

Project 3: New guitar case (guitar plus amplifier)



Background:

Pianos are static; guitars are mobile. Guitars need a case to protect them while moved, and if they are electric, they need an amplifier and speaker and they too have to be moved and protected. The mission is to simplify this protection problem by designing a case that will hold and protect both, the guitar and the amplifier plus speaker.

Objective:

Select materials and a process method to make a case for guitar and amplifier.

Requirements:

- Must be tough – the rule of thumb here is that the fracture toughness, K_{Ic} , should be greater than $18 \text{ ksi}\sqrt{\text{inches}}$
- Must be moldable
- Very good resistance to fresh and salt water
- Must be light
- Should not cost too much

The project will require the use of Level 1+2 of CES. Set the selection to Level 2, Materials. Use a *Limit stage* to apply the first 3 requirements: selecting *Mechanical properties* to apply the first, *Processability* to apply second and *Environmental properties* to apply third. Then make a graph stage with Price on the X-axis and Density on the Y-axis to find out which of the survivors is the cheapest, and which the lightest. Remember you can “grey-out” materials on the graph that do not meet the limit stage criteria by clicking the little icon like two intersecting circles in the row of icons along the top of the graph.