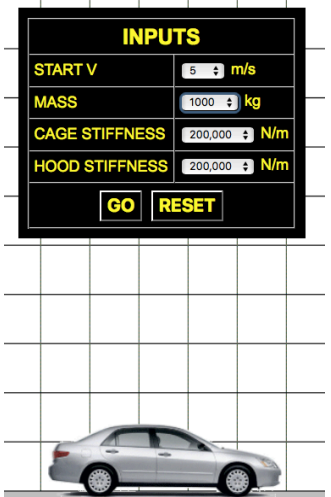


Safe Vehicle Design

Your task is to adjust the hood & cage stiffness to keep the cage crush as low as possible and the g's as low as possible.

You have been assigned a vehicle mass of **1000 kg**

Try different combinations of cage and hood stiffness until you make the vehicle as safe as possible. Crushing the hood completely is fine. At high speeds, the numbers will get ugly!



QUESTIONS

To keep the g's low, what do you need to do?

To keep the people from being crushed, what do you need to do?

Which should be stiffer: cage hood

| start v | cage stiffness | hood stiffness | max decel g's | cage crush | hood crush |
|---------|----------------|----------------|---------------|------------|------------|
| 5 m/s | | | | | |
| 10 m/s | | | | | |
| 15 m/s | | | | | |
| 20 m/s | | | | | |

The image shows a screenshot of a car crash test simulation interface. On the left is an 'INPUT' panel with four adjustable parameters: 'START V' (5 m/s), 'MASS' (1000 kg), 'CAGE STIFFNESS' (200,000 N/m), and 'HOOD STIFFNESS' (200,000 N/m). On the right is an 'OUTPUTS' panel showing results: 'CRASH DURATION' (0.18 s), 'MAX DECELERATION' (5.1 g's), 'CAGE CRUSH' (0.25 m), and 'HOOD CRUSH' (0.25 m of 2 m). A central text box contains instructions: 'Start at 5 m/s', 'Set & keep the same', and 'Adjust these to keep these from turning red.' Red circles and arrows highlight the 'START V' and 'CAGE STIFFNESS' input fields, the 'MAX DECELERATION' output field, and the 'Adjust these to keep these from turning red.' text. At the bottom, a small 3D model of a silver car is shown crashing into a grey rectangular barrier.

| INPUT | |
|----------------|-------------|
| START V | 5 m/s |
| MASS | 1000 kg |
| CAGE STIFFNESS | 200,000 N/m |
| HOOD STIFFNESS | 200,000 N/m |

Start at 5 m/s

Set & keep the same

Adjust these to keep these from turning red.

| OUTPUTS | |
|------------------|---------------|
| CRASH DURATION | 0.18 s |
| MAX DECELERATION | 5.1 g's |
| CAGE CRUSH | 0.25 m |
| HOOD CRUSH | 0.25 m of 2 m |

Note: at higher speeds, it might not be possible, but do the best you can.

Clickable Link: <http://www.mrmont.com/games/crashtest.html>