

## 1657b ERGONOMIC ASSESSMENT OF ARC WELDING JOB

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**Introduction** Among the various process of welding metal arc welding is the most common, versatile and inexpensive one and account for over 50% of the total welding in advanced countries and over 80% in India. A large number of workforces around the world earn their livelihood in this occupation. Welders have no fixed work station in developing world irrespective of industries. They are forced to work in cramped space assuming awkward posture that burden to cardio-respiratory system.

**Methods** This study was performed on worker (n=31) engaged in welding job in different unorganised industry throughout West Bengal. The task was examined in the light of the observed physiological parameters and postural load in workers during their performances. The physical strain in terms of cardio-acceleration and energy cost was examined by Heart Rate Monitor. Ergonomic assessment tool REBA (Rapid Entire Body Assessment) was used to assess the working posture and risk level of postural load. Different thermal factors like Dry bulb temperature (DB), Wet bulb temperature (WB), Globe temperature (GT), Relative humidity (RH), Air velocity (AV), Wet bulb globe temperature (WBGT) was evaluated by Asman Hygrometer and EXTECH HT30, KATA Thermometer.

**Result** Cardio-acceleration and energy cost was found to be moderately heavy. Risk level of postural load was found to be 4–9 category. DB (32.27°C–35.7°C), WB (23.92°C–26.5°C), GT (36.73°C–40.73°C), RH (43.27%–49.9%), AV (15.56 metre/minute–26.67 metre/minute), WBGT (27.23°C–30.2°C) was found.

**Discussion** Postural load was seen to be in the higher order indicating the workers are suffering from huge amount of ergonomic challenges. It can be seen that the welders how encounter with radiant heat sourced from climate as well as from the job itself, which makes the work for the welders more strenuous. It is important to consider both the environmental issues and postural load because they impact the workforce welfare and consequently the productivity.

## 1657c RELIABLE RISK PERCEPTION FOR PROMOTING PREVENTION AT CONSTRUCTION SITES

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**Introduction** Frequency rates of severe injury including fatality as well as occupational diseases are notably higher in construction than other industries. Studies also indicate that safety performance of construction industry gets adversely affected due to various factors including inherent nature of high risk activities, deployment of large number of unskilled people, heavy machinery as well as demographic factors.

India, with nearly 1.3 billion population, tremendous ethnic and linguistic diversity, high ratio of younger people, is poised for all-round growth. With focus of development of infrastructure, construction sector is the one which is going to boom and sustain the same for several years.

Construction workers keep moving from one place to the other to pursue their profession. Prior to joining the trade, a miniscule of them receive some formal skill training and safety training which are essential for safe working. Consequently a large portion of them get set to pick-up the trade-skills on-the-job, which compounds the challenges to ensuring a safe working at site.

**Methods** In this study, spanning over 24 months duration, involving more than 10 000 workers from multiple project sites, factors associated with 'risk perception', emerges as one of the most common causative contributors for various recordable injury cases.<sup>2</sup>

**Results** The study highlights that, misplaced risk perception by the individuals associated with the activities at various levels, have acted as the 'trigger', directly or indirectly, leading the event chain to injury outcome.

**Conclusion** Subsequently, focused efforts are planned for mitigation, by improving risk awareness among all concerned team members, through various methods, including on-the-job, class-room training and experiential learning associated with activity related hazards and consequences.

This paper describes facets of risk perception, its role in risk mitigation and demonstrate effectiveness of awareness programs as well as other initiatives in optimising risk perception for incident prevention.

## 1657d ACCIDENT PREVENTION IN CONSTRUCTION INDUSTRY – PERSPECTIVE OF WOMAN PROFESSIONAL

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**Introduction** Construction, one of the fastest growing industries in the world, is still considered to be largely male dominated. The common exception being women as civil labourers, in the unskilled category, as seen in several Indian construction sites. Of course, there are examples of women trailblazers globally who are striving to bring about a cultural change and promote diversity and inclusivity throughout the industry. However their numbers are not very high.

Organisation like National Association of Women in Construction (NAWIC) and SEWA have also emerged as a contributory factor in bringing about the transformation.

**Methods** Exploring examples of companies encouraging engagement of women employees in Construction. Studies show that in the last decade, companies have increasingly been supporting women in construction as an essential element while striving to to grow their business and construction capabilities.

**Results** Career opportunities for women professional in construction are not limited to engineering and hard core mechanical work. Attributes of women professionals, best suited certain roles in occupational safety and health at construction sites, aiming to excel in accident prevention safety training.

**Conclusion** To handle the unique challenges of construction industry, well mix of men and women professionals is desirable for optimised use of their respective inherent potential and talent. While both men and women working in construction face many of the same risks, there are some unique issues that are of greater concern to women, best understood and

handled by women colleagues in the team, particularly in occupational health and safety.

### 1657e PREDOMINANCE OF MUSCULOSKELETAL AILMENTS AND ALLIED WORK-RELATED CONTRIBUTING FACTORS AMONGST CONSTRUCTION LABOURERS OF WEST BENGAL, INDIA

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**Introduction** An enormous number of labourers engaged in construction industry in India both in organised and unorganised sectors. The construction labourers regularly work for a broadened time frame and they are compelled to maintain adjusted static and dynamic working positions in unbalanced locations during the total time of work which raises the demand of the musculoskeletal system and may lead to work related musculoskeletal ailments.

**Objective** This study is proposed to investigate the operational position and work related musculoskeletal ailments among the construction workers. One eighty four male workers from various construction sites of West Bengal was indiscriminately taken for this study.

**Methods** A modified Nordic questionnaire on MSD and the 12 item General Health Questionnaire (GHQ12) were administered on the construction labourers. REBA and OWAS posture analysis techniques were applied to evaluate the awkward postures. At last, discomfort levels of the particular working positions were figured by the use of risk level and BPD scale.

**Results** From the study it was uncovered that the greater part of the construction labourers frequently in unbalanced and awkward working position and were allied by different work-related contributing factors like pain in low back, neck, and wrist. It has been likewise discovered that there is a significant ( $p < 0.05$ ) association between the intensity of pain feeling, age, year of working experience and risk level of the individual working postures of the labourers.

**Conclusion** Suitable work-rest schedule, revisions of some working techniques and use of some ergonomically modified tools may decrease the WMSDs and enhance the health eminence and wellbeing distinction of construction labourers in unorganised sectors.

### 1597 PARTICIPATORY APPROACH IMPROVING SAFETY AND HEALTH IN CONSTRUCTION INDUSTRY

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**Aim of special session** Utility and feasibility of participatory approaches to increase health and safety measures at (construction) worksites.

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### 1597a DEVELOPMENT OF A GUIDELINE 'PARTICIPATORY APPROACH AT THE WORKPLACE' IN THE NETHERLANDS

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**Introduction** In the Netherlands, we aimed to develop a multidisciplinary guideline for the Participatory Approach (PA) at the Workplace, in collaboration with insurance physicians, work experts, occupational health physicians, occupational health nurses, occupational hygienists, and occupational therapists.

**Methods** A working group of representatives from all 7 participating professions defined the topics that needed to be addressed by the guideline. When possible the guideline was based on scientific evidence. In case of none or insufficient scientific evidence, the working group formulated an expert opinion. After incorporating feedback from experts in the field the concept guideline was finalised. This whole process was supervised by a steering committee.

**Results** In the guideline, PA was defined as a systematic approach consisting of six predefined steps in which worker(s) and relevant stakeholders (e.g. supervisors or employer) reach consensus on the main problems and solutions for the worker (s)'s health problems and work participation. This results in an action plan defining who does what and when. One should start (step 1) with creating the right conditions and end with a proper evaluation of the pre-set goals (step 6). The guideline can be used to apply the PA at an organisational (mainly primary prevention and targeting groups of workers) or an individual level (treatment and re-integration of the individual worker). Our systematic literature review showed that the PA at an organisational level was effective for improving (determinants of) behaviour, reducing musculoskeletal symptoms, improving work performance, reducing sick leave and reducing costs. At the individual level the PA appeared especially effective to reduce sick leave and fasten return-to-work.

**Discussion** We successfully developed an evidence-based multidisciplinary guideline for the Participatory Approach at the Workplace. Currently, we face the challenge of successfully implementing the guideline in practice by arranging authorisation among the professional groups and giving trainings in the field.

### 1597b IMPROVING EMPLOYEE INVOLVEMENT THROUGH SAFETY COMMUNICATION

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