

Integrated prevention of occupational risks at airport workplaces – the prevention project TAQP

Author(s):

Steffi Krüger, Germany – affiliation(s):1

Dr. Markus Kohn, Germany – affiliation(s):1

Affiliation(s) Description:

1) German Social Accident Insurance DGUV

Abstract:

The integrated prevention project TAQP analyses the questions how occupational safety and health could be considered when technical innovations are being introduced to work processes, and how in such cases prevention aspects could systematically be integrated into the organisation's innovation process. The TAQP project is being carried out by the German Social Accident Insurance (DGUV) in cooperation with the Fraport AG, the owner and operator of Frankfurt Airport. The project is being funded by the German Federal Ministry for Education and Research and co-funded by the European Social Fund.

The project mainly investigates physical and mental workloads in the working areas “baggage handling” and “airport security check”. Work at these areas is characterised by manifold physical and mental strains. Therefore, work in these areas requires good physical and mental working conditions in order to preserve the employees' health and employability during their whole work life.

In designing working conditions in a human-centred and age-oriented way it is necessary to equally consider the three dimensions man, technology and organisation. TAQP does so by implementing two innovative technical systems which help decreasing work load at baggage handling work places and therefore preventing work related musculoskeletal disorders. Along with the implementation of these technical systems, measures concerning work organisation, qualification and prevention have been taken.

In parallel, the working conditions in the second work area “security check” have been analysed for sources of physical as well as mental strains. The results are being used for decreasing the mental work load by implementing prevention measures in each of the three dimensions of human-oriented work place design.

This contribution gives an overview of the TAQP project and of its results achieved up to now.

Keywords:

Integrated Prevention, Demographic Change, Innovation Process, Airport

1. Introduction

Work always takes place between the potentially conflicting demands of the dimensions human, organisation and technology. When designing working conditions in a human-centred and age-oriented way it is necessary to adequately consider each of these three dimensions. In practice designing these three dimensions often fails because of the task's high complexity and last but not least because of the costs. However, failing due to these problems can be avoided by designing working conditions step by step rather than by one-time measures.

For this purpose the project TAQP examines single aspects of each of these three dimensions: Regarding the aspect of technology TAQP accompanies the implementation of innovative technologies at baggage handling workplaces. Regarding the aspect of organisation it supervises parts of the work organisation in the working areas baggage handling and airport security check. Regarding the aspect of qualification it observes certain aspects of qualification like in-house-training concepts in the working areas described above. Prevention represents the embracing factor around these three aspects (compare the illustration 1).

The central question of the project is how to integrate preventive occupational safety and health from the very beginning when implementing innovative technology and reorganising operational structures. This question is analysed in some selected working areas of the Frankfurt Airport.

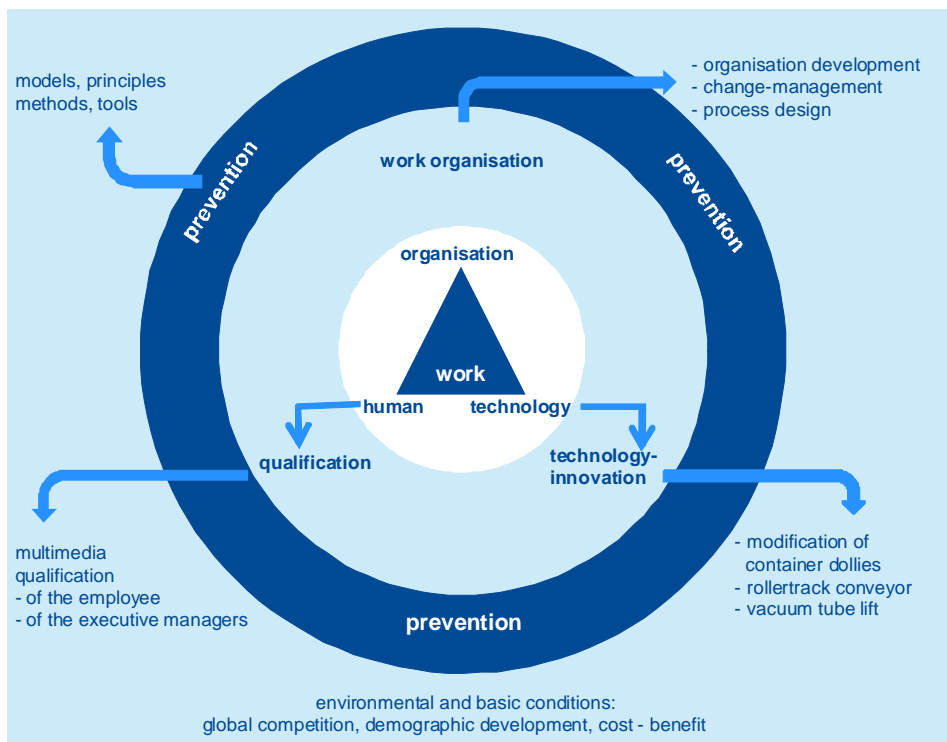


Illustration 1: TAQP in the context of occupational science

Intervention area Frankfurt Airport

The owner and operator of Frankfurt Airport is Fraport AG, one of the leading companies in the airport business worldwide. Frankfurt Airport has become Germany's largest employment complex at a single location, with more than 500 companies and organizations providing jobs for 71,000 people. Fraport AG and its subsidiaries and affiliated companies alone employed nearly 18,500 people at FRA as of the end of 2009 (including apprentices and staff on leave).

In regard to the passenger count in 2009, Frankfurt Airport was ranked third in Europe behind London-Heathrow and Paris Charles de Gaulle. In the freight sector it was ranked second in Europe. Frankfurt Airport serviced about 51 million passengers in 2009.

TAQP is designing working conditions in the areas of Ground Services and Airport Security Check, whose employees are exposed to intense workloads. Both areas act as an interface between the main customers – the passengers and the airlines. These two areas are of high complexity regarding work organisation, employment of modern technology and staff, labour time management, and safety as well as security standards. Another aim of the project is to develop an operational concept, which shows how to integrate prevention into innovation processes.

2. Approach and structure of the project TAQP

The project TAQP consists of three sub-projects: baggage handling as a part of ground handling, airport security check and last but not least the operational concept.

2.1 Sub-project 1: Ground Handling (Baggage-Handling)

There are more than 100.000 pieces of luggage, which have to be handled every day. This hard physical work, especially the continuous change between indoor and outdoor activities independent of the current weather situation could result in serious strains to the worker's health.

The aims in this sub-project are:

- designing technology with regard to the employee's health
- improving work organisation related to demographic aspects which means load reduction and, hence, the receipt of employability of all employees especially the older ones as well as the disabled ones.

In the area of baggage-handling two innovative technical systems were implemented during the project:

The rollertrack conveyor is a versatile belt loader extension. It is built into a mobile belt conveyor in order to facilitate the loading and offloading of passenger's baggage in the aircraft cargo hold. The rollertrack conveyor transports the luggage into the aircraft belt. Hence, the employee can put the luggage in the respective level with lower effort.

The second system is an ergonomic lifting aid. A vacuum-tube lift uses vacuum to grab hold of and lift the luggage in a single action and with nearly no effort.

2.1.1 Improvement of inhouse-training

The implementation of those two described systems, the rollertrack conveyor as well as the vacuum-tube lift, is accompanied by measures to improve inhouse-trainings to form competences and optimise the workflow. The optimised inhouse-training consists of three phases:

In phase one the executive managers show their employees a motion picture about the use of these machines in informal meetings. This movie demonstrates the ergonomic reduction of workload if using the above mentioned machines. This movie was produced at the Frankfurt Airport starring colleagues.

In the second phase an already trained colleague acts as a co-trainer showing the employee how to use the machines. In this way the employee, on the one side, learns the use of the machines by doing. On the other side, the co-trainer confirms his newly acquired knowledge and strengthens his individual responsibility as well as his ability to work in a team.

The third phase is about teaching the employee proper behaviour in case of technical disturbance.

2.1.2 CUELA measuring system

The CUELA measuring system (computer-assisted recording and long-term analysis of musculoskeletal loading) is a personal measuring system using advanced sensor-technology, which can be worn on the person's working clothing. The associated WIDAAN software permits the automatic evaluation of the readings on the basis of ergonomic and biomechanical assessment criteria. This allows for drawing conclusions about the measures necessary to eliminate work-related health risks.

The CUELA-measuring system was accomplished using ten probands in each case working with vacuum-tube lift resp. the rollertrack conveyor. The aim of the measurement was to analyse the physical loads during the work in both cases, i.e. working with and working without the new systems, respectively.

The most important results of the measurement in case of using the rollertrack conveyer are:

- reduction of the time, in which the employee handled the load by an average of 50 percent
- as a consequence a load reduction regarding shoulder, arms and lumbar spine
- loads regarding the knees unfortunately remain unchanged

The most important results of the measurement in case of using the vacuum-tube lift are:

- reduction of the weight of luggage lifting by an employee by an average of 83 percent
- a reduction of 90 percent is possible within daily routine

2.2 Sub-project 2: Airport Security Check

More than 100.000 passengers are being checked at Frankfurt Airport every day. The main health impairments of the employees are mental loads. 42 percent of the employees are women. Possibilities for designing working conditions regarding technology are limited because of legal restrictions, which also apply to measures regarding qualification and forming competences. Therefore, the main focus of this sub-project is on improving work organisation and work environment. The aims in the area of airport security check are the improvement of operational structures at the human-human-interface as well as the improvement of the work environment with regard to load-decrease for all employees, especially women, who are double-burdened with family care and work.

The physical and mental workload at the airport security check has been analysed by Fraunhofer Institute for Industrial Engineering. In addition, an employee attitude survey has been executed. Both the results of the on-site analyses and the survey will be used for developing appropriate measures in work place design. Currently, airport security check is holding workshops with groups of employees for obtaining first proposals for solutions.

2.3 Sub-project 3: Operational concept to integrate prevention

The measures and concepts which were developed in the sub-projects 1 and 2 shall be combined into a systematic operational concept in order to improve the contribution of occupational safety and health prevention to organisational development processes.

Furthermore, sub-project 3 develops special training courses for executive managers, since managers are responsible for conversing the general concept of prevention into tangible measures in practice. These training courses are going to be held as blended-learning trainings. The supporting e-learning tool was developed by the German Social Accident Insurance Institution for the public sector in Hesse in cooperation with the Institute of Work and Health of the German Social Accident Insurance.

3. Conclusion

The demographical change as well as the rising demand for employees of preserving their full employability during their whole work-life in connection with technological and organisational innovations are highly up-to-date topics, which challenge companies with new demands and new problems. This forces companies to make even stronger efforts in developing integrated prevention strategies. Fraport AG and DGUV have developed some approaches for solutions within the project TAQP.