

Title:

Design and Development of a Loader Bucket Wheelbarrow

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Abstract:

This paper briefly introduces the design and analysis of developing the loader bucket at the front of the wheelbarrow to create an assisting system for lifting load into the wheelbarrow. To operate the wheelbarrow, the user has two jobs, which is to manoeuvre the wheelbarrow and scoop the load using a shovel or lifting the load using bare hands. The process of loading and unloading the wheelbarrow could cause discomfort to the waist area for prolonged and repeating work for many hours throughout the day. Moreover, the ergonomic factor is also being considered when using a shovel or even lifting some load using bare hands. Furthermore, to overcome this problem, the wheelbarrow is designed to have its loader bucket at the front of it to do the jobs. The six-point linkages, a pneumatic actuator is assembled with the loader bucket and being controlled by an electric motor. This design has made the jobs easier, effortless, and very safe to the users. The design process starts with data collection of necessities from the users to have a clear problem statement of the current wheelbarrow. Then generations of some ideas of the loader bucket are made, and some design tools assessed them until the final conceptual design created by a CAD software. On a final note, to verify the design, the final design was analysed in terms of its strength through stress and deformation analysis by using a CAD software as well. The result of the whole assembly of loader bucket wheelbarrow after modification is acceptable with the deformation for stress is $6.297e + 07$ N/m², the deformation for displacement is 2.062 mm and the strain is $6.247e-04$.