



# A. JAMES CLARK SCHOOL OF ENGINEERING



# [Inflatable Seatbelt]

[Ehab Hijazi Hasan Ozkan Charles Shorter Yohanes Dejen Michael Stevens Syed Hasan]

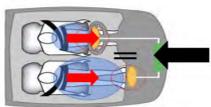
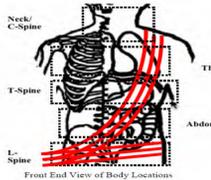
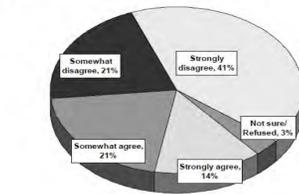
# Mechanical Engineering Design Day

Date: November 30, 2010

- 25% of vehicle collisions result in a seatbelt injury. (2.9million\*.25=725000)
- There are 16.1 -17.4 million new cars sold yearly
- Customer requirements: Safety, Reliability, Comfort, Reusability, Ease of installation, Aesthetics, and Cost
- Engineering characteristics: Force, Inflation & Deflation Air Pressures, Deformation of Air Tube, Seatbelt Adjustability, & Controller
- Constraints: Force Distribution, Inflation & Deflation Air Pressures, & Controls
- Physics: Must be able to restrain an average weight person moving at 40mph (150lb\*40mph)=60000lb

## Objective

Seat Belts Are Just As Likely To Harm You As Help You



Collision Forces  
(Go? G activates inflation: >27mph causes injury)  
Weight (lbs) x Speed of collision = Restraining force

For an average 150 lb person, a 37 mph collision would require a restraining force of ~5550 pounds.

Approximate inflation range

Reducing 5550 pounds by about 3 times, the inflatable seatbelt would bring the required force to 1850 lbs.



Material	Quantity	Unit Price	Total Price
SUNLITE TUBE	6	1.00	6.00
MASTERFLOW INFLATOR	84	1.00	84.00
MASTERFLOW DEFLATOR	50	1.00	50.00
GM BUCKLE	15	1.00	15.00
REGULATOR	1	1.00	1.00
SENSOR	1	1.00	1.00
RELAY	1	1.00	1.00
TRANSISTOR	1	1.00	1.00
BATTERY	1	1.00	1.00
WIRE	1	1.00	1.00
SWITCH	1	1.00	1.00
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