



INTRODUCTION

The total cost of unintentional injuries at work in the US was estimated to be over \$175 billion in 2007 (NSC, 2009). Approximately 40% of occupational injuries and illnesses resulting in days away from work were strains and sprains, 24% were associated with overexertion, and 13% with overexertion while lifting (NSC, 2009). In the marine industry, sprains represented approximately 20% of injuries resulting in days away from work (ABS, 2010). It is also estimated that 70 million working days are lost each year in the United Kingdom (UK) due to back pain (Pheasant, 1990).

There are many factors that affect personnel's ability to safely and effectively perform materials handling tasks, including the design of the task, the form of the material handled, the design of the working area, the availability of assisted lifting devices, and the physical/physiological characteristics of the people themselves.

Keys to Acceptable Materials Handling and Lifting. A general approach to designing for materials handling and lifting tasks include the following:

- Avoid manual materials handling altogether, whenever possible
- Redesign the load
- Redesign the lifting/carrying task
- Redesign the working environment
- Introduce assisted lifting devices.

One-versus Two-Person Lifting and Carrying. In general limits on lifting and carrying are as follows:

- Items weighing up to 20 kg (45 lbs.) or less may be lifted or carried by one person.
- Items weighing more than 20 kg (45 lbs.) and less than 40 kg (90 lbs.) should be lifted or carried by two persons, provided the lifting load is distributed equally between the two.

Assisted Lifting. Assisted lifting devices (e.g., padeyes, chain falls, come-alongs, rail cranes, mono-rails, etc.) should be provided for items or devices under the following conditions:

- Load weight in excess of 11kg (25 lbs.), for loads which are lowered from or placed in locations greater than 1525 mm (60 in) high
- Load weight in excess of 11kg (25 lbs.), which needs to be supported during removal, replacement, or installation
- Load weight in excess of 20 kg (45 lbs.), where the load is not distributed evenly or is bulky
- Load weight in excess of 40 kg (90 lbs.).

TERMS/DEFINITIONS

Anthropometrics: The measurement of human variability of body dimensions and strength as a function of gender, race, and regional origin.

Assisted Lifting: The use of devices such as cranes, hoists, counter-balancing mechanisms, trolleys, mono-rails, come-alongs, padeyes, or A-frames by personnel to perform materials handling tasks.

Center of mass: the mean location of all the mass in a system (sometimes "center of gravity is used).

Ergonomic: Designed for ease of use, maximum comfort, efficiency, and safety.

Manual Materials Handling: Actions taken by personnel to physically (manually) lift, lower, push, pull, hold, or carry loads.

Personal Protective Equipment: Specialized clothing or equipment worn by employees for protection against health and safety hazards