

Abstract Submitted
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Mechanical and Stability Analysis of Hand Truck Using Physical and Numerical Calculations DANIEL LEE, RICHARD KYUNG, Choice Research Group — As an alternative to a traditional forklift or tailgate loader, the hand truck serves as a quick and easy solution for lifting, carrying, and loading small materials as well as goods, using the principle of the lever to multiply forces. Today's forklifts and hand trucks are lighter and easier to use. They also include features such as automatic uploading and brake devices. However, there are still many ways to improve hand trucks and make them more comfortable and efficient. Present research includes mechanical and stability analysis of the hand truck. To ensure structural stability and to figure out whether the internal forces in the materials are tensile or compressive, our research focused on setting up equilibrium equations and calculating the forces on each links and members of the hand truck. In addition, we presented an analytical method to determine the static forward, rear, and lateral stability of the hand truck on a tilting platform. The weight and dimension of the goods, along with the location of the center of gravity, were shown as the factors affecting the stability. The objective of the second part of the presented research was to determine the extent of the effect of load positions on the hand truck stability.

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