

but also contain guidance on the use of levers, cranks and wheels that are fitted to work stations.

Methods This paper presents the results of several research studies performed by NIOM researchers in the field of force necessary for the professional activities. The studies were done using the measuring set: tensometric dynamometer, force converter, amplifier and PC for data collection. Measurements were done at least 3 times for one activity, the average value of force was taken for further analysis.

Result During the tests, it was stated that, depending on the technical condition of the transport trolleys used in the hypermarkets (weight including the load of about 450 kg limited by law), kind of the pavement on which they moved and the way they were put into motion, the force necessary to start their movement was from 60 n to 650 n.

Discussion These values were 2–3 times higher than the applicable standards (300 n – for pushing, 250 n – for pulling). On the other hand, the measurements of the force needed to launch overloaded trucks used in the transport of gas cylinders or materials in the textile industry (up to about 1500 kg) indicate the necessity to use 500 n – 700 n force – well above the permissible. It is visible that the ergonomic interventions including education and training is necessary.

343 BIOMECHANICAL AND PHYSIOLOGICAL PARAMETERS FOR MANUAL MATERIAL HANDLING (MMH) RISK ASSESSMENT IN MARITIME WORKERS

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10.1136/oemed-2018-ICOHabstracts.769

Introduction According to EU data, the fishing sector is the one with the highest injury rate of all other sectors. Aim of the study is to assess some MMH tasks in which it was possible to use the common standardised protocols in conditions where, although their restrictions, they could provide early indications.

Methods NIOSH protocol was used to assess unloading crates of fish (weight of 12 Kg or 16 Kg) out of the boat to the van and while unloading crates, inside the boat, from the refrigerator to the slipway. Unloading crates from the boat to the van was studied also by means of 3DSSPP to estimate compression force at L4/L5 level. Heart rate monitors were used to estimate CCR while handling crates inside refrigerator.

Result Results obtained using the NIOSH protocol show LIs between 2.55 and 6.34 and a RWL between 2.52 Kg e 4.69 Kg. 3DSSPP analysis reported L4/L5 compression force ranging between 2752N and 3946N and low strength percent capability at wrist, shoulder, trunk and hip joints. Unloading crates from refrigerator to slipway analysis reported LIs ranging from 1.63 to 5.83 and a RWL ranging from 2.74 Kg to 7.36 Kg. MMH inside refrigerator showed CCR values of 40.5% and 42.7%.

Discussion During boarding, we observed several activities worthy of attention under the biomechanical overload point of view. We investigated the most strenuous tasks according to the crew's information. All obtained values were largely over the limit for all used methods and are consistent with results from other studies. We observed MMH activities not assessable with any of the methods currently available in the literature because they cannot describe the tasks in their globality. It was also noted that the workers, based on their experience,

have adopted enhancements reducing vertical displacement, asymmetry angle and adopting an internal organisation of rotation during MMH tasks.

Acknowledgements This study has been accomplished with the support from UILA Pesc

362 DOCKWORKERS MUSCULOSKELETAL INJURY PREVENTION PROGRAM ON A BRAZILIAN TERMINAL

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10.1136/oemed-2018-ICOHabstracts.770

Introduction Terminals in the port of Santos, the largest in Latin America, are constantly working to minimise physical impacts of work on employees. Aiming at the prevention of musculoskeletal injuries and quality of life improvement, we implemented a series of functional and ergonomic measures in 2014, which resulted in significant absenteeism reduction and excellent acceptance from employees, with a relevant improvement to their quality of life.

Methods The program begins with a health evaluation on the employee's admission that includes anthropometry, dynamometry and surface electromyography. On the first month of work, the employee's last 40 min of the workday are held in a gym inside the terminal, where specific exercises, conducted by 3 physical educators professionals. After this period this routine becomes optional, but with a strong incentive for its continuity (outside of the work period). Also, there is a daily labour gymnastics program maintained for all employees. Concomitantly, research is done on ergonomic conditions, where employees give opinions about job satisfaction and possible adverse conditions, suggesting actions that will be evaluated by the Ergonomics Committee that study and treat these cases.

Result Since 2015, when the program started, if compared to 2014, there was a 30% reduction of absenteeism caused by osteomuscular injuries. From 2015 to 2016 there was a 46% absenteeism reduction from the same causes. When comparing 2014 with 2016, there was an overall reduction of 62%. Additionally, in 2016, 132 employees suggestions on ergonomic aspects were raised and addressed by the Ergonomics Committee. A relevant index show that 78% of the employees were practicing some physical activity by the end of 2016 and of those, 48% performed the activities inside the Terminal's gym.

Discussion Musculoskeletal injuries are the major causes of dockworkers absenteeism. The Program implementation and employees suggestions significantly reduced absenteeism rates, encouraged the physical activities practice in the workplace and consequently improved their quality of life.

445 A PRACTICAL NOVEL MODEL FOR OFFICE ERGONOMICS AWARENESS AMONGST GLOBAL CORPORATE OFFICE EMPLOYEES'. SHARING EXPERIENCE FROM 11 COUNTRIES

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10.1136/oemed-2018-ICOHabstracts.771

Introduction With increase in use of laptops, globally there is a need to spread awareness on office ergonomics. The