

Manual Handling Process improvements using an ergonomic approach

Andrew McGiffert

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Purpose of the assessment

The aim of this assessment is to better understand the musculoskeletal risks involved in the task of manually loading pallets.

Task Details

This task is performed during the hours 7am to 3pm, by approximately 8 people on average. The shift breakdown is shown below:

7am to 9am	Work period	2hrs
9am to 9:20am	Rest period	20mins
9:20am to 12pm	Work period	2hrs 40mins
12pm to 12:30pm	Rest period	30mins
12:30pm to 3pm	Work period	2hrs 30min

The work area is divided by bays, the conveyor is laid out in a herringbone fashion, staff members stand at the centre of each line coming off the main conveyor. Pallets are placed on the left and right of the staff member. Pallets are placed at ground level and positioned at a 45 degree angle to enable a clear view of the bay and staff member to pallet mover drivers.

As boxes move along the conveyor they are distributed into each of the herringbone lines, the staff member is required to lift the items from the roller conveyor and place them onto the appropriate pallets. The distance of travel is short and the task is performed without need for twisting. There are usually five different pallets on each line that the staff member must separate the boxes across different pallets, weights of boxes vary.

The staff member is able to access all sides of the pallet for loading in order to achieve the correct configuration on the pallet. It is at the individual staff member's discretion as to whether they stock the pallet from the middle of the bay or walk around it to do so.



Figure 1: Bays in the SA 5/6 Line with space in centre for standing pallet mover



Figure 2: Space available 'behind' the pallet in the bay

Within the Herringbone conveyor layout there are 10 lanes, each with a maximum of 5 pallet positions. The lanes are divided by state, with a mix of stores taking the pallet positions. Team members are assigned to individual lanes.

Measurements

Physical measurements

Empty pallet height:	150mm
Conveyor belt height:	830mm
Completed pallet height:	1400mm – 1800mm

Frequency rates

Number of operating bays:	5
Pallets loaded per shift/per bay	180-250 (approximately)
Pallets loaded per worker per shift:	40 (approximately)
Number of boxes/units per pallet:	14 (average)
Number of boxes/units loaded per shift per worker:	560 – 600 (approximately)
Weight of boxes/units:	1-20kg

NIOSH Lifting Equation Assessment

NIOSH has developed an equation for calculating the recommended weight limit (RWL) that nearly all healthy workers could perform in a specific task over a specified period of time, without an increased risk of developing lifting-related low back pain.

“The revised lifting equation for calculating the RWL is based on a multiplicative model that provides a weighting for each of six task variables. The weightings are expressed as coefficients that serve to decrease the load constant” (Huynh).

For this assessment all six variables have been measured, HM – Horizontal multiplier, VM – Vertical multiplier, DM – Distance multiplier, AM – Asymmetrical multiplier, FM – Frequency measurement and CM – Coupling measurement, their associated co-efficients have been calculated to measure the safe lifting limit for the task when the pallet is at ground level.

NIOSH recommends a maximum load of 23kg under ideal lifting conditions. An ideal condition is a load that is to be lifted no more than 75cm above the ground, held no more than 25cm in front of the body, lifted no more than 25cm vertically and only lifted occasionally. The 6 variables (coefficients) have been developed to reduce the RWL to account for task factors that cause departures from the above ideal lifting scenario.

The Recommended Weight Limit for the task of lifting boxes/units from the conveyor belt and placing them onto a pallet at ground level is as follows: