$$Formula\ for\ D\ interms\ of\ W, L, R_W$$

$$=> R^2 = L^2 + (W + x)^2$$
$$=> We\ \ find\ the\ expression\ for\ x$$
$$=> (W + x)^2 = R^2 - L^2$$
$$=> W + x = (R^2 - L^2)^{\frac{1}{2}}$$
$$=> x = (R^2 - L^2)^{\frac{1}{2}} - W$$
$$=> Next\ we\ obtain\ the\ D\ expression:$$
$$=> (L + D)^2 + x^2 = R^2$$
$$=> (L + D)^2 + [(R^2 - L^2)^{\frac{1}{2}} - W]^2 = R^2$$

$$=> ((L + D)^2)^{\frac{1}{2}} = (R^2 - [(R^2 - L^2)^{\frac{1}{2}} - W]^2)^{\frac{1}{2}}$$
$$=> L + D = (R^2 - [(R^2 - L^2)^{\frac{1}{2}} - W]^2)^{\frac{1}{2}}$$
$$=> D = (R^2 - [(R^2 - L^2)^{\frac{1}{2}} - W]^2)^{\frac{1}{2}} - L$$
$$=> D = \sqrt{R^2 - [(R^2 - L^2)^{\frac{1}{2}} - W]^2} - L$$

Values for W,L,R and L_r

W=1799mm

=>1m=1000mm

=>1799mm=?

W=1.799m

R—Given turning circle diameter as 10.9m

To get wall-to wall turning radius as 10.9m/2=5.45m

R=5.45m

To get L and Lr we need to make some assumptions and simplifications about the car:

We have the wheelbase length =2620mm, and total length from the rear corner to front corner =4258mm

(i) **We assume that the distance from rear corner to rear wheels is equal to the distance from front corner to the front wheels for simplifications**

Therefore:

- ⇨ **x+x+2620mm=4258mm**
- ⇨ **2x=4258mm-2620mm=1638mm**
- ⇨ **x=1638mm/2=819mm**
- ⇨ **x=0.819m**

Lr =0.819m

L =>2620mm+819mm=3439mm

L=3.439m

$$\text{Total gap length} , D + L + L_r$$

Since we have L and Lr, we need to find D using the Formula for D

$$=> D = (R^2 - [(R^2 - L^2)^{\frac{1}{2}} - W]^2)^{\frac{1}{2}} - L$$

$$=> D = \sqrt{R^2 - [(R^2 - L^2)^{\frac{1}{2}} - W]^2} - L$$

$$=> D = (5.45^2 - [(5.45^2 - 3.439^2)^{\frac{1}{2}} - 1.799]^2)^{\frac{1}{2}} - 3.439$$

$$=> D = 1.439788mm \approx 1.44m$$

$$=> Total\ gap\ length = 1.44m + 3.439m + 0.819m = 5.698m$$

THE END!!!

THANK YOU!!!