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ERGONOMIC CONSIDERATIONS IN MECHANISING THE PROCESS OF REMOVING THE DETACHABLE CENTRAL DISC (DCD) OF ALUMINIUM CAP (AC)Chetan Kothalkar

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Abstract

Aluminium cap (AC) along with rubber bung (RB) is used in pharmaceutical industry to hermetically seal the glass container for ensuring the integrity of sterile, pyrogen free injectable or oral suspension. DCD is a part of the AC and is attached to it at two or three points. Consumption of the AC with DCD is economic and high, this is available in the market in larger volumes at competitive rates. Because the requirement/consumption of AC without DCD is very less it is a scarce commodity in market and an imported AC without DCD costs 10 times more than the conventional AC with DCD. This encouraged taking up this job of removing the DCD in-house only when consumption was less.

Traditionally, when the requirement of the AC without DCD was less, it was a manual operation. Workers using pilling action, used to remove the DCD of AC. but this method was slowest in terms of rate of removal. Also, finishing obtained is very poor and rate of rejection was more. Another simpler method uses a hand held tool almost equal to or less than diameter of the DCD. This is placed on the DCD and using the hand palm the hand tool is pushed to break all the joints of the DCD with the AC. This operation gave good results in terms of rate of DCD removal, effort required but poor finishing and rejections due to cap deformation put limitations. All advantages were related to the less requirement.

But for requirement of around 500 AC's without DCD in a lot, this method was slow, damage prone, Labour intensive, injury prone. Due to such limitations of the manual process it was decided to go for the mechanization of this process. The study is highlighting the steps in mechanization of this process of DCD removal for ease to the worker, increased rate and reduced rejections.

Key words: Aluminium Cap (AC), Detachable Central Disc (DCD), Rubber Bung (RB), Pyrogen Free, Sterility

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**A LIMITED REVIEW ON THE RESEARCH OF MAN MACHINE INTERACTION FOR
PROCESS DEVELOPMENT IN COGNITIVE APPLICATIONS**

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Abstract

A human operator operates multi machining system only when he is conversant with the computerized interface. This needs proper training and experience up to the desired level of skill particularly in a user interface .The capability of human being to receive stimuli in the form of audio or visual is very limited .To perform cognitive task in the computerized array of machine or group of machines to operator, machines to machine or operator to operator needs an overall idea of the system integrated with the conceptual ability. This requires a continuous neural network to decode the signal in terms of continuous strategic monitoring of the cognitive process on the basis of automated or semi automated production system.

The study aims at overall planning at both conceptual and physiological level in design and application of computerized interface with a generalized discussion on special training and experience required by the operator to anticipate plant or multi machine safety problems .Authors pay attention to situational and practical problems and analyses them time to time for development of realistic model which will be helpful for the process development taking into account operational support parameters and constraints.

The system application development suggested in such a manner that the process development will consider the protection of the computerised interface eliminating constraints and hazards at all level

Keywords: cognitive, neural, task, interface

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**WOMEN FRIENDLY TECHNOLOGY INTERVENTIONS IN AGRICULTURAL TASKS
AND THEIR FIELD FEASIBILITY**Adurthi Mrunalini

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Abstract

It is well known that, the subsistence economy mainly revolves around agriculture and women work in farm activities for nearly 6 – 8 hours a day. They suffer drudgery of these livelihood activities due to low pace of work, more time at the tasks, muscular pains and fatigue for meager or low wages in India. The time spent on field activities prevents rural women from undertaking other income-generating activities; therefore the poor families are deprived of much-needed income. Clearly, there is need for technology and alternative sources to hasten women's pace of work and comfort so that they could well utilize the opportunity costs of time for productive and economic gain.

The intervention study was undertaken to find the field feasibility of various technologies evolved for the purpose of work improvement, comfort and & optimize the pace of work. Participatory intervention techniques were utilized where in the users were involved for assessing the technologies and contribute in the technology modification or change for a new design. Thirty women were selected for each technology intervention and three technologies viz; improved weeders, castor picking bag and multipurpose decorticator were tested for the three important dry land field operations namely weeding, castor picking and groundnut decortication.

Results obtained on subjective rating scale indicated that the technologies were effective in relieving the physical stress and could be popularized with few modifications and necessary technical and policy support on access & price.

Keywords: Technology interventions, women, agriculture

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**AGE AND SEX RELATED VARIATION OF FINGER FLEXIBILITY AND EXTENSIBILITY
IN ADULT BENGALEE POPULATION**

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Abstract

The present investigation was aimed to find out the age and sex related variation of finger flexibility and extensibility and their association with some anthropometric characteristics. A total number of 325 subjects (175 male and 150 female) having the age range 18-60 years were selected at random and divided into three age groups, viz., younger adults (18-34 years), older adults (35-50 years) and old (51-60 years). The finger flexion and extension was measured using Psytech finger flexion and extension gauge. Results revealed that the strength of finger flexion and finger extension was significantly greater ($p < 0.001$) in male subjects than that of female subjects. The right hand was significantly stronger ($p < 0.001$) in flexibility and extensibility than that of left hand in both men (5.13% to 11.11%) and women (13.79% to 19.05%), although no significant difference was observed in all individual age groups.

From the ANOVA study it was found that there was significant variation in the strength of finger extension of male and female subjects with the variation of age. Multiple comparison tests revealed that the flexibility and extensibility scores were significantly different between middle and upper age groups in male subjects. The strength of finger flexion and extension was found to be positively correlated with hand length and digit II length only in case of male subjects. The norms for the grades of finger flexion and extension scores for both male and female subjects was also formulated using suitable statistical methods.

It can be concluded that the lower value of finger flexion and extension of the female subjects should be considered during designing control panel, switches and other finger operated devices.

Key words: Key words: Finger flexion and extension, adult male and female subject, anthropometric characteristics

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**PRIORITIZING ERGONOMIC PARAMETERS FOR SPECIFIC WORK ENVIRONMENT
FOR ALL: A FUZZY SET APPROACH**Rajeev Kumar Upadhyay

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Abstract

In the present era, the level of mental stress is increasing among the individuals in every section of society due to excessive work load, behavioral maladjustments, competitive environment, egocentric attitude and highly ambitious production targets. Every individual whether working in private, public or government undertakings, be it in production, service or even household sector witnesses the realization of the strain of such kind either occasionally or perpetually causing dissatisfaction and consequent loss in productivity. This in turn diminishes quality of life creating more dissatisfaction. It is this vicious circle that needs to be broken in order to increase the level of quality of life in one hand and productivity on the other. It is, therefore, necessary to identify common ergonomic parameters relevant for all that are necessary to improve productivity and quality of life. Further, it is necessary to identify dominant ergonomic parameters specific to a specific work environment in order to make strategic decision to improve quality of life of workers at all levels and thus assure improvement in productivity. Such decisions become complex when plurality and subjectivity is involved. Many of the ergonomic parameters are subjective in nature. It is because of this subjectivity that ergonomic parameters become fuzzy in nature. Fuzzy decision methodology therefore sounds fit for a decision making process and can be adopted for such work environment.

The present paper focuses this issue and tries to identify dominant ergonomic parameters for different working groups for specific work environment.

A set of Seventeen common ergonomic parameters related to four broad sectors namely service sector, industrial sector, agricultural sector and household have been obtained from various sources. Fuzzy opinion- poll- matrixes have been obtained from different stakeholders for different work environment under a set of five features namely performance, productivity, overall cost, quality of life and responsiveness. The dominance obtained for specific work environment has been discussed in the paper.

Keywords: ergonomic parameters work environment, fuzzy approach

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EVALUATION OF ERGONOMICS CONDITION AT VIDEO DISPLAY TERMINALS

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Abstract

Operating computer terminal is currently an integral part of daily work of employee and they are at risk for work related musculoskeletal disorders.

We interviewed with a pre structured questionnaire and ergonomic assessment using RULA (Rapid upper limb assessment) during their peak work hours.

A total of 27 among 19(70.4%) male and 8(29.6%) female patients were interviewed. 11(40.7%) people uses computer in average of 2-5 hours a day, 16 (59.3%) uses 6-10 hours per day in their work place. 48.1% of people also uses computers in their home apart from their work place, Home use ranges of these subjects from 1 hour to 4 hour per day and in average 1.5 hours per day. There were 53 (20.1%) incidence of pain at the nine specified sites with 20(37.7%) of incidence was present in the week of assessment. 50.8% pain of spinal origin, 33.7 % upper limb and 15.5% lower limb ailments were found. Severity of pain which leads to discontinuity of work is graded which a scale of 1-4 and the following is found. 7.5% (grade 4), 64.1% (grade 3), (24.5% grade2), 3.7% (grade 1) In the RULA scoring among the 27 subjects 37% were having less than are equal to score 4, 37% having score 5-6, 26% have score greater than 6.

Thus it can be concluded from our study that effective and early screening of computer operators and work station is very necessary to minimize the risk for developing Cumulative Trauma Disorders.

Keywords: Cumulative trauma Disorders, RULA, Computer Terminal

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**EFFECTS OF ENVIRONMENTAL FACTORS AND TEXT-BACKGROUND COLOUR
COMBINATION ON WEB BASED READING TASK PERFORMANCE**

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Abstract

The visual discomfort / reduced performance of the computer users are nowadays have become a serious issue for ergonomists. Several studies have reported the investigations regarding the use of Visual displays.

To improve the performance of web users, there was a need to find the levels of environmental factors and text-background colour combination which may create comfort/discomfort to the users.

Therefore, this study investigated the effects of ambient illumination, equivalent noise and text-background colour combination on reading performance for subjects between 20 -31 years age group having net exposure of less than 2 hours/ day. This lot of subjects was chosen to eliminate the previous endurance to the web based task. The performance was measured in terms of reading time for pseudo text displayed on thin film transistor liquid crystal displays (TFT-LCD) monitors using a self develop Visual Basic Code. The results showed that reading time was not significantly affected by ambient illumination (150 lx – 525 lx).

Although, equivalent noise level and Text – background colour combination were found to be significant on reading task performance.

Keywords: visual discomfort, environment, text-background, TFT-LCD monitors

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HUMAN SYSTEM INTERFACE USING EYE MOVEMENTNaveen MareGowda^a and Srinivasan Jayaraman^b^a Graduate Student, RV College of Engineering, Bangalore, India^b Scientist, Innovation Labs Bangalore, TATA Consultancy Services, Bangalore, IndiaEmail: srinivasa.j@tcs.com**Abstract**

In today's technology driven world, the benefits of effectively utilizing different versions of computers are self-evident. There is a rapidly growing interest in the development of intelligent interfaces in which operator state information derived from operators' physiological and/or video-based measures. The measured signals are used directly to inform, interact with, or control computer-based systems. The usability of mouse as controlling device is preferable on Windows or Linux-based software interface. However the same would not be possible for individuals with motor disabilities. A realistic model would allow assessment and also function as a rehabilitative tool for individuals with motor disabilities. One such model is the human system interface (HSI) or human computer interface (HCI) or brain computer interface (BCI).

Aim of this work is to: a) design and develop a HSI system for mouse cursor control, as a utility of HSI agents, using video-based signals as input signal and b) allow the user to play game. Thus developed HSI system for cursor control system is based on captured eye movement for assisting disabilities. The eye movement images were used for cursor direction control and voluntary eye blink image was used for selection operation that is very similar to right click operation of computer mouse. Thus developed HSI system requires a visual simulator to elicit the webcam capture image. This virtual simulated snake game is used to measure the system performance. The results indicate that, HSI system using eye movement images captured using low cost webcam shall be used as a technique for controlling the computer cursor.

Keyword: Human System Interface (HSI), computer game, rehabilitative tool, computer cursor control

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**HOW DO WE HOLD TO OPEN A BOTTLE? AN EXPERIMENTAL
STUDY ON PREFERRED GRASPS**Raghu Menon and Dibakar Sen

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Abstract

The paper presents observations on the strategies people use for opening a container by turning. Although a few studies are available in literature in quantifying grasp (force) capabilities in turning cylinders of given diameters, no qualitative study to understand preferences of the users in grasp adaptation, as reported in this paper, are available. Natural grasping adopted by the subjects was studied by observing how they open containers of varied sizes and shapes, from tiny perfume bottles to big health drink containers. Nine subjects took part in the experiments. The objects given were categorized as beverages, cosmetics, health drink, pickles & jam, sauce and miscellaneous items because their size, shape and nature of content vary significantly across these categories. The participants were asked to open the bottle in four different positions namely, sitting in front of a table, standing in front of a table, sitting and standing as shown in. No instruction was given regarding taking support from the table or the chair. Photographs were taken while the subjects were performing the tasks in the laboratory insulated from other subjects or observers. Grasps used by the subjects were classified into the conventional types such as power, chuck, disc, lateral pinch, collet grasp etc. About 1160 photographs were studied to understand the natural preferences of subjects. Representative photographs are included in the paper.

For beverages where the bottles have relatively large cylindrical container and small cap, subjects mostly held the bottle in power grasp using their left hand and use chuck or lateral pinch to grasp the cap for turning using their right hand. Similar generalized observations for all other categories of containers have been reported in the paper using bar charts. It was observed that, although the subjects largely adopted similar grasps, there were significant variations in them as well. The shape and size of the containers were the dominant factors in determining the grasp type. However, other factors such as the estimated force requirement, knowledge about the properties content and personal preferences also played significant role. Grasp preferences for bottle opening is found to be significantly different between right handed and left handed users. Also, grasp type was different for initial loosening of the caps (requiring more force and less motion) and later turning for removing the cap (requiring more motion and less force); grasps with smooth transition between the two kinds of requirement was more prevalent. Except for big and/or heavy containers, the subjects rarely took support of the table. It was interesting to observe that each subject had a preferred holding orientation irrespective of the category of the bottle.

Keywords: bottle, preferred grasp

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COMPUTER AIDED PROTOTYPE DESIGN OF KITCHEN TONGS

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Food preparation, a part of cooking activity involves the use of various kitchen tools. Different models of these tools are available in the market, which may be ergonomically compatible or incompatible.

The ergonomic evaluation of tools is thus needed to assess the positive product design features and to avoid potentially negative implications. Hence the present study was taken up to evaluate identified models of kitchen tongs and to evolve modified computer aided prototype design of kitchen tong. The study was conducted in twin cities of Hyderabad and Secunderabad on employed home makers in the age group of 30-40 years.

Based on the findings of the ergonomic evaluation of the existing models of kitchen tongs, a modified computer aided prototype design was evolved to ensure the user's comfort, safety and efficiency while using the kitchen tong by using pro E software.

Keywords: kitchen tong, ergonomic evaluation, prototype design, pro E software

**PARTICIPATORY ERGONOMICS IN REDESIGNING OF
DYEING TUB FOR FABRIC DYERS**

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Abstract

Dyeing and printing is an age old process, of conventional dyeing of yarns and fabrics. The workers use a dyeing tub which does not suit to the work posture and body dimensions. They adopted awkward postures over a long period of time which resulted in severe discomforts in neck, shoulders and lower extremities.

Hence redesigning of dyeing tub by participatory approach is the need of the hour. Redesigning of the dyeing tub was carried out in three phases that included views of workers and proprietors, technical information from researchers and design development of the prototype model. the prototype model dyeing tub was fabricated and was evaluated by nine workers for a period of three months.

Studies on the impact of the new tub on postural discomfort and productivity revealed that there was a reduction in the discomfort level from severe to moderate level. Assessment of productivity also indicated an increase in the individual productivity which ranged from 3 to 17%.

Keywords: Dyeing workers, participatory ergonomics, dyeing tub, postural discomfort, productivity