RISK OF UPPER LIMB MUSCULOSKELETAL DISORDERS IN SMALL SCALE INDUSTRIES AROUND ALIGARH

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Abstract

Epidemiologic researches have provided strong evidence of an association between Musculoskeletal Disorders (MSD) and work related physical factors when there are long exposure in combinations with physical factors such as repetitiveness, force level, and awkward posture etc. (Bernard, 1997).

A survey of different tasks involved in small scale lock/ hardware making industries of Aligarh was carried out in this study. An Observation chart was prepared to record the perceived discomfort level and point of discomfort at the end of the day's job.

There was high prevalence of disorders were reported in almost every joint of the upper limbs. Further certain elements of the tasks were identified as prone to WMSDs. So that, the tasks prone to high risk of disorders might be redesigned for the reduced risk of disorders.

Keywords: MSD, repetitivemenss, awkward posture, discomfort

ERGONOMIC EVALUATION OF POSTURAL STRESSES OF MALE AND FEMALE CONSTRUCTION LABOURERS EMPLOYED IN UNORGANIZED SECTORS, IN WEST BENGAL

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Abstract

This study was performed to evaluate ergonomically the postural stresses of male and female construction labourers employed in unorganized sectors in West Bengal.

A modified Nordic questionnaire was applied on one hundred twenty male and eighty female construction labourers to acquire information about musculoskeletal stresses of labourers. Postural stresses of the labourers due to traditional methods used during work and environmental conditions in work sites were studied by direct observations and still and movie photography. Work schedules and work cycles of the labourers in different work activities were also studied. The physical exertion and postural discomfort of the labourers were also studied by Perceived Exertion Rating (PER) and Body Part Discomfort (BPD) scale. REBA and LUBA methods were conducted in order to analyze the working postures.

The study of PER and BPD scale revealed that Manual material handling and equipments handling tasks imposed maximum physical exertion and discomfort in both male and female construction labourers. The analyses of working postures revealed that most of their working postures were highly unsafe. From study of modified Nordic questionnaire, it was observed that the prevalence of pain in various regions of the body, especially waist pain were alarmingly high in both male and female labourers. From the ergonomic point of view, it may be recommended that, training for safe lifting and handling of materials, proper work rest schedule, modifications of some working procedures and use of some ergonomically designed equipments may reduce the postural stresses and improve the quality of work done and the health status of construction labourers working in unorganized sectors.

Keywords: Postural stress, PER, Ergonomics, MMH, REBA,

ERGONOMIC DESIGN OF PP-3 OF WIRE ROD MILL,BHILAI STEEL PLANT

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Abstract

Since commissioning of WRM in 1967, the mill operations through pulpit has gone through various changes and modifications but without any change in original layout of desks, controls and other amenities. With increasing production demand and change in operational needs especially after modernization of B, C & D strand, the PP-3 has become the focus point of attention, where all drives of Roughing, 1st and 2nd intermediate group and flying shear are controlled.

Although strands B, C & D of WRM have been modernized, the pulpit shares the combined control functions upto stand 15 (i.e up to 1st intermediate group) for all strands and 2nd intermediate group functions up to strand 19 only for A strand.

PP-3 of WRM is a 17m long and 3.1m wide almost rectangular hall type steel structure at – 3.3m height from ground level having 2 entrances from 2 sides with large glass windows in front side to have clear visibility of equipments and rolling line. It has a 3.37m long AC ventilation chamber separated by a wall & 12 nos. of operating desks in length along glass windows and 11 nos. transformer tapping controls in length along back wall.

The ergonomic design of PP-3 was taken up to make the tasks simple, fast and more efficient for the operator. Operator's views were taken on the subject and through various discussions their need was assessed. Modifications were-12 nos. of operating desks in length may be combined into 5 nos. operating desks placed in C shape where operator's position will be at the center. The AC unit may be replaced to increase its cooling effect & should be shifted to 0 level Thus noise pollution will be eliminated. If possible, the width of steel column working as support for glasses may be reduced to suitable size. This will increase visibility. The lighting in the pulpit to be improved for comfortable working.

Based on the above recommendation, the job of modification of Pulpit-3 was carried out during Capital Repair of WRM.

Keywords: ergonomic design, wire rod mill, noise pollution, bhilai steel plant

ERGONOMICS STUDY OF QUENCHING CAR OPERATORS CABIN AT BATTERY 1 to 8 of COKEOVENS&CCD,BHLAI STEEL PLANT

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Abstract

Coke Oven Batteries, which play a vital role in Steel production, involves large nos. of employees, who work under rigorous schedule for efficient operation of Coke Ovens. The oppressive heat, flying coal/coke dust, smoke, gaseous mist, all makes the work environment rather uncomfortable and tediously tiring. Among the vast arrays of different activities, Quenching Car operation is a crucial work for Battery Operation, where the operator has to cope up with different challenges. The main function of quenching car operation is to receive pushed out red hot coke into the car, drive the car to quenching tower where the hot coke is quenched with phenolic water (waste).then deliver the quenched coke to the wharf where the coke is further cooled,sized,sceened and subsequently send to blast furnace.

The present study aim to assess the Working Environment involved in quenching car operation, to assess the work load, existing work station, ,workplace design , work posture, and work schedule and to assess subjectively, the Psychological aspects with work such as Job Autonomy, Task Variety, mental overload, work rest pauses, training needs,etc.

The workload aspect associated with quenching car operators is agreed by more than 80% of operators that the work is 'machine paced', target oriented, and repetitive motion task. 90% of operators carry out their job in "sitting and sometimes standing" position. This indicates that the job does not involve rigorous physical activity and is rather benign. 90% of operator opined that there is a scope of improvement in workplace design in terms of seating, free leg space, reach to control desk, comfort cooling, visibility, vibration. Condition becomes worse in summer season. breathing problem exists among the operators. 70% operators expressed that they suffer from pain in hip, knees, wrist, elbows, due to improper seating arrangement and vibration.

Improved workstation design, comfortable working conditions, improve the working capacity of the employees resulting into increase in productivity.

Keywords: ergonomics, quenching car operators, coke oven, postures

EVALUATION OF PHYSIOLOGICAL STRAIN IN AN OCCUPATION INVOLVING HIGH TEMPERATURE IN WORK ENVIRONMENT

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Abstract

There are many traditional industrial operations being carried out in the state of West Bengal, which are labor intensive, operate with not so good health safety conditions and are in the midst of an change-over process from traditional to modern technology. Foundry operations belong to this category.

A study was conducted on Foundry workers in order to assess physiological strain experienced by them in course of their work. 174 healthy male foundry workers, chosen at random, voluntarily participated in the study. The participants in the study belonged to an age group of 18-34 years and had a working experience of 2-19 years.

They were engaged in different types of works like preparation of wet mould, dry mould, cupola firing, collection/pouring of hot molten material etc. Besides physical parameters, cardio respiratory performance parameters, body temperature and physiological strain due to work exposure were assessed. The physical environmental parameters were studied and the heat stress indices were computed.

The workers were found to have elevated body temperature and some form of compromised recovery responses in most of the foundry operations.

Keywords: Occupational health, unorganized sector, West Bengal, hot working environment

S III-A- 6

A STUDY OF GENERAL HEALTH STATUS OF WORKERS ENGAGED IN JEWELLERY MANUFACTURING

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Abstract

From time immemorial, jewellery forms a part of traditions in every section of society in India. Approximately two million highly skilled workers are engaged in jewellery manufacturing. Apart from work station and work posture related problems that can be attributed to ergonomics, jewellery manufacturing also requires highly specialized workplace and work environment. In majority of the cases, the manufacturing activities are being carried out in small rooms which have very low general illumination levels and ventilation. Over and above, the work requires melting, cleaning, washing and polishing of the metals which often result in release of obnoxious chemicals and gases. It is expected that working in such an unhealthy condition may have an impact on the health of the workers. Keeping the above in mind, it was therefore planned to carry out a study to evaluate the general health status of these workers.

The study was carried out on fifty five subjects engaged in jewellery manufacturing. Signed informed consents were obtained. Complete blood count (CBC), differential count, RBC morphology, sedimentation rate, blood glucose level (fasting and post prandial), serum creatinine level, X – ray of chest and hand and pulmonary function tests were performed to ascertain the general health status of these workers.

The study was carried out in an accredited clinical reference laboratory; qualified medical practitioners (pathologist, radiologist and chest physicians) were involved in collection and interpretation of the data. Mean age, height, weight and BMI of the subjects were 23.65 (±4.23) yrs, 165.91 (±5.99) cm, 59.61 (±10.88) kg and 21.67 (±3.85) kg/m^2 respectively. Results showed that 14.81% of the subjects had problems in blood cell parameters. Differential count and RBC morphology showed 27.78% and 20.37% of the subjects had abnormalities in WBC and RBC. The study had also shown that 11.11% subjects had airflow obstructions that are tested positive with bronchodilators.

Abnormalities pertaining to other parameters were found to be insignificant.

Keyword: Jewellery manufacturing, general health status, CBC, blood glucose, serum creatinine, X–ray, PFT

EFFECT OF LADLE, CRUCIBLE AND POSTURE ON THE PHYSIOLOGICAL PERFORMANCE OF A WORKER IN A CASTING INDUSTRY

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Abstract

The process of casting is treated as a hazardous process as the pouring of molten metal exposes the worker performing task manually to various ergonomic risk factors. These factors put a lot of strain on the worker performing task in a casting industry. The industry despite being very old has not seen much improvement in the past.

One of the probable reasons may be that around 90% of such industries fall under unorganised sectors. Present research was carried out to study the effect of type of ladle and crucible while performing the simulated casting task under different postures on physiological performance of the worker. The change in heart rate was used as a measure of physiological performance. The data collected was analysed using three-factor ANOVA.

The results of the study showed that the type of ladle and crucible were having a statistically significant effect on the physiological performance of the worker while the lifting posture was found to be statistically non significant. The results have been discussed in the light of previous researches carried out in the field.

Keywords: posture, physiological performance, worker, casting industry

POSTURAL HAZARDOUSNESS ANALYSIS FOR CANE CRAFTS AND BRASS METAL ARTISANS OF ASSAM, NORTH-EAST INDIA

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Abstract

Performances, productivity, comfort and safety is greatly influenced by adoption of a particular posture. Awkward and prolonged static posture is hazardous and has been identified as a risk for musculo-skeletal stress and has remained a great interest for Ergonomics investigation.

This study investigates work postures in North-East crafts and cottage sectors which are socio-culturally influenced and traditionally adopted by craftsperson on and near floor with and without low-height stool. The study was conducted in cane crafts and brass-metal cottage sectors of Assam, India.

Evaluation of working postures were carried out by ErgoMaster Version 4 software, based on RULA and REBA scoring method. Measurement of joint angles was carried out using Electrogoniometer (Make-BIOPAC). Analysis of these postures revealed that most of the adopted postures for cane crafts making activities are low hazardous except cane bending and straightening which are medium hazardous.

In similar way, most of the adopted postures for brass metal activities are medium hazardous except for brazing activity which is low hazardous.

Keyword: Work postures, crafts and cottage production sectors, postural evaluation methods, hazardousness analysis of posture.

Role of Interpersonal Health Education for Combating Musculo-Skeletal Disorders in Bokaro Steel plant

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Abstract

Though the necessity of imparting health education in steel industry need not require any debate and its importance grows greater with increasing multivariate technological development as well as with various modernization projects, still the efficacy of existing health education process needs to be analyzed, audited and evaluated. In traditional system of Heath Education, some times, it becomes apparent the lack of coordination between the course contents and the recipients' attitudes, habits, motives and traditions. Most often the information contents mismatch the level of workers' intelligence and also interest on particular disease on discussion. As a matter of fact, the ultimate goal has not been reached so far in spite of huge expenditure in terms of money and man-hours.

Based on such invisible critical problem, a planned study had been undertaken in between April'07 – March'09 on Sixty eight selected workers who used to treat their musculoskeletal disorder (MSD) regularly at Bokaro General Hospital. Fifty percent of the group had been selected as Control group and other as Experimental. The Experimental group had been called thrice during the period in the conference hall of OHS centre for three hour session and imparted a planned health education on "Musculoskeletal disorders & Ergonomics". During each session, last one hour had been kept for discussion on personal problems. The efficacy of such interpersonal health education was evaluated after detail examination of their one year medical records and its' cost.

The overwhelming positive results of Interpersonal Health Education system leads the HRD management to rethink on existing Health Education System for preparing the ideal module in health education programme in Steel Industry.

Keywords: Health Education, Interpersonal, MSD, Steel Industry

S III-A- 10

EVALUATION OF BODY PART DISCOMFORT IN RELATION TO POSTURAL STRESS OF BRICK MAKING WORKERS

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Abstract

In the present study an attempt has been taken to find out work related body part discomfort in relation to postural stress of the brick making workers. The study was carried out on 120 male and 105 female workers whose age range was 18-45 yrs. The postural stress was evaluated by assessing work-posture pattern and biomechanical analysis (CG and lumber spinal angle). The physiological stress was also evaluated in terms of cardiovascular stress index during brick making. The musculoskeletal disorders (MSD) of the workers were studied by questionnaire technique and the body part discomfort was assessed by using a 10 point subjective scale.

From the result it has been revealed that the workers spend maximum percentage of time (male 69.74% and female 67.62%) in squat-straight posture which was followed by squat-twisting posture (male 15.36% and female 13.41%) and squat-bend posture (male 8.41% and female 10.46%). The results body part discomfort showed that the lower back region had highest degree of discomfort. The cardiovascular stress index (CSI) had a significant difference ($p<0.001$) between male and female workers. The deviation of center of gravity (CG) and the changes of lumber spinal angle indicated the degree of postural stress. For the study of stresses it appeared that the workers suffered from higher degree of MSD and segmental pain and the female workers were more suffer than the males.

It was concluded that the stress related body discomfort might be decreased by changing the work method, work posture and work-rest cycle.

Keywords: Body part discomfort, postural stress, cardiovascular stress