

Design Support

ARB

Objectives

The objective of the anti-roll is to provide adequate settings for the oversteer/understeer balance of the car, as well as limiting camber gain. As a first EV car, the main purpose of Artemiz'25 is to be reliable and easy to drive for beginner drivers, which is why we need to be able to easily tune the car and reach neutral/understeer handling.

Conception steps

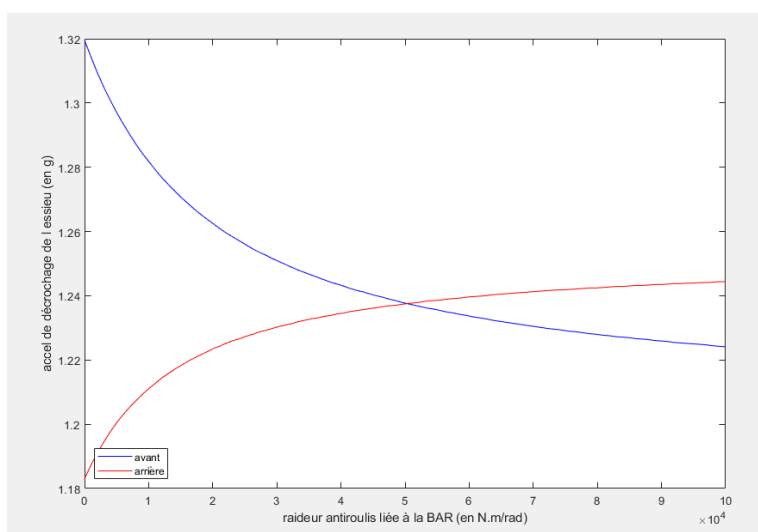
1st step : Do we need an anti-roll bar ?

Under bicycle assumptions, due to COG longitudinal location, natural behavior of the car tends to be oversteery. To reach our objectives, it is therefore necessary to have a sufficient tuning variable, ie being able to stiffen the front suspensions. Changing springs is an option but it means changing the ride height and is not always possible (risk of either bottoming, or failing tilt test). It also affects the compliance in the tires and can lead to overall grip loss.

2nd step : Front, rear, or both ?

- Front is necessary to stiffen the front suspensions easily and avoid oversteer.
- Under bicycle model assumptions, rear ARB isn't necessary. However, we'll need to measure the effect of tires' self-aligning moments and steer compliance, which can lead to a natural understeer behavior. Rear ARB would then be necessary.
- To save design time and make the whole packaging easier, we settled for an ARB at the front only.

3rd step : Mechanical design

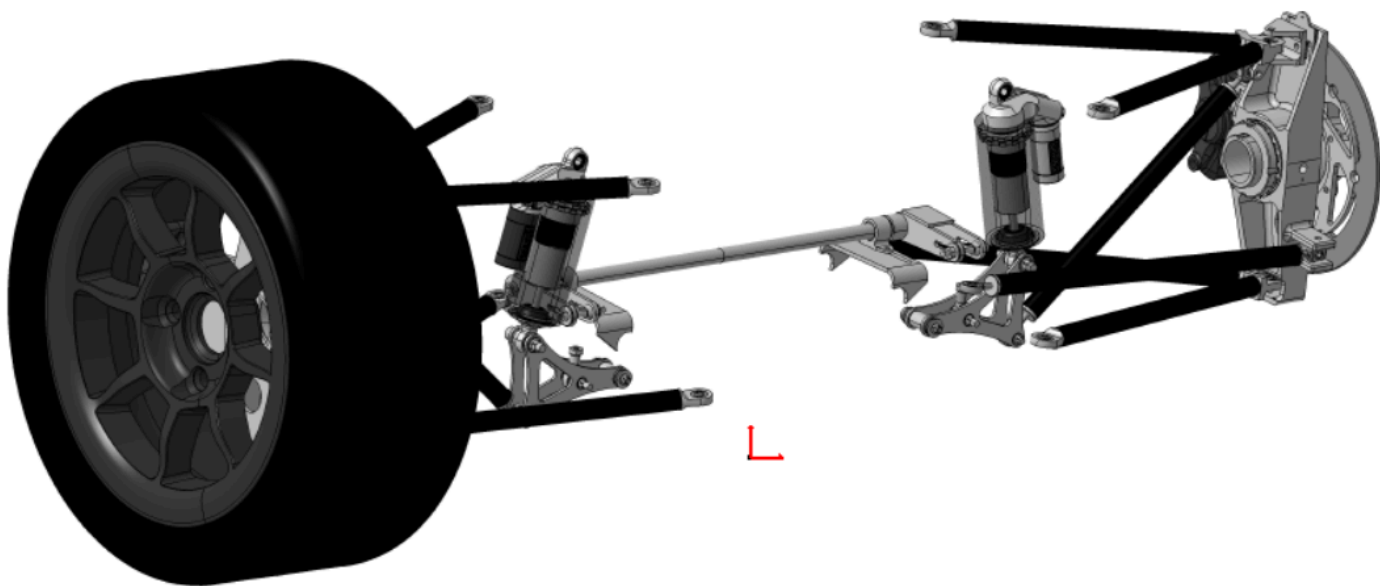


Peak lateral acceleration vs ARB stiffness (front/rear)

- Stiffness chosen to have a slightly understeery behavior
- Material choice :

Material	Strength to weight ratio	Price	Fatigue behavior	Total
Steel	2	5	5	12
Aluminum	3	5	1	9
Titanium	5	2	4	11

4th step : Car integration



Front suspension ARB integration