V SUMMARY AND CONCLUSION

Systematic Scientific attention and sustained interest to study the implications and impacts of the human factors on designing tools and equipments for work performance has seen, gradual, yet, rapid developments with an understanding of the concepts of ergonomics. Application of ergonomics relates to the objective of maintaining and enhancing human welfare (health, safety and satisfaction) while performing activities. In any ergonomic study all the three components of activity – work, worker and work environment - are considered, as, factors encompassing all the three can impact each other. Work has different meanings in structural and non-structural conditions of work which decide the status of the worker as organised or unorganised. This is dependent upon the work milieu. Besides, a worker is also affected by other factors – physical, social, economic and/ or ergonomic.

An investigatory study done in Coimbatore city (the locale of the study) revealed the presence of 376,707 registered female construction workers (35.4 %) apart from the very many who had not registered. Similarly regular visit to the General Hospital for a month’s time pointed to women construction workers approaching them for health problems relating to work induced ortho, skin and reproductive disorders. The essence of the investigatory study projected the impermanence and unorganized nature of the jobs along with the occupational hazards and work-related disorders that they endured due to involvement in the activities which more or less proclaimed their lack of knowledge on the ergonomic issues associated with the activities. Based on the light of these data, an empirical study on the status of construction workers and an action study to know their ergonomic profile was decided upon.

With this backdrop a study on “Ergonomic Analysis of Unorganized Women Construction Labourers in their Occupational Settings “.was launched with distinct objectives:
Observe workers (women) in their occupational settings for modalities of performance in the job.

Study the work environmental impact for sources of work-related hazards and on their health status.

Examine their socio-economic status, knowledge on occupational health hazards, work-related health disorders and access to social security systems.

Ergonomically relate the impact of repetitive actions and the postures adopted with objective/subjective feelings of pain and perceived discomforts during performance.

Design an ergonomic intervention programme involving them as participating partners.

The locale selected for the study enrolled specific areas in Coimbatore City adopting purposive or convenience sampling (depending upon the requirements of the study) and 500 women construction workers (convenience sampling) for the empirical study and 50 women workers (purposive sampling) for the action research. Semi-structured Interview schedule, check list, test-batteries and action programme were essentially put to use as tools for eliciting data with interview and observation as effective methods. Both primary and secondary data was resorted to. The findings of the study are summarised as under.

Socio-economic background

- Fifty four and 46 per cent of the samples belonged to scheduled caste and backward community respectively and 96 per cent were Hindus.
- More than three fourths of the sample maintained nuclear families and 55 per cent belonged to medium size families with 4-6 members.
- A majority of 68 per cent of the families comprised of children in the 6-12 years age, picturing the sample in the expanding stage of family life cycle, while 60 per cent of the families also had senior citizens, clearly indicating the extra mouths to be fed by the respective families.
Despite having more hands to earn, in some families, the study revealed a good 62 per cent to be in the low income group (₹2500–3500/ per month) and 25 per cent to be categorised under economically weaker sections (EWS- less than ₹ 2500/ per month).

Forty per cent of the heads of families were illiterates and 97.4 per cent reported to be employed as unorganised labour.

A majority of 70 per cent of the families lived in two-roomed houses, while 12 per cent lived in a single room with no sanitary facilities or attach bath/toilets.

Access to community facilities and essential services except water supply was found to be comparatively better.

Personal Profile of the Samples

Age wise those in the 26-35 years of age (44.8%) and 36.45 years of age (27.4%) predominated than those who were represented in the age ranges below or above them.

Divorcees (12.8%) and widows (5.6%) also featured.

Though 57 per cent were literates with minimal formal education, circumstances had forced their entry into the labour force.

There were two extremes with regard to the sample’s age of entry into the labour force, those who had entered below their 15 years of age (4%) and those who had crossed 46 years of age. One half had entered in the 16-25 years of age.

Fifteen, 15 and 20 percent emerged as experienced tradeswomen as they had put between 11-15, 16-20 and 26-30 years of service in the field respectively.

All the samples expressed break in service either due to non-availability of job, sickness, absence due to confinement or child care.

Monthly earnings of the sample ranged from ₹2500-3000/- for a maximum of 60 per cent, though 22 per cent earned more than that (₹3001-3500/-).
• A majority of 96 per cent of the samples contributed from 96-100 per cent of their income to the family income, showcasing that they were the major earners in the family, despite 81.6 per cent living with spouses and 60 per cent having other earning members in the family.

• Economic, emotional and psychological factors were attributed as reasons for taking up the job.

• Only ‘known skill’ was projected as the major motivating force.

• An enquiry of the nutritional status of the selected samples revealed the daily intake (consumption) to be below recommended allowances for iron, Vitamin A, riboflavin and niacin - highly essential nutrients for the women in their productive age range. Contrarily, intake of fat and starchy food was found to be higher.

• Though 56 per cent of the samples pictured in the normal values for BMI range assessed using International standards (WHO, 2004), according to Indian standard references, only 46 per cent were found to be normal. Fourteen and 22 per cent demonstrated for overweight and obese category.

• More than 80 per cent took complete responsibility for household chores.

❖ Job canvas

• Majority of 52 per cent of the samples worked under contractors followed by 38 per cent who were under supervisors. Evidently all of them were contractual labourers.

• Migration of labour or mechanisation was not found to displace them. But failure to enrol in Union office and completion of projects by the promoters had left them jobless for specific times.

• They were employed only for unskilled, casual labour and were entrusted activities involving mainly manual materials handling tasks.
• The activities performed were carrying loads of different building materials in the same floor or up floors, passing bricks manually, sieving sand, shovelling, filling mud in foundations and sweeping, using crude tools and accessories, the use of which impacted their upper extremities. Moreover, they were found to be very heavy (pan alone - 2 Kg; shovel/ spade -2.5 Kg) and unwieldy for gripping. Many of them were worn out and hence were not user-friendly, causing minor (supposedly) injuries and bruises.

• The activities entrusted thus demanded repetitive tasks (mainly for the arms, hands and wrist), awkward postures and application of force.

❖ Job structure

• Average work timings was found to be eight hours a day, inclusive of an hour’s lunch plus tea break.

• Manual handling of loads included lifting, raising the weight, carrying, moving and dumping the load.

• Mean weight of materials carried and shifted ranged from 25-35 Kg of different building materials, much heavier than the recommended allowances for women labourers (according to ILO (1990), mean permissible load to be carried by women is 15-20 Kg).

• The distance walked with loads extended from 3 -6 m for shovelling and passing bricks manually to 9-15 m for carrying loads and sweeping.

• The jobs evidently were found to be highly strenuous.

• While one work cycle of carrying loads and filling mud was repeated twice in a minute, the other activities (except sweeping) was repeated ten times in a minute, projecting the monotony and strenuousness associated with the activities.
Women labourers in the working milieu

- Ambience in the work area was found to be polluted with flying dirt, dust, debris and with noise from concrete mixers, vehicles, welding/drilling works, cutting stones and rods and breaking stones.
- Water provided for ablution was reported as highly contaminated.
- Despite enduring headache, dehydration, cold, fever, migraine etc. the samples otherwise were found to have got acclimatised to the external ambient temperature and humidity.
- Seasonal impacts was felt more as displacement from jobs as contractors / supervisors restrained from taking up construction work during heavy rain or in winter.
- Lack of personal protective clothing and environments not congenial and comfortable for working emerged as the highly drudgery- causing situations in the work place for the selected sample.
- Furthermore lack of sanitary and copious good water for personal activities and restrooms (if at all available was unisex) also added to their plight.
- The samples were found to contain their urges for nature’s call and thirst, thus self- allying themselves to UTI, electrolyte imbalances and related health disorders.
- Safety equipments/ services were not provided in any of the construction sites.
- First-aid boxes also were not provided.

Prevailing work culture

- Wage discrimination was quite rampant. Wages paid to the samples was to the tune of ₹120-150 / day and higher wages for men folk.
- Experience in the job was not considered for giving hike in wages.
- Monotony and casualisation / feminisation of labour was distinct.
- All the samples endured male domination in the work site.
- Exploitation as giving more work for those who were not subservient (72%) and using their services for personal work (87%) were also reported of. Access to better jobs within the construction domain was nonexistent.
• Contractors, masons and supervisors had a high hand in entrusting / allocating activities and wages to women workers.
• Gender discrimination in the form of psychological violence using vulgar words (58%) abusing (52%) and criticising and bullying were common complaints.
• Coming a little late for work, requests for leave, slowing pace of work or talking to co - workers were not entertained.
• In appropriate initiation (54%) hugging (38%) brushing (27%) and other cheap behaviour were reported as evidences of existing sexual harassment in the work sites.
• None of the samples reported such treatments (still those of higher order too) to their higher authorities or others.
• Mixed feelings of fear, further harassment, subordination to male domination, facing ill treatment (78%) and loss of job permanently (100%) were expressed as reasons for enduring such personalised abuses and insults.
• Job insecurity is evidently a true phenomenon scaring the concerned sample.
• Adjustment and cooperation to male dominance and discrimination were therefore written dicta in their work place culture, highlighting further the casualisation and feminisation of labour.
• They were not protected through social security schemes or medical/ insurance benefits.
• Triggerers of fatigue were thus fear of losing the job, wage discrimination, work related and human – interaction related factors for all the samples. These factors had led to onset of job stress subsequently in the samples.
• Being ‘branded as unskilled labour’ despite having put in 26-30 years of experience further affected their psychological status very badly.
• Ultimately, the activities performed by them were ‘branded’ as women’s jobs.
Safety Culture

- Provision of safety/protectorive devices and awareness generation on potential pollution and injury-prone factors and of disseminating the information to the workers never found place in the agenda of the employer's/contractor's work or job schedule. This was never practiced as their primary responsibility.
- Training on jobs to be performed and safety measures to be adopted was never given to the workers.
- A basic first aid box even was missing in the work sites.
- Safety culture was thus found to be nonexistent in the works sites, paving way for resultant occupational health hazards for women workers.

Occupational health hazards endured

- Work place related health disorders like pain in the shoulder, neck, back; knees, hands and wrists were reported by all the samples.
- Exposure to noise, dirt, work over load, paint smell, and the like in the work spot had manifested in the form of various health problems.
- Sustained and severe exposure to these environmental vectors and injuries can lead to the onset of many Work Related Musculo-Skeletal Disorders (WRMSDSs) in the workers like carpal tunnel syndrome, tendinitis, back pain, sprain, strain etc in the future about which they were unaware of.

Human resource use pattern

- On an average the sample carried loads for 6-8 hours a day, whereas passing bricks manually, sieving sand and filling mud in foundation was performed for 3-4 hours respectively. Shovelling for 2-3 hours and sweeping for 1-2 hours was also reported. Only carrying loads were done for the whole day. Otherwise the schedule included combination of two or three works from the other stated jobs, making up the eight hour shift – all Manual Materials Handling (MMH) jobs.
• The MMH activities therefore were found to be monotonous, fatigue – causing and drudgery and injury - prone for all the samples.
• Work site hence was not found to be labour – friendly.
• Further the samples were found to expend energy and time (3-4 hours a day) on household chores.

❖ Fatigue experiences

• All activities demanded adduction, abduction and medial rotation of the different parts of the body to the extremes. Hence posture adopted, poor work environment and the work itself had contributed to feelings of fatigue in 100 per cent of the samples respectively whereas the time cost of the activities performed, distance travelled, and twisting were responsible for such feelings in 80 per cent of the samples performing all the so called ‘branded’ activities.
• From empirical data analysis, age factor was not found to influence fatiguing experiences.
• Leisure as a concept to alleviate fatigue was found to be a rare commodity as far as the selected sample was concerned.
• Both personal problems- economic, housing and fear of future – in the home front and job insecurity, lower wages, safety – less work culture, work overload, harassment- including sexual – in the work spot were but a few problems faced by the samples.
• Since satisfaction of these factors proclaims the ‘identity’ a worker enjoys, the study proved that the samples lacked identity in both the home and work place.
• Rights for identity and visibility was thus a rational claim for and by the samples, though was not granted
• Working in an unorganised set up, lack of knowledge on social security (as they were not offered any) and lack of unionism to support and voice their grievances had left them with no ‘identity’ and little room for redress.
Ergonomics of construction work

- All activities demanded all types of efforts – mental, visual, manual, torsal and pedal, as reported by 80-100 per cent of the samples. All the activities required the sample to stand, bend, twist and flex while performing all the activities, projecting the interplay of both static and dynamic forces in performance.
- All the samples were found to adopt awkward postures to complete the allotted tasks, the impact of which is sure to lead to WMSD in them.
- Short stature and small palms, limited the ease with which the samples could operate the crude tools/accessories provided for working.
- These factors reflect as increased limitations and reduced capacity for work on the workers.

General Health profile

- Computation of BMI revealed 56 per cent of the samples to be normal according to International standards, but on the guidelines of national standard (which provided further refinement to include and classify overnight persons too) 46 per cent were normal. Almost one third of the sample was overweight or obese.
- Involvement in the job-related activities had caused gastro intestinal problems (22%) abdominal pain, constipation, loss of appetite, contact dermatitis (25%) gynaecological problems (56%) and work related body pain (100%), in the samples apart from regular bouts of cough, head ache and nausea.

Perception of work-related body discomfort / pain

- Headache, swelling in the hand, general weakness and pain in the whole body was reported by all the samples doing all the activities, while itching in the skin (98%) palpitation / breathlessness (63%-100%), tingling in the fingers (66-100%) and feelings of numbness (47-100%) were also complained of; many of which are evidences that prove WMSDs to have already set in for the related sample.
Work related body pain endured

- Work related body pain defining 16 musculo-skeletal body regions in the body – preceding stages for onset of WMSDs – was reported of by cent per cent (100%) of the samples the findings focused the propensity for the selected samples to succumb to WMSDs in the near future.
- Repetitive work, awkward posture, static/dynamic work inter play, work overload, stress, time pressure and personal characteristics like physical capacity and old age – were listed out as reasons for the pain endured.
- Self medication and tendency to adopt simple traditional techniques for relieving pain were found to be practiced, while expenditure on medical care was less.
- Being provided with no ESI or other medical benefits and the need to approach private hospitals which demand high fees (for quick relief) were reported as reasons for self medication.
- Thus, all the samples were found to suffer from non traumatic injuries to their system in a silent way.

The situational studies presented hitherto explained / reflected the plethora of problems faced by the selected samples on all scores with no room for redressal of their grievances. The home-front too had forced their entry to this unorganised sector. Such reflections on dire realities necessitated finding out the ergonomic profile of the sample workers both on objective and subjective terms. A purposive sample comprising 50 women workers who were willing to cooperate for the study and learn and effect changes in their occupational pattern was chosen for the study, the salient findings of which are summarised below:

Physical ergonomics

- Five anthropometric traits were taken on each subject.
- The strength of the samples in terms of BMI, hand grip strength and pinch grip strength were found out adopting appropriate methods and tools.
The BMI of the sample as stated earlier, revealed 46 per cent to be normal, 14 and 22 per cent to be overweight and obese respectively. Below normal standards was demonstrated by 18 per cent.

As all the samples were found to be engaged in manual materials handling, yet unskilled jobs, data on handgrip and pinch grip was recorded.

Right hand (RH) was found to be the dominant one for all the samples. Evidently strength in the left hand (LH) was found to be considerably low.

Only eight per cent featured in the 26-35kg range published as average/above average standard for hand grip strength.

A majority of 78 (RH) and 90 (LH) per cent respectively could be categorised only under very poor (<20kg).

Hand grip is widely used to assess general strength in order to determine work capacity. From the data obtained, it is inferred that the strength of the sample does not satisfy given statistics and are evidently weak in health status.

With regard to pinch strength, much inter-sample difference was not noticed between dominant and non dominant hands as almost 80 per cent exhibited strength to hold between 5.1 – 10 kg in their fingers.

To study the interplay of dependent/independent variables, individual BMI and age factor were correlated with the values obtained for hand grip strength. Age Vs right hand grip alone was found to be significant at 5% level.

Cardiac cost of activities

Heart rate (HR) being a true indicator of the stress and strain on individual experiences during performance of an activity, this factor was studied in detail.

HR for performance of the selected activities was recorded by fixing a standard HR monitor which permitted recording minute by minute HR data (one recording every 60 seconds).
• Carrying loads on the same floor and up floors augmented cardiac activity such that the sample recorded between 51-70 beats\(^{-1}\) (incremental HR) with a maximum represented in the 56-65 beats\(^{-1}\) range.

• Filling mud in the foundation also affected them physiologically as 90 per cent of the samples showed high increment in HR (78% showed a hike in their HR data by 51-55 beats\(^{-1}\) incremental)

• Among the other four activities, except sweeping, all caused a rise in HR over basal values from 21-45 beats\(^{-1}\).

• Evidently the activities performed can be adjudged as highly strenuous, drudgery-causing and fatiguing for the selected sample.

• Statistical analysis to locate relationship of incremental HR (for all activities) with personal factors of age and BMI was done. BMI was not found to affect the physiological parameter.

• Age of the sample was found to influence this physiological parameter for all activities (except filling mud in foundation) at 1% level.

• This is an important finding in that, the employers hitherto, have to have a check on the age factor of the workers when they induct them for this contractual work, ignoring which can perpetuate accidents and occupation related cardiac problems for workers in the work sites. As compensation for work site injuries, fatal accidents etc is not a factor common in Indian conditions and as absenteeism to work does not affect construction activity as in other developed countries (by virtue of the availability of alternate cheap labour) these factors are not given any heed either by local contractors / promoters or policy makers. This has to be given due significance while framing policies.

• The findings also revealed subject variation to exertion, which necessitated categorisation of the activities performed by the sample for severity of prolonged physical work.

• Comparison of the WHR (the absolute value recorded while performing the activity) with published standards revealed carrying load up floors to fall under very heavy to extremely heavy, and carrying load in the same floor as very heavy.
• Except sweeping which could be classified under moderately heavy task, all others qualified for being heavy or very heavy. Hence the cardiac stress of the samples was found to be very high.

❖ Variation in subject exertion

• To find out variation in subject exertion, the WHR was commuted for the time factor of performance to find out the Absolute cardiac cost.
• For Relative cardiac cost, the IHR (Incremental HR x time) was also found for all the activities and all the 50 samples.
• Analysis done showed carrying loads in the same floor and for both the costs with age to show negative significance at 5% level.
• Passing bricks and sieving sand with age also showed positive significance at 1% level.
• For filling sand correlation with BMI showed positive relationship at 1% level, for both the scores, while for shovelling, absolute cardiac cost showed significance at 1% level with BMI.
• Though all the activities entrusted to the workers were classified under ‘unskilled work’ the samples were found to exert more than those skilled workers, the men.
• Findings on the ‘physical ergonomics’ score is hence concluded as highly strenuous and taxing on the sample.

❖ Outcomes of Subjective Ergonomics

• To enable a subjective analysis of the samples for the activities performed, both physical ergonomics on subjective measures and postural ergonomic measures were resorted to:

➢ Response for the Subjective Physical Ergonomics

• **Response for the Nordic Musculoskeletal Questionnaire (NMQ)** recorded the samples to have been ending the day's work with pain in many of the body regions, 12 months prior to the commencing of the study (satisfying the eligibility to participate in the test) and had therefore expressed the pain to have hindered with their performance of regular activities. Similarly they also reported to be enduring pain for
the last one week before administrating to NMQ. These factors projected that the samples were suffering pain in several body regions by virtue of being employed in the construction sector for more than a year without any visible repercussions.

Perception of body discomfort / pain

- For this a standard body discomfort / pain scale was administered on the sample.
- The details recorded pain in various body regions – shoulder, neck, upper and lower extremities, upper/ lower and mid back, buttocks and thighs – quite a long list.
- Among the activities and from the total scores awarded, it was possible to understand that the three activities of passing bricks manually, shovelling and filling mud in the foundation afflicted pain in different body regions than the other activities.
- Evidently repetition of the tasks within a short duration, force applied and the awkward postures adopted had emerged attributes for them to have perceived pain in many of the body regions, necessitating a postural analysis of the samples at work.

Response for the subjective postural analysis

- Postural analysis was done administrating OWAS and RULA.
- The samples were video graphed, while in action, which enabled tracking postural variations they adopted for doing the same activity.
- The action category scores recorded pointed to carrying loads (at any level) as highly harmful as it had received the maximum score of 4 (requiring immediate corrective measures), followed by all the other activities which recorded 3, except sweeping for which the data recorded was for score 2.
- These warrant a high recommendation for correcting the postures while performing work, which had to be practiced at the earliest.
• While OWAS studied the strenuousness of the posture on action delivery, RULA studied the effectiveness of repetition, force and posture on the samples’ physiological system.

• The cumulative score for arm and wrist analysis (RULA) done for all the tasks was arrived as 8+ while neck, trunk and leg analysis received a score of 7+. The final score for RULA was found to be 7, which interprets that the postures need further investigation, it is inevitable and has to be implemented soon, as all the concerned actions ranged from above the shoulder work to below the knees work and a variety in between. Above all the postures are not acceptable and tolerable.

• These factors formed the germane for undertaking the applied ergonomics program. It aimed mainly to educate a unit of the affected population (sample) on ergonomic issues and the occupation related health disorders.

❖ Relevance of applied ergonomics

• Final section of the study therefore included conduct of an intervention programme involving:
  
o A survey using a check list to understand the extent of knowledge the samples had about ergonomics and health issues related to the vocation.
  
o A general survey on their awareness of the social security schemes existing, they had availed of and details on the registration to union office.
  
o Conduct of intervention programme roping is essential stakeholders in the agenda
  
o Post intervention survey to gauge the extent of info transfer made possible to effect viable life style changes.

• The pre-intervention revealed the samples ignorance about the concept of ergonomics, let alone their significance in occupational settings. Neither was they aware of or was beneficiaries of social security schemes, or had registered in the Union Office. It was enough evidence to show their ignorance of the entire issue.
• None of them were allowed leave on medical grounds or maternity leave (they had to quit the job during confinement and rejoin afterwards), were not covered under any medical insurance or were enjoying ESI benefits. None of them were protected for Tetanus.

• Not being a member in the union office and lack of unionism among the samples had left them with no choice but to suffer the adversaries. Lack of support from co-workers (men and women) and employers had ditched them with no chances for redress of even major problems like requests for separate toilet facilities, permission to bring children along to the work spot etc.

• Harassment of all sorts including sexual was very rife. ‘Quid-Pro-quo’ type of harassment was an unwritten dictum.

• The subsequent intervention programme organised for the benefit of the samples was a joint effort of the Resource Management Department of the University, Department of worker’s Education, Coimbatore, (Ministry of Labour, GOI), an NGO – Rotary Club of Coimbatore Texcity, the Field Publicity Office (GOI), Coimbatore and other invited speakers including professors, physicians, philanthropists, local governing bodies, physiotherapists etc – pooled together by the earnest efforts of the investigator under a single umbrella for a common cause.

• Info-transfer was religiously disseminated through lectures, lecture -cum- demonstrations, screening of documentary on health hygiene and related aspects, posters, print media and the like.

• Distribution of personal protective gadgets – a head load support to ease the strain on the neck shoulder (made by the investigator herself) and gloves (donated by Rotary club of Coimbatore Texcity) gave additional flavour to the programme.

• As a crowning elements of the programme 52 samples (50 of the participants plus who joined later) were facilitated to register with the Tamil Nadu Welfare Board of Construction Office.
Feedback received from the samples after the two days programme evinced positive feelings of understanding the concepts framed for info-transfer and assurance to practice them in their day to day activities.

They were all the more happy to participate as they were all paid an honorarium of Rs. 100/- a day (besides being taken care of the two day’s boarding expenses by the Rotary club) by the Department of Worker’s Education as a promotional measure. They requested for more such educational programmes in future.

Follow up

Responses received for a follow up study administering the same checklist (put to use before the intervention programme) proved that the samples had imbibed the general health issues and ergonomic principles well and were practicing them in their daily activities – both at home and in the work front.

Above all their request for a mask to protect selves from air pollution and thus prevent respiratory diseases was a bonus treat to the investigator as the request is a true indicator of the comprehension of the problems and thought for simple remedial measures.

Status quo inferred warranting deliberate action – The BIG PICTURE

Women construction workers put in invisible labour, bear identity crisis silently, and are exploited in this male dominated sector.

They enrol with a contractor without any idea of the workplace environment or the amenities made available, with every change in contractors or job sites. This is even a daily affair for those who seek daily employment.

They are victims of gendered division of labour doing all back breaking, energy sapping jobs.

They suffer the brunt of discrimination in allocation of work and wages – a silent battle of grievances without redress.

They are vulnerable to ‘Quid-pro-quo’ harassment in the workplace.
Their livelihood status is temporary (job insecurity), which lacks social security and privacy.

They do not have prospects for promotion.

They suffer occupation and work related health disorders and diseases, but the expenditure on health care was less.

They are forced into service with a variety of weaknesses inherent with factors of age, gender, general weakness, known health debilities (Diabetes, BP etc), motivation and skill levels and lack of protection (even for tetanus), and ante-natal/ pre-natal/ geriatric care.

They endure dual role syndrome.

They perform the branded women’s activities – unskilled labour in an unorganised occupational setting – and thus indirectly assume responsibility for casualisation and feminisation of those activities – creating a gynocentric sector in an otherwise genderless one.

All the five alternate hypothesis proposed in the introduction chapter have been rejected from the findings of the study as indicated in different sections of results and discussion.

Unlike other developed Countries, in India, absence of occupational hygienists and occupational nursing is a felt lacuna. Concept of sociology of workers is also not a known discipline even among educated population. Lack of proper legislation enforcing regulations for working conditions, employment of women labour, wage pattern, leave and medical benefits, above all compensation for injuries/ accidents, and education of promoters/ contractors on the rules/ regulations they need to abide is still much diluted.

This study undertaken was on a micro level and the deliberations picture only a minor effort. To bring in revolutionary changes efforts on a war-footing encompassing all stakeholders starting from the grassroots – workers, employers / contractors and up to the policy makers - should be pitched in for proactive role and fruitful deliberation. Hence the following recommendations are put forth.
Recommendations

Local Bodies

- Streamline unions to train registered workers on occupational and work-related disorders before induction through induction programmes
- Organise skill training/ awareness programmes for union leaders, union registration office personnel, contractors, masons, promoters, workers, insurance personnel on the various facets of occupational safety and work related issues roping in Institutions, NGOs and the Department of Worker’s Education at periodic intervals
- Form Quality clusters involving all stakeholders as a team and as a common platform for voicing their problems and opinions and gaining quick redress
- Network with health officials from local governance and arrange for surprise visits to construction sites and enforce punitory actions on defaulters at the spot.
- Ensure periodic monitoring and promote negotiable norms in the industry enabling mutual benefits and have collective bargaining agreements

Institutions / NGOs

- Introduce Courses on Occupational Hygienists/ Safety Officers as a discipline in Institutions
- Promote Occupational health nursing and occupational specialists as a practice oriented vocation in Hospital Administration
- Draft proposals for collaborative projects to take up in-depth studies on such labour and tradeswomen
- Create databases of tradeswomen’s problems and organise seminars/conferences inviting stakeholders to discuss and deliberate viable solutions
- Disseminate and info-transfer as an effort basically for sensitising the society on the issues and to further generate a forum for addressing the issues
- Envisage Courses on Preventive Health and Curative Health as innovative programmes
Hospitals

✓ Designate Occupational health service as a special discipline and Department with adequate trained personnel.
✓ Network and form a team in construction sites to prevent injuries, accidents and WRMSDs.
✓ Make additional columns in the existing admission sheets in Government and private hospitals to enter the vocation taken up by the reporting patient, illness reporting for, reasons/ causes for getting the disorder, period of suffering, body region where injury was inflicted and the like for enabling creation of a database on occupation related disorders.

Ministry (Government)

✓ Insist on appointment of trained occupational hygienists and safety officers as mandatory in construction promoters teams (like recruiting Engineers).
✓ Frame policies laying regulations for appointment (even for unorganised labour) of labour on health grounds and other biological factors.
✓ Empower/ strengthen organisations and infuse leadership in tradeswomen through the Department of Worker’s Education.
✓ Bring out framework, a white paper on modern OHS (Occupational Health Services) regulations forging adequate enforcement, machinery, laws and awareness programmes.
✓ Conduct awareness programmes for contractors/masons/ promoters on maintenance of safety culture and human relations to improve workplace culture and deliberate mandatory implementation of the same in work sites.
✓ Envisage scope for extending ESI benefits for unorganised labour.
✓ Safeguard employment opportunities for landless labourers, especially women whose alternate choice is only the unorganised construction sector.
✓ Expand social security benefits one size larger to engulf unorganised labour class too within the umbrella.
✓ Recommend Health Promotion as a special discipline to be included in education planning and policy framework.
✓ Envisage Primary preventive health and Curative Health as separate entities in Public Health endeavours.

All these recommendations can be framed as policies for implementation by governance and administration.
Research

- Study workers in other unorganised sector
- Study migrant workers
- Study safety in construction sites
- Women in Blue collar jobs

CONCLUSION

When ergonomic changes are introduced into the workplace or job site, they should always be accompanied by worker training on how to work safely. To this effect, the study was streamlined on the following lines:

- Based on the light of the studies, an Ergonomics intervention programme was organized both to give them an opportunity for introspection and also to provide insight into some social security schemes, access to them and good occupational health services.
- Health education to practice good personal hygiene and devices like gloves and head gear for personal protection were provided.
- It has been an earnest effort on a smaller group. This can be extended to larger masses with collaborative endeavours.
- Lack of unionism among the samples was very distinct.
- The first National Commission on labour (1966-69) defined unorganized labour as those who have not been able to organize themselves in pursuit of common objectives due to constraints like casual nature of employment, ignorance and illiteracy, small and scattered size of establishments and position of power enjoyed by employers, an inimitable bone on the industry (NCRL1987-91).
- The study had thus proved that till date, the condition to be remaining the same.
- Simple changes can make a big difference as NIOSH (National Institute of Occupational Safety and Health) advocates.
- The study was streamlined with such an aim. It is fortunate that the outcomes have been successful in creating a positive attitudinal change among the samples to think about themselves.

Health and safety at work being essential issues of working conditions, the study, had thus paved a way for ‘introspection’ and induction of corrective measures by the selected sample.

The investigator had embarked on a research study of common interest with an ethnic tinge and had successfully completed in engaging all the stakeholders. The chain has to continue, the linkage should be maintained and the relay should be sustained. The Decent work agenda proposed by ILO should be dealt in detail and practiced in full earnest.

Let us fervently pledge to transform the plight of the women construction labourers (unorganised) from a rickety past to a healthy present in all respects.