The major objective of this research is to study the lifting capacity of Indian industrial workers and develop predictive models for lifting capacity for low level, repetitive, manual lifting tasks. Both single-man lifting and two-men lifting tasks are considered for investigation.

A secondary objective is to investigate the effects of posture, container type, frequency, height level and body twisting on manual lifting performance and also to suggest a methodology for estimating the metabolic cost of lifting activities.

This investigation is planned in three parts:

In the first part, experiments are conducted to determine the influence of the type of container, frequency of lift, height level, body twisting while lifting and the posture on the manual lifting performance.

In the second part, Bernard's model for estimating oxygen consumption of manual tasks is checked for its applicability to manual lifting tasks by actually measuring the oxygen consumption rate. Also, an equation is proposed for the estimation of pulmonary ventilation during manual lifting tasks.

The third part experiments lead to the development of predictive models for obtaining the maximum acceptable
load. These models are developed in terms of job specific
dynamic lift strength instead of static strength. Models are
developed both for single-man lifting tasks and two-men
lifting tasks.

Based on the results of the research, the
following are some of the major conclusions arrived at.

With a simple measurement of job specific dynamic
lift strength, the predictive models can be used for
selection and placement of employees for manual lifting
tasks. The proposed model for estimating pulmonary
ventilation along with Bernard's model can be used for
estimating the rate of oxygen consumption during manual
lifting tasks.

It is found that the bucket type of container may
be preferred to rectangular shaped containers for lifting
uniform density materials since with bucket the lifting
capacity is more and the stress due to lifting is less. The
regression equation proposed for predicting the peak
compression force on L5/S1 disc may be used to determine the
lifting capacity of an individual for infrequent lifting
tasks.

It is suggested to adopt two-men lifting wherever
possible. Because, with proper pairing of subjects with two-
men lifting, significantly more load can be lifted per lift
compared to the sum of the loads that can be lifted by the
two men independently.