

WEIGHT LIMIT FOR LIFTING-RELATED LOW BACK PAIN PREVENTION: A MATHEMATICAL MODEL

BY

O. E. Charles-Owaba, *PhD*; S. O. Ismaila, *PhD*
Industrial and Production Engineering Department
Faculty of Technology, University of Ibadan, Ibadan, Nigeria

ABSTRACT

Manual load lifting is reported as responsible for about 75% cases of low back pains (LBP), the source of agony to many workers and heavy losses to industry. In the past three decades, a considerable amount of ergonomic research has been directed towards finding the limit a worker can lift, lower or carry to avoid LBP. The most celebrated result was the 1991 NIOSH equation made mandatory for industrial lifting task design. Industry's acceptance is, however, very low because of the model's lack of features for selective matching of tasks to individuals for higher productivity. In this paper, a scientific bases for a safe-weight of lift was established and a mathematical model for computing individual's weight limit was formulated in terms of worker's spinal length, chest size, work-period height shrinkage and spinal-disc's Modulus of elasticity. Others include such lifting task parameters as horizontal and vertical load distance; vertical load displacement and the angle of lift. Also outlined are the steps a healthy individual can take to determine his/her weight limit for lifting-related low back pain prevention. Applying the model, higher labor productivity plans can be pursued along mandatory prevention of LBP at the work place.