

## **Drop Weight Impact Analysis of Laminated Polyurethane Foam/Cloisite 30B Clay**

### **Abstract**

Laminated polyurethane foam composite was produced by incorporating Cloisite 30B clay as filler and aluminium sheet as the skin. Initially, PU foams were synthesized with reaction of natural oil polyol and isocyanate with ratio of 1:1.1 by weight. Water was used as the blowing agent and appropriate surfactant and catalyst were added to ensure better performance of end product. Cloisite 30B was added as filler and the percentages were varied from 1 to 5 wt%. Al skin was attached at the top and bottom of the foam to increase the stiffness of the composite and improve its mechanical properties. In order to evaluate its impact characteristic, drop weight impact test was done and the drop height was varied from 5 cm to 20 cm. The results showed that there was no pattern that exists in the impact force, but found the results for the control PU foam (PU foam without filler) has a high impact force values at 5cm, 10 cm and 15 cm drop heights. The incorporation of clay particles were found to give lower impact force to the sample, especially at low filler percentage of 1%. It was found that the addition of clay particles has decrease the impact force of PU foam due to brittleness. Besides, the impact force of the laminated composite is higher than PU foam at the same drop height. For laminated composite at 10 cm, the impact force is higher with an average value of 817% as compared to PU foam. This shows that the addition of Al sheets have improved mechanical characteristics of foam and its ability to withstand higher impact force.

Keywords; Clay, Drop Weight Impact, Laminated Composite, Polyurethane Foam