



PROBLEM

Every game season, **20%** of hockey players receive concussions. A major reason for these concussions is ice hockey helmets do not fit players well.

SOLUTION

A helmet that provides custom fitting with more protection while maintaining the traditional style for NHL players.

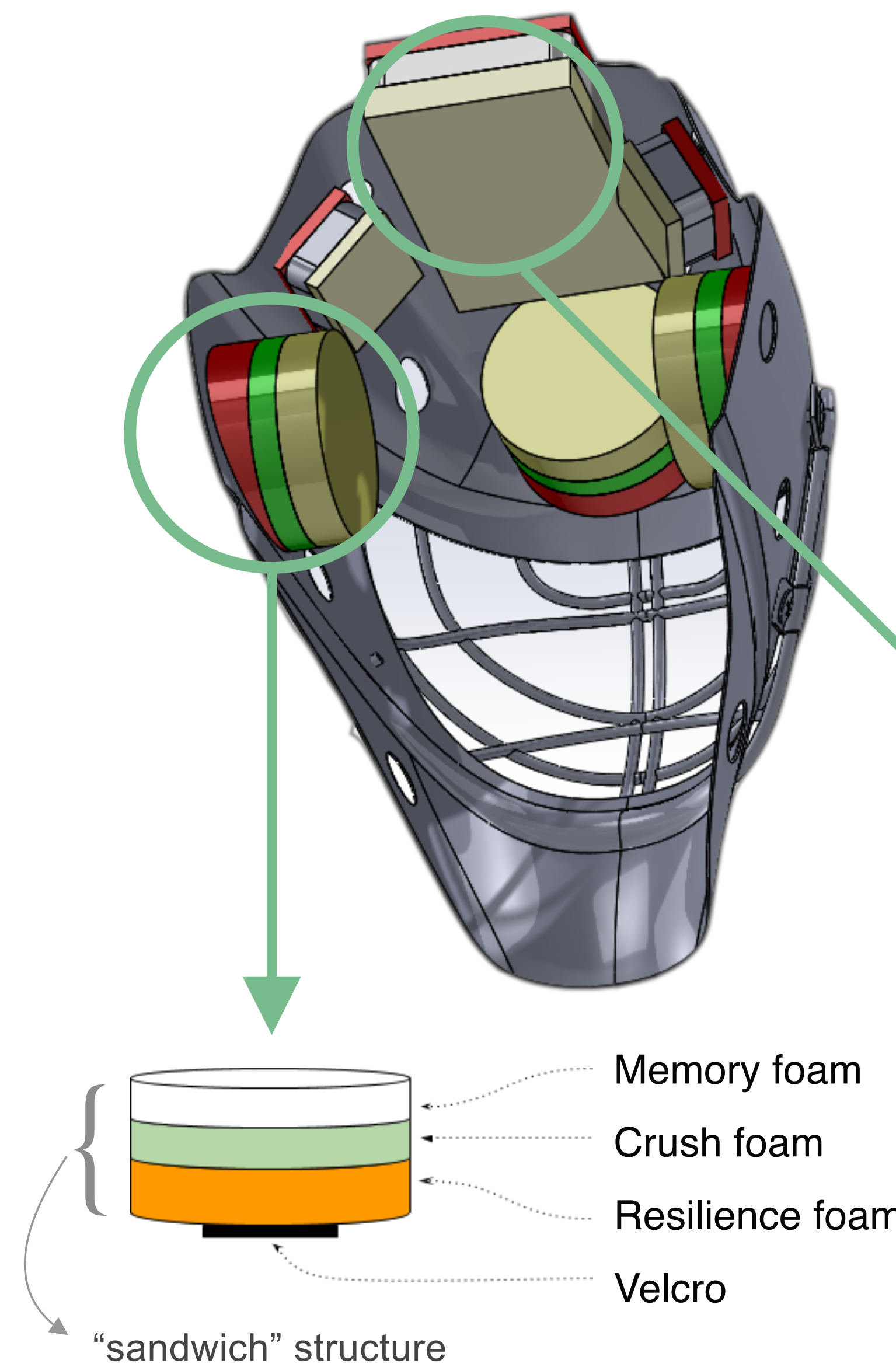
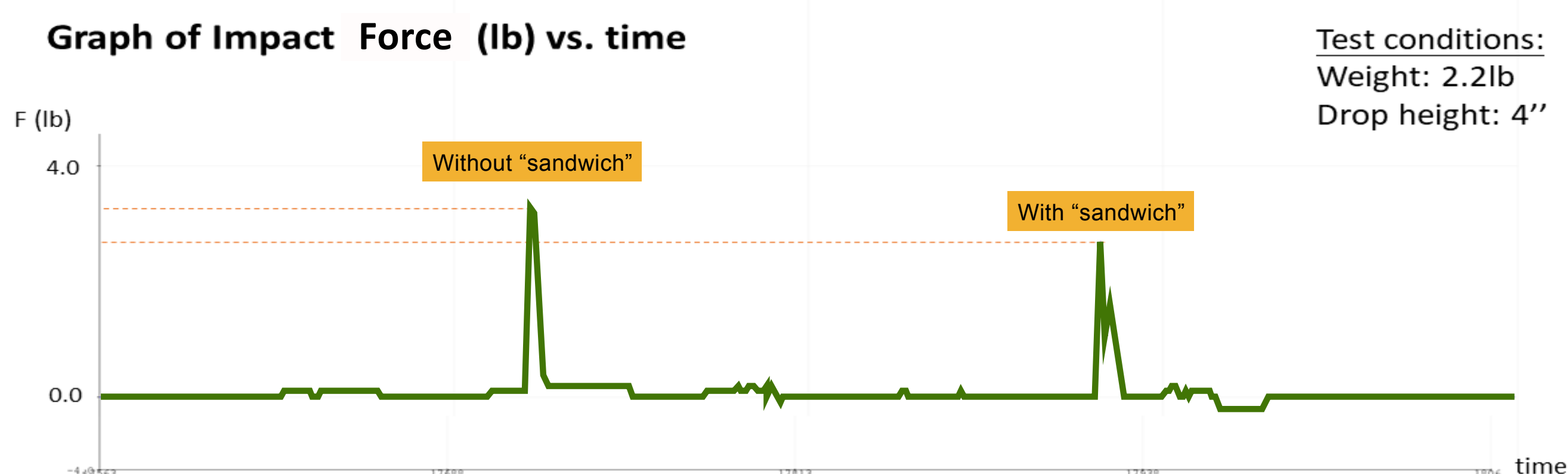
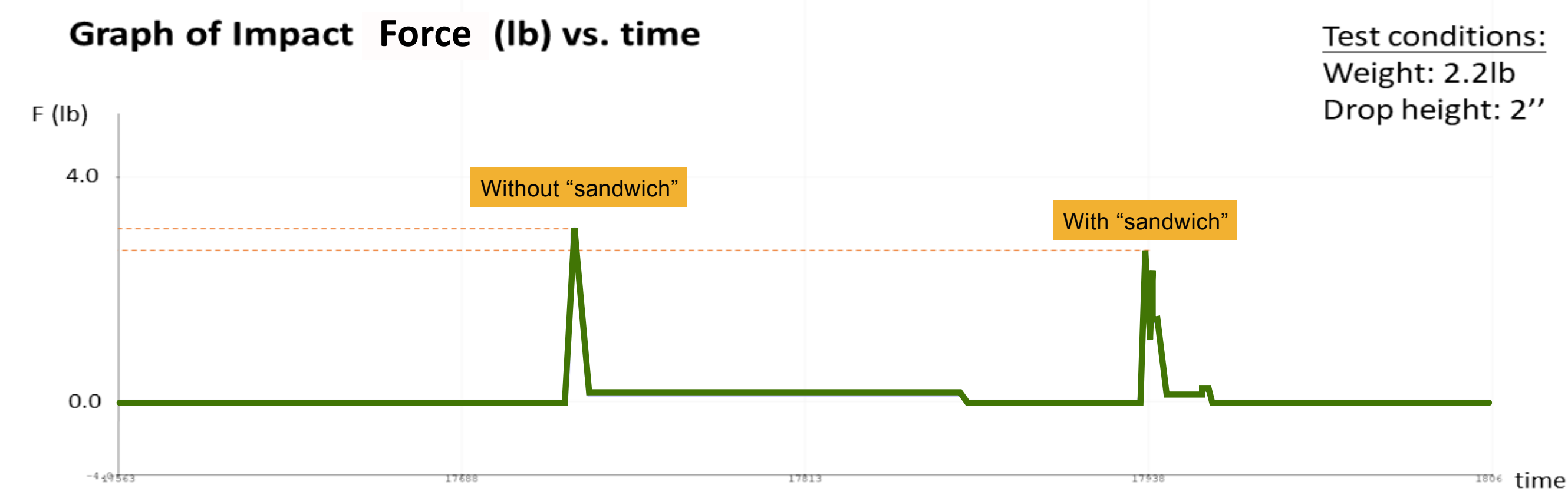
INSPIRATION

- Car crash > absorb energy > use EA foam
- Skate pump fitting > use TPU airbag



IMPACT TESTING

- The “sandwich” structure is effective at absorbing force
- Our data show effectiveness increases as force increases



Customization

3 sandwich sizes and adjustable airbags fit a wide range of players



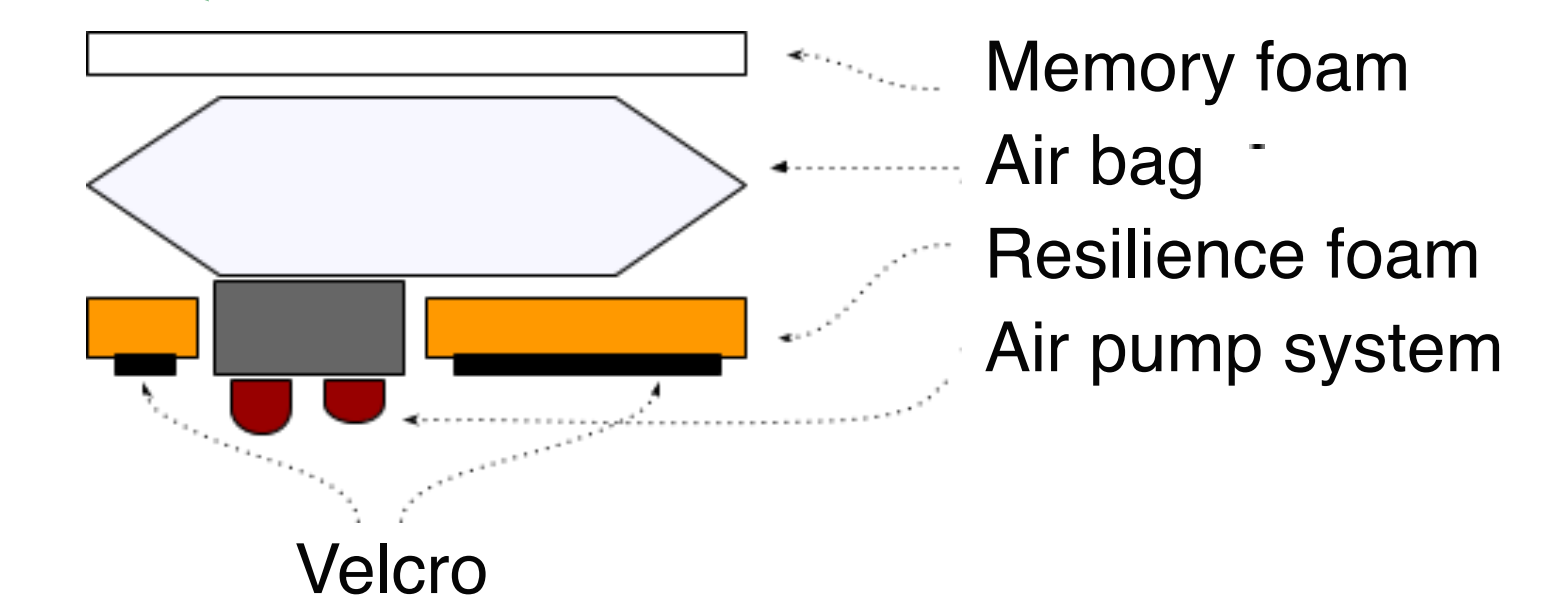
Safety

Prevent concussions and lost play time with our design



Ease of Replacement

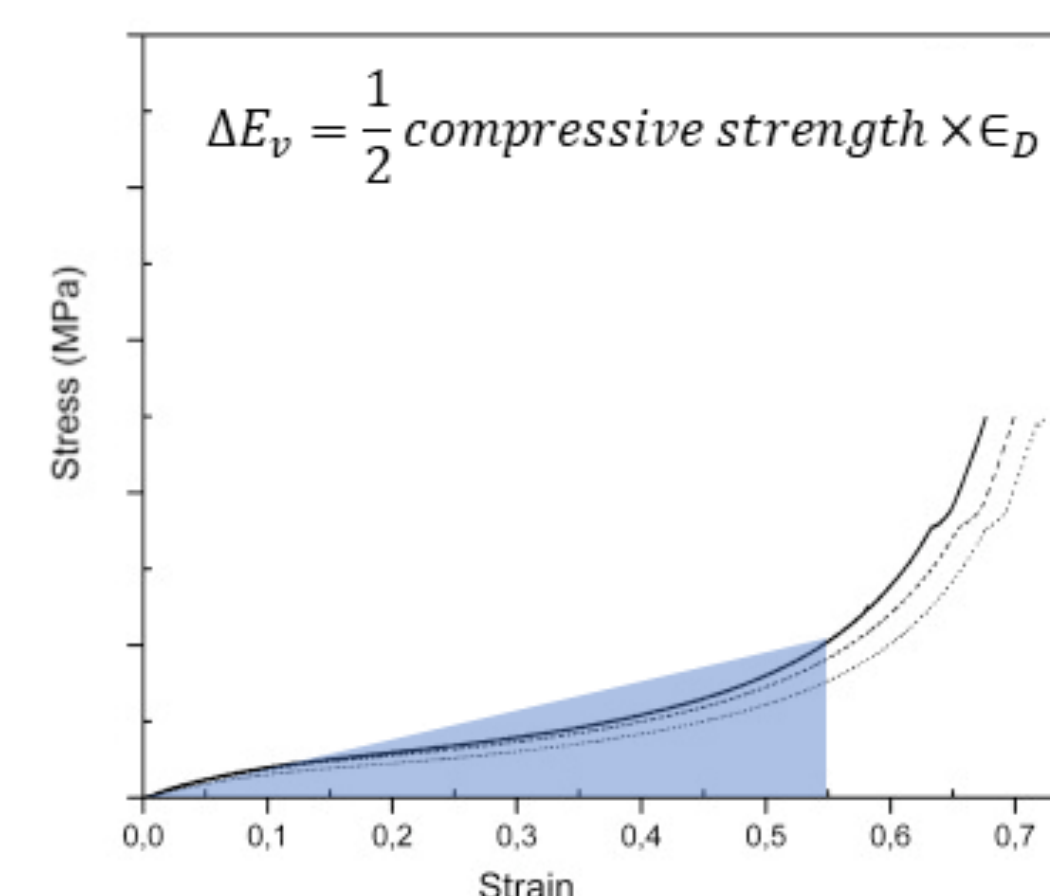
Put Velcro to Velcro and you're good to go! Very intuitive!



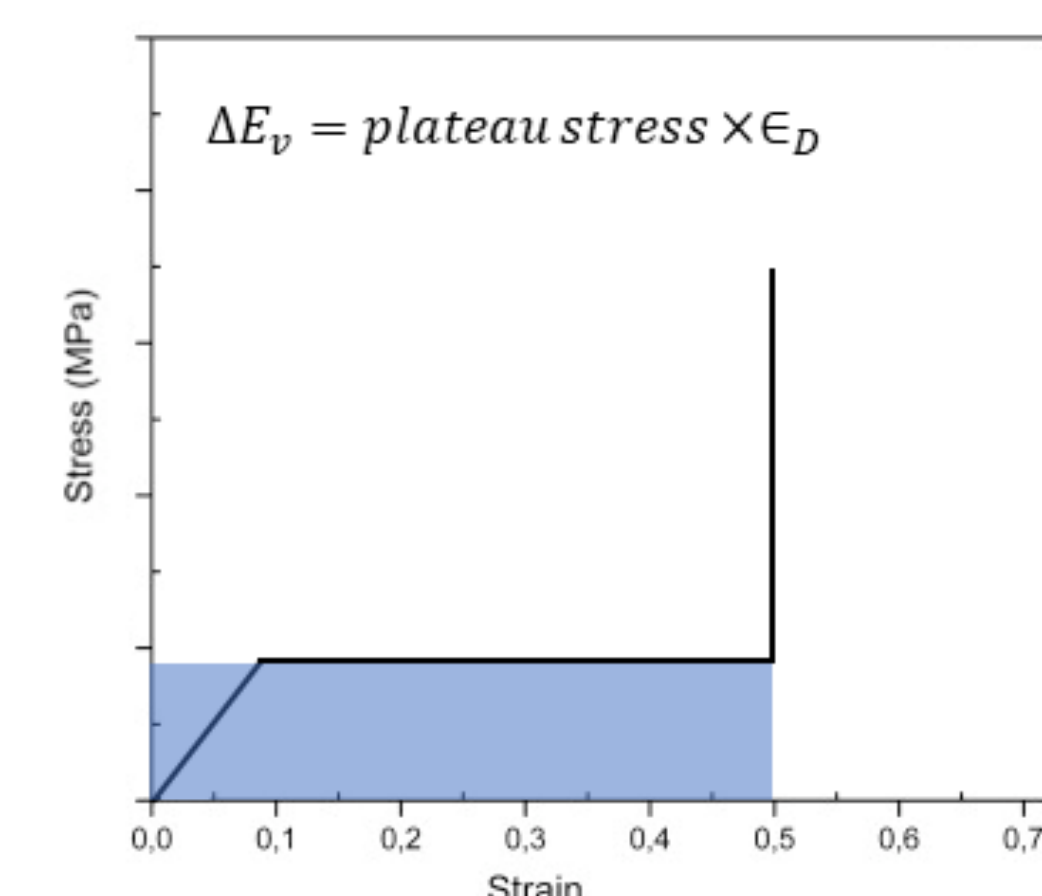
EFFECTIVENESS

- The impact energy experienced by player's head decreases by 69%
- Head injury Criterion (HIC) decreases by 42%

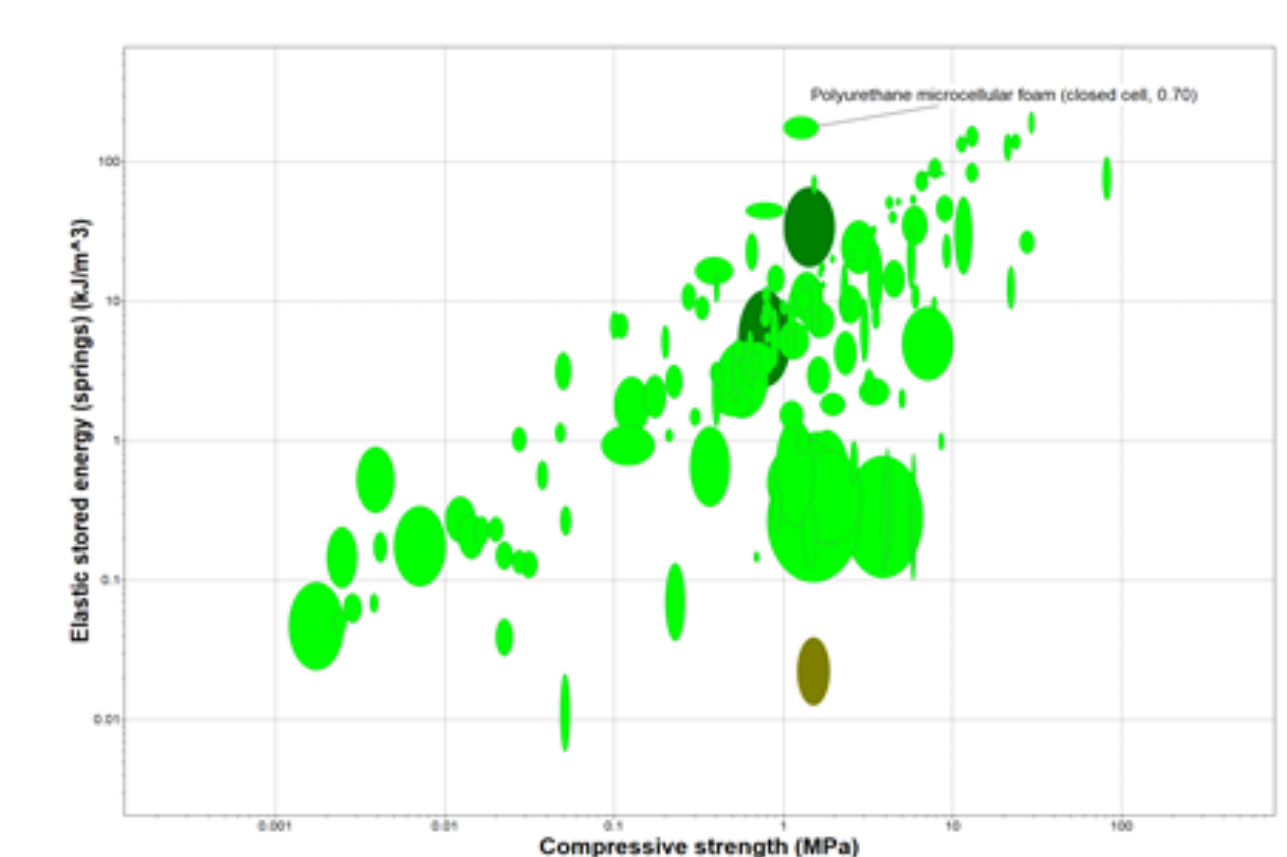
High-resilience foam energy absorption



Semi-rigid foam energy absorption



Property charts of candidate materials



Scenario: head-on collision between two 200lb players at 15mph during a check

Equation 1: $HIC = \left(\frac{1}{t_2 - t_1} \int_{t_1}^{t_2} \hat{a}(t) * dt \right)^{2.5} * (t_2 - t_1)$

Equation 2: $\Delta E = \frac{1}{2} m_A v_A^2 + \frac{1}{2} m_B v_B^2$

Equation 3: $F = \frac{\Delta P}{t} = ma$

	Without helmet	With our helmet	Difference
$\Delta E_{head} (J)$	90.5	28.3	68.7%
$a(g)$	29.3	23.7	20%
HIC	340	194.6	42%