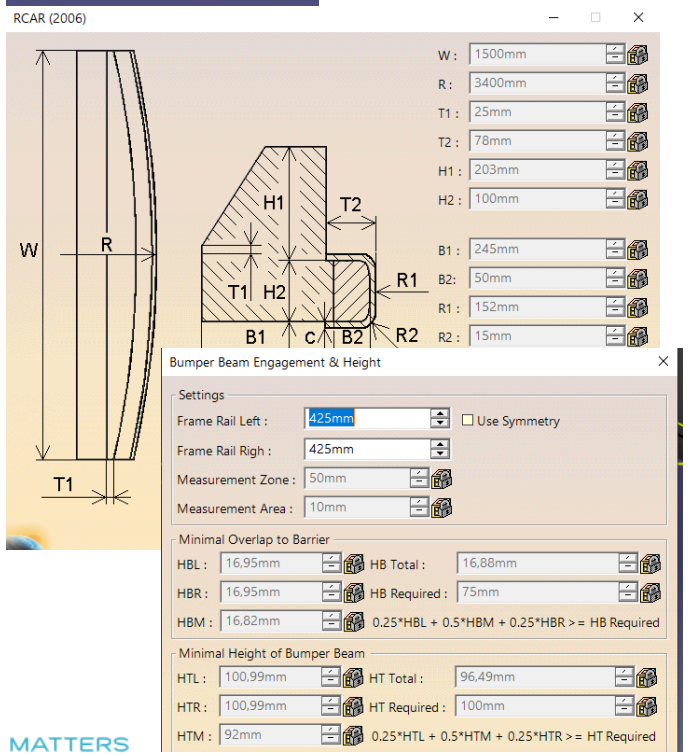
- Positioning of crash barriers
- Entry Card: This option calculates the qualifying bumper beam height and relevant bumper engagement according to the RCAR procedure
- Calculates contact point with the vehicle.
- User defined barrier profiles

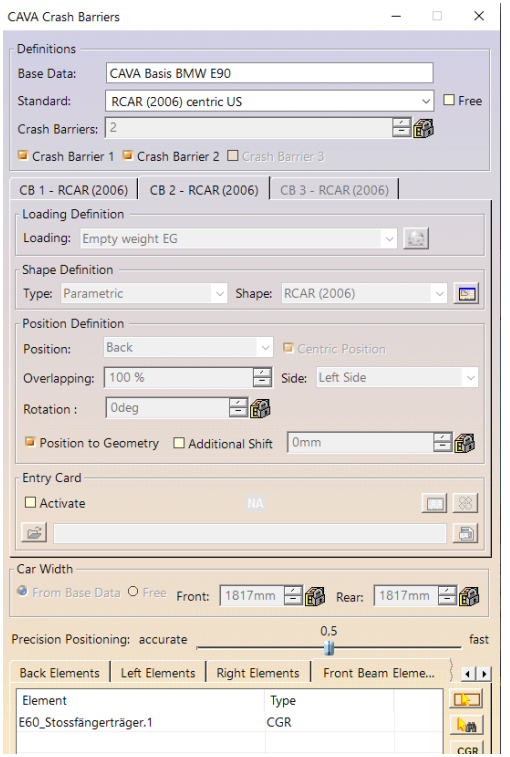
Result

- Visualization of crash barriers geometry and contact points
- Entry Card values and Drawing









TECHNIA
ADDNODE GROUP

EXPERIENCE MATTERS

CAVA OVA - Side Impact

This feature facilitates positioning of barriers for side impact crash tests on the vehicle.

Supported standards include

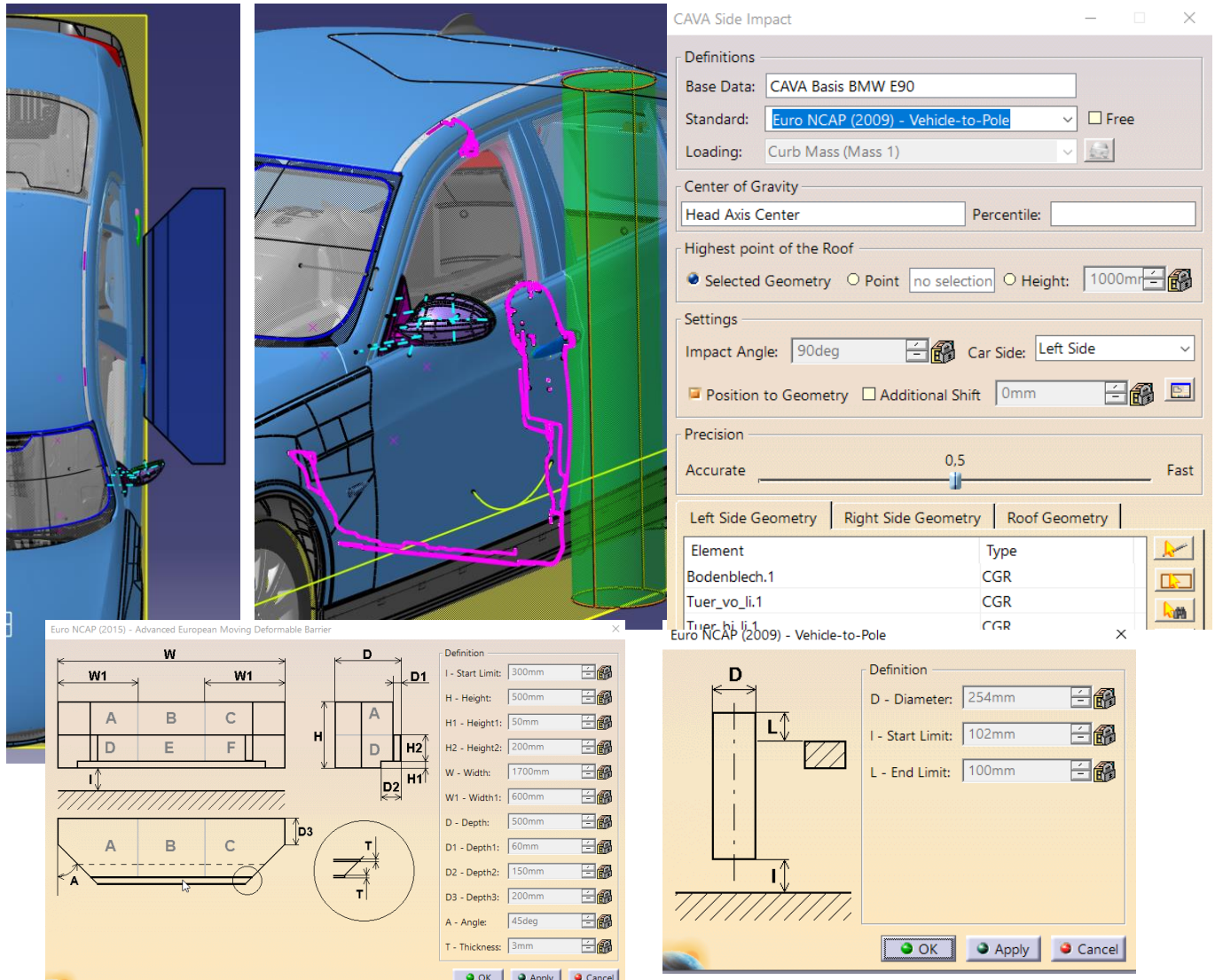
- MDB: Euro NCAP (2009), Euro NCAP MPDB (2015), FMVSS 214, IIHS
- Vehicle to Pole: FMVSS 214, Euro NCAP
- Door Crush Resistance: FMVSS 214, IIHS

Features

- Positioning of the crash barrier
- Visualize contact area
- User defined barrier shapes

Result

- Visualization of barrier geometry and contact area



CAVA OVA – Wheel Covering

Regulations require that the wheel is sufficiently covered by the fender to avoid damage by flying objects. This feature measures and visualizes the coverage values.

Supported standards include

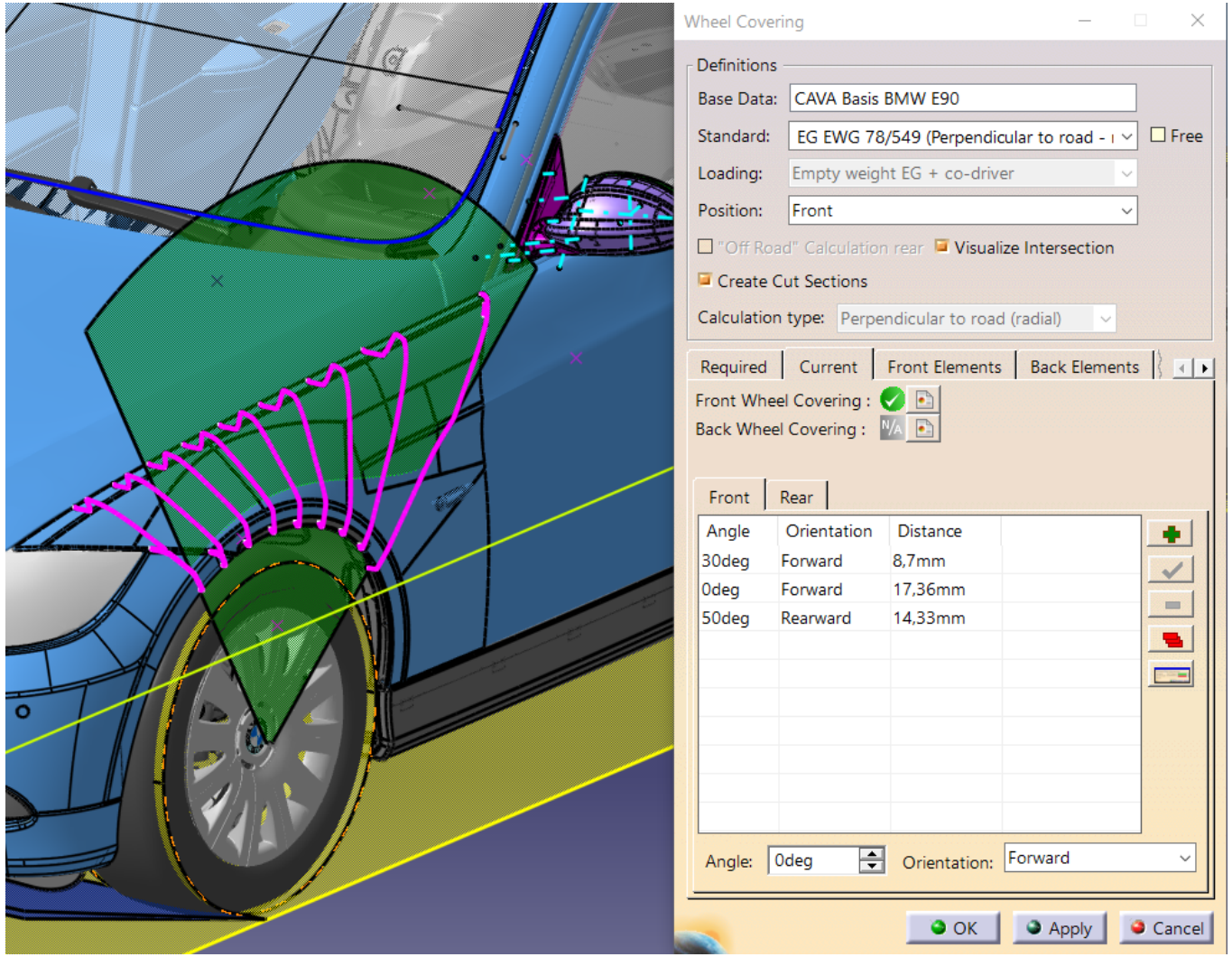
- EG EWG 78/549
- EG EWG 78/549 (Perpendicular to road - radial)
- AUS ADR 42/03
- Japan (TRIAS 1-1996)

Features

- Creates and visualizes the outer boundary surface of required coverage
- Different methods to calculate the boundary surface according to supported standards
- Measures distance values

Result

- Measured coverage values and visualization
- Check result if coverage is sufficient



CAVA OVA - Seat-belt mounting points

This feature provides visualization of the fields containing the allowed positions of the guide and/or end fitting and/or buckle

Supported standards include

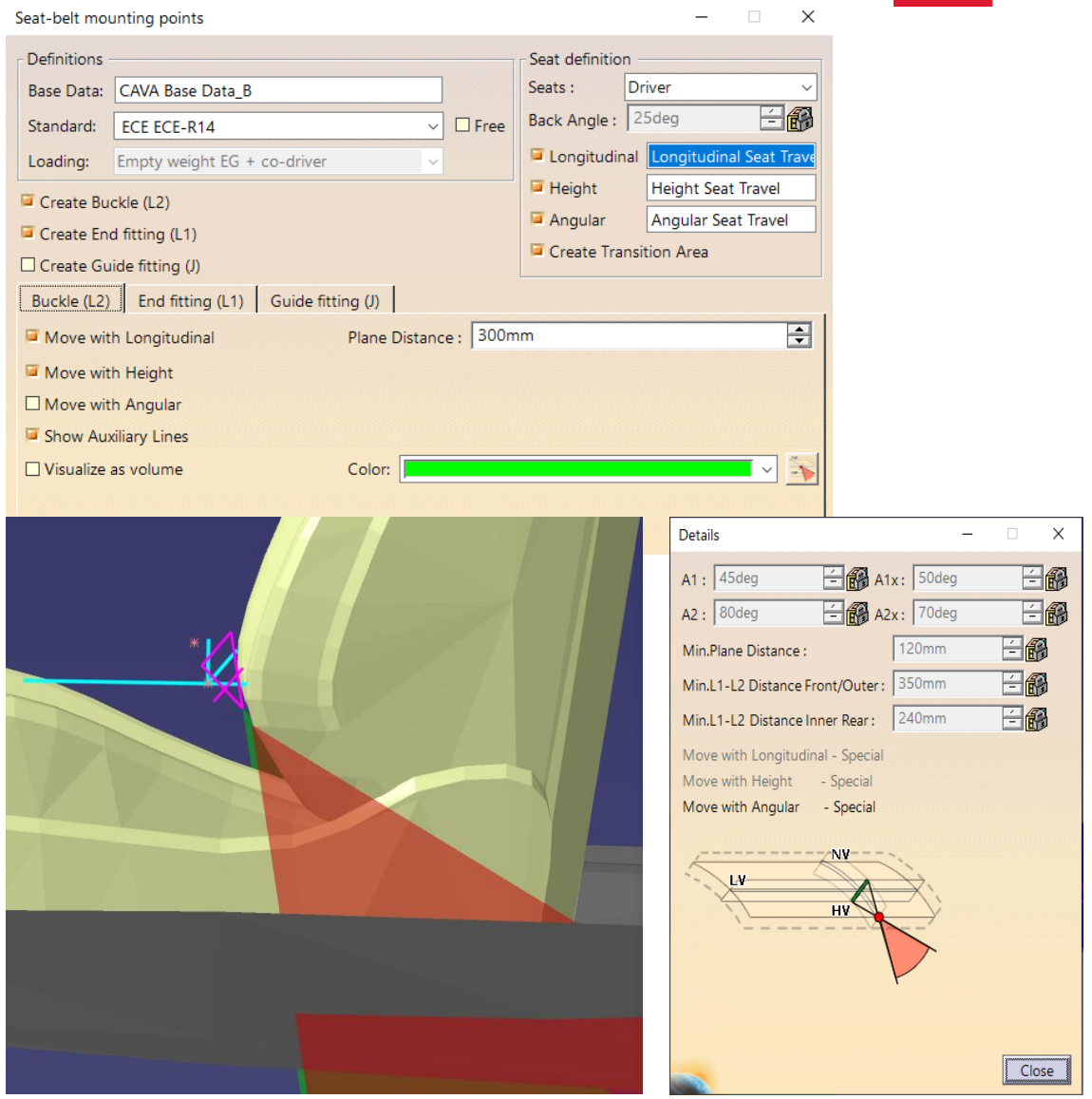
- ECE-R 14
- FMVSS 210

Features

- Creates allowed position fields for buckle, guide fitting and end fitting, considering the limits of position and distance to each other
- Considers the movement of the seat
- Support buckle and fittings attached to the seat or fixed to the frame

Result

- Visualization of allowed position fields for buckle and fittings



CAVA OVA - Child Protection & Free Space Top Tether

This feature creates a visualization of the allowed positions for fixing the top tether of a child seat, as well as a visualization of the required free space to fix the top tether at a given point.

Supported standards include

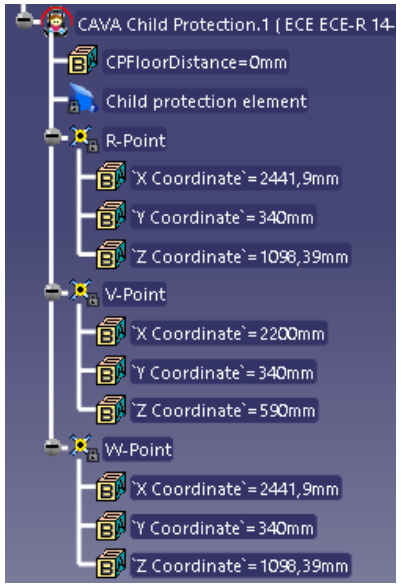
- ECE-R 14
- FMVSS 225
- AUS ADR 34

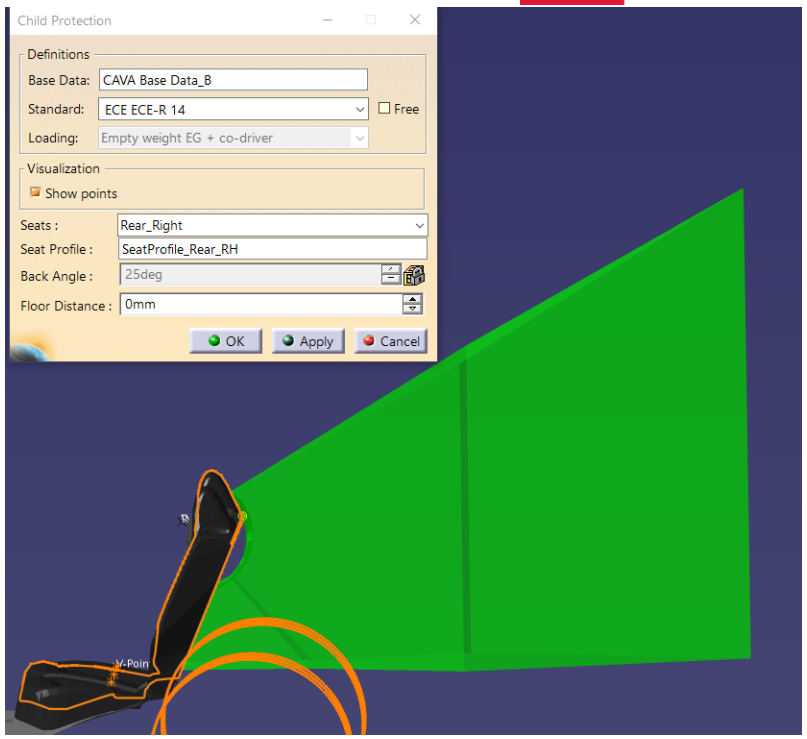
Features

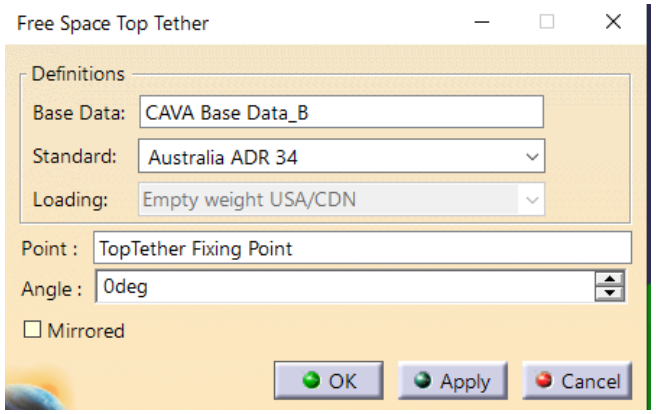
- Visualization of the top tether fixing space including the cutout area based on the seat profile
- Calculation of the R-Point, V-Point and W-Point

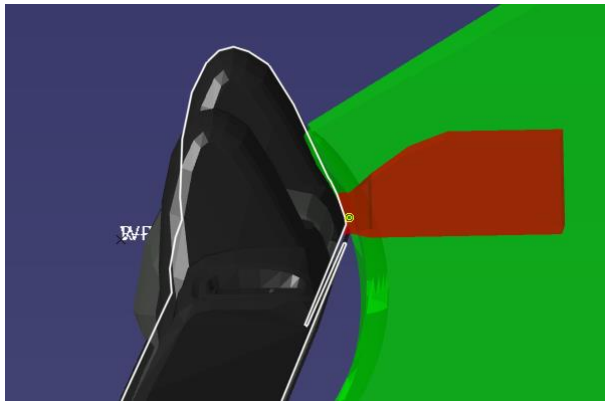
Result

- Visualization of the top tether fixing space
- Visualization of the free space around a selected fixing point









CAVA OVA - Pedal Clearance

This feature measures the clearance between the accelerator, brake, clutch pedals and the floor.

Supported standard

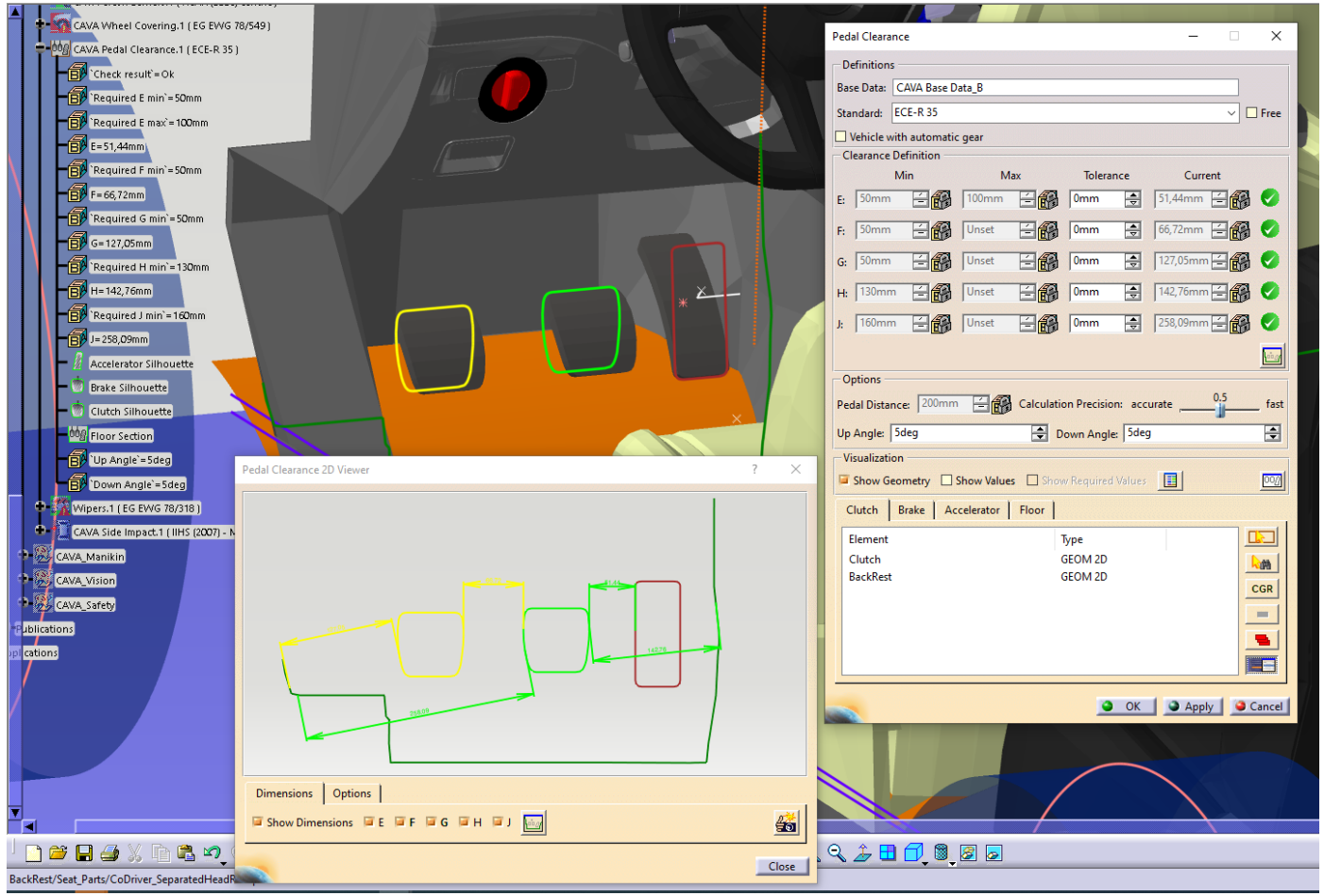
- ECE-R 35

Features

- Calculates actual clearance values
- Supports vehicles with manual and automatic gear
- Creates the projection to the measure plane
- Configurable visualization in a 2D Viewer for easy capturing and documentation of the result

Result

- Measured clearance values
- Visualization of measurement in 3D and 2D viewer
- Check result if values are within limits



CAVA OVA - TCD Clearance

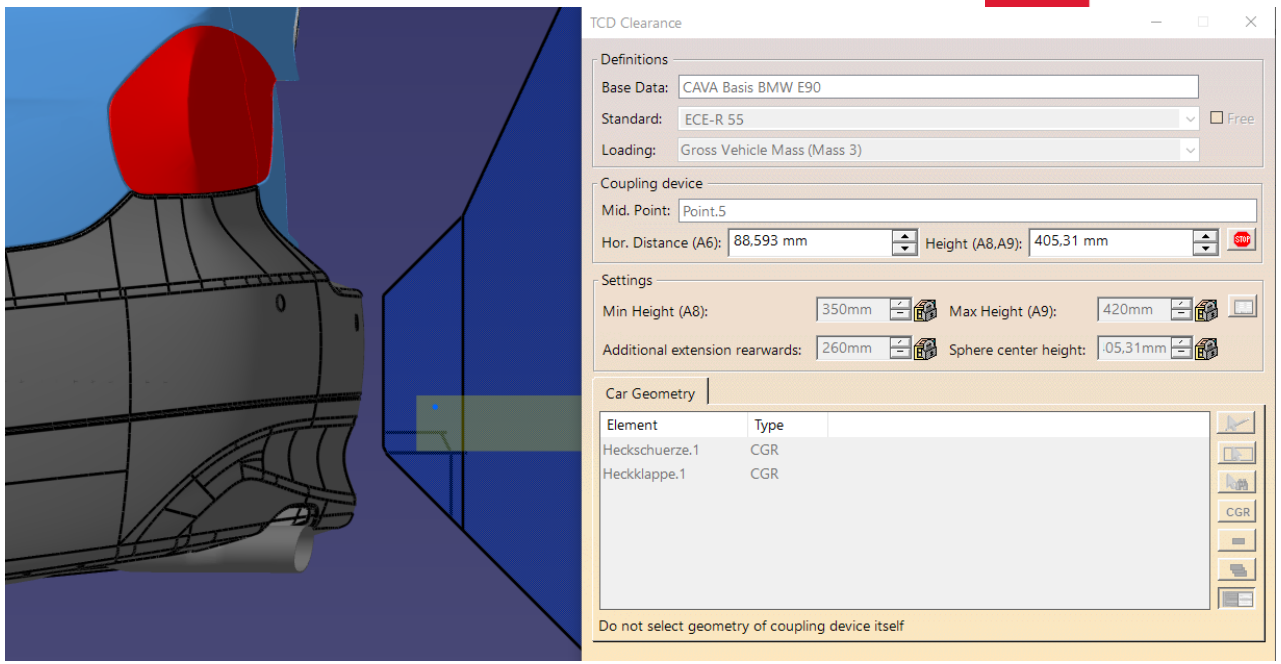
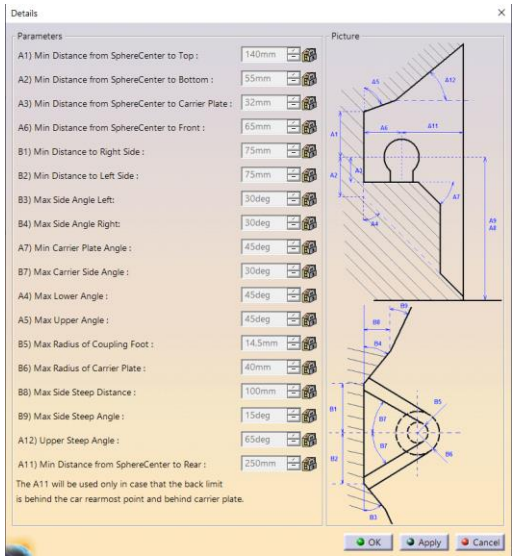
This feature visualizes and checks the required clearance from the TCD (trailer coupling device) to the vehicle geometry.

Supported standards include

- ECE-R 55
- 94/20/EG

Features

- Visualize the required free space around the TCD
- Checks violation of the free space by the vehicle geometry
- Positioning tool to define the TCD center point in the allowed area

Result

- Visualization of the free space around the TCD
- Check result for free space violations