THE ROYAL SOCIETY

Be A Crash Test Investigator

Calculation between vehicle A and vehicle B

The 'Skidman' provides a deceleration figure in metres per second per second or ms^{-2}.

The results for this scenario are as follows:-

(1) -6.87 ms^{-2} **(2) -6.99 ms^{-2}**

The other values that are required that are not on the plan drawing are as follows

Mass of Car A = 1200 kg

Mass of Car B = 1400 kg

The formula for the tyre skid marks is **$v^2 = u^2 + 2as$**

Where v = final velocity (ms^{-1})
u= initial or starting velocity (ms^{-1})
a= acceleration (ms^{-2})
s =displacement

Conservation of Linear Momentum

When two or more bodies act upon one another, their total momentum remains constant, providing no external forces are acting upon them.

Total momentum before the collision = Total momentum after the collision.

$$m_A u_A + m_B u_B = m_A v_A + m_B v_B$$

For the purposes of the following calculations we are considering the momentum in the direction as travelled by car A, hence the reason the momentum for Car B below is zero.

1. Hypothesize what you think happened and what are the possible road traffic rules that have been broken.
2. State who you think might be to blame in this situation.
3. Calculate the speed the vehicles both have after they have collided. *You will need your equations of motion to complete this.*
4. If the car at the junction (car B) had an initial velocity of 0 ms^{-1} in the direction along the main road, calculate the minimum speed car A was travelling as he collided with car B. *You will need the conservation of momentum equations to complete this.*
5. Calculate the minimum speed of Car A as the wheels locked and produced skid marks.
6. Convert this speed to miles per hour by multiplying by 2.2.
7. Identify who was to blame for this collision and give your reasons.