

Focus on IFA's work

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Reduction of stress upon baggage handlers and ramp agents at airports

Problem

Employees involved in baggage handling tasks at airports are subject to high levels of stress. The large number of load handling operations and the weight of the baggage items lead to strain upon the musculoskeletal system, particularly the back.

In addition, ramp agents must load and unload the low baggage compartments of narrow-body aircraft in a kneeling posture. Various international studies have examined these stresses and the scope for reducing them. Workplaces in the baggage compartments of narrow-body aircraft were described by 70% of those questioned in the studies as involving high levels of stress.

Activities

In the context of the TAQP project (a systematic action plan for productivity and health; the German acronym TAQP stands for technological innovation, work organization, training and prevention), two new engineered systems have been introduced for airport use: three vacuum lifters in the baggage handling centre, and eight rollertrack conveyors on the airport ramp. The project is being conducted jointly by Fraport AG and the DGUV.

The IFA studied the reduction in stress achieved by the new systems. For this purpose, baggage handling personnel were studied by means of the CUELA measurement system developed within



Ramp agent with CUELA measurement system

the IFA. The measurement system is worn on the workers' clothing, and records all ergonomically relevant body movements and load manipulations.

It was used to determine the stresses upon ten baggage handlers at the technically modified workplaces and at the existing, unmodified workplaces. The results were then compared.

In addition, the stresses upon 13 ramp agents were measured during 15 loading and unloading operations, during which a total of 719 items of baggage were loaded and 848 items unloaded.

Results and Application

It was observed that the high risk to baggage handlers of contracting a spinal/discogenic disorder could be reduced to an acceptable level by the vacuum lifter. In view of the reduction of up to 90% in manual handling and lifting operations, sustained influence upon the employees' health may be anticipated. An important objective of the measure is thus reached, not least in consideration of an ageing working population. Lifting of baggage without exertion of force by means of the lifter, even in a bent-forward posture, relieves the stress upon workers.

The body posture itself was not significantly improved by the use of the lifter.

The measurements showed that use of the lifter reduced working speed by 21%; the handling rate was nevertheless still higher than that necessitated by the average daily baggage volume.

A further benefit of the lifter is its compatibility with the conventional work process. In the event of technical problems, reversion to the manual baggage handling procedure is smoothly possible. In addition, several baggage handlers are able to work on the baggage conveyor simultaneously with the lifter and conventionally. This high degree of flexibility enables seasonal peaks in passenger volumes to be handled.

The proportion of time in knee straining postures by ramp agents is high, regardless of whether the rollertrack conveyor is employed. This is due to the low height of the baggage compartments on narrow-body aircraft.

When the rollertrack conveyor was used, a clear reduction in stress of 53% was observed in terms of the force which ramp agents must exert during loading the aircraft. In addition, the body inclination was improved.

During unloading of the baggage items, the duration of handling and the stress were reduced by 45%; no improvement was observed in this case in the body posture, however.

Since additional time is required for the rollertrack conveyor to be positioned in aircraft's hold, the handling times are increased. The unloading time per item of baggage was increased on average by approximately 40%; during loading, the increase was a modest 12.5%.

Altogether, the rollertrack conveyor resulted in a moderate reduction in the exposure of ramp agents to stress.

Area of Application

Operators of airports; all larger baggage and unit-load freight distributors

Additional Information

- www.taqp.de
- Ditchen, D., Ellegast, R.; Rehme, G.: GonKatast – Ein Messwertkataster zu beruflichen Kniebelastungen. IFA-Report 1/2010. Ed.: Institut für Arbeitsschutz der Deutschen Gesetzlichen Unfallversicherung (IFA), Sankt Augustin 2010

Expert Assistance

IFA; Division 4: Ergonomics – Physical environmental factors

Literature Requests

IFA, Central Division