

Improving Ergonomics and Reducing Physical Workload in Cargo Operations

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OPERATIONAL CONTEXT



Air cargo operations are a fast-paced process that starts with receiving cargo at the facility and continues until the cargo is prepared for flight. In this process, manual lifting, lowering, and carrying activities are performed frequently. In areas where automation cannot be used, employees are required to perform physically demanding movements on a regular basis. This physical effort, together with the difficulty of maintaining proper posture in a busy work environment and the need to handle loads of different weights manually, may lead to long-term health problems and fatigue for employees.

Wearable and physical support equipment is important because it provides mechanical assistance to employees during lifting, carrying, and build-up activities. This support helps reduce the load on back and joints, maintaining proper posture, and contributes to a more ergonomic working environment.

How Are Ergonomics And Physical Workload Processes Managed?

Human muscle power remains essential across air cargo processes, particularly in narrow spaces and areas where automation cannot be used. Physical strains generally occur across the following stages:

- **Acceptance and Handling:** Cargo may be moved by personnel from acceptance points or sorter lines to flight destination areas using manual labor. The high handling pace and repetitive movements in this process quickly increase employees' physical fatigue.
- **Build-up:** During flight preparation, cargo is manually stacked inside ULDs (air cargo pallets/containers) in a way that ensures optimal use of space.
- **Break-down:** Break-down operations for heavy and non-standard cargo arriving from inbound aircraft require a high level of physical effort. Manual handling of these loads, which vary in size and weight, requires continuous effort and creates a directly exhausting impact on employees.

How Might We Canvas

Who?

who are the stakeholders that get effected?

Warehouse Operations Teams, Cargo Handling Personnel, Occupational Health and Safety (OHS) Specialists, Operations Managers

What?

what is the problem that needs to be solved?

Employees working in operations that require intense physical effort experience ergonomic strain due to repetitive movements and the manipulation of heavy loads.

Why?

why is this problem worth solving?

Excessive physical effort and poor posture lead to fatigue, musculoskeletal disorders, and losses in operational sustainability and efficiency.

How?

how can this problem be eliminated?

By directly supporting personnel physically through exoskeletons, mechanical support wearables, load-reducing equipment, and robotic assistance systems.

Challenge:

How might we develop solutions that reduce employees' physical workload in air cargo operations, minimize musculoskeletal system risks, provide ergonomic support during repetitive and demanding tasks, and reduce personnel fatigue?