



## RESEARCH ARTICLE

## Protective Clothing for Women Labour on Construction Sites, Delhi

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### Abstract

According to NTPC Safety Rules building worker means “A person who is employed by a contractor or his subcontractor to do any skilled, semi-skilled or manual, supervisory, technical or clerical work for hire or reward, whether the terms of employment be expressed or implied, in connection with any building or other construction work.” (Rules, 2012). Construction industry is the backbone of the economy as they provide job opportunity to the creators of modern India. The labour strength comprises of both skilled and unskilled workforce. In the current scenario of everyday development of Indian economy, these construction workers play an indispensable role. Female workers abroad are provided with proper protective clothing depending on the kind of work being assigned to them, but unfortunately none was found in Delhi during the study. The focus of the study is to understand the nature of work on site and identify the key factors related to the problems faced by female workers while on site in terms of clothing. The interaction with the female labours and the field study has revealed the problems that women are currently facing. The study further leads to systematically design and development of protective clothing for female workers which caters to the functional aspect designed by keeping in mind the cultural essence also. The knowledge gained via survey and the interview conducted on 46 female workers on construction site, helped understanding their requirement and offering them a functional solution in their clothing to ease their problems.

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## INTRODUCTION

Cities in India are mushrooming with Commercial sky- scrapers and residential towers. Even today, construction is a labour driven activity. Striving farmers and landless labourers get attracted towards the cities in search of work during their crises period. Those not having any skills set offer their labour in the construction sites. They stay in rough shelters devoid of basic amenities. Working schedule is physically tiring and of long hours. Sanitation, electricity and even clean water are not part of their camp stay at such sites. Their children grow along with this nomadic movement. (Creches, 2011) Construction Industry provides 7% of the total world employment. Today Indian construction industry employs about 31 million people and creates assets worth over Rs.200, 000 million (India Infra Guru, 2008; GOI, 2008a) annually.

## SCENARIO OF WOMEN LABOUR ON CONSTRUCTION SITES

In India, construction industry is the second largest employer, after agriculture. It constitutes of largely unorganized workforce (89%), of whom majority (3/4th) is unskilled. In terms of national investment, almost 40 to 50 per cent of the National Plan outlay is on construction. The industry contributes to 20 per cent of the GDP. (Creches, 2011) Wherein, booming construction industry provides the immigrants with a sharp contrast. It ends up pulling a large number of workers into the cities.

Women contributes to half of the workers in India as skilled jobs/ unskilled – jobs in other industries but in construction industry, they are employed as unskilled labourers. Women irrespective of the years they have worked are not upgraded as skilled labours. They perform various unskilled jobs in the industry like cleaning building sites, carrying bricks, gravel, mortar and water up to the skilled carpenters and masons.

The current scenario of women labour on Delhi construction sites is a sad tale. They constitute one of the most vulnerable segment out of the unorganized segment in the country. The women are working on sites along with their husbands and other male family members. Family responsibilities and field responsibilities are loaded on their minds whereas heavy loads of materials otherwise. There is a huge risk of limb and life while on the site. Moreover they do not get any proper medical facilities and there is no sign of permitted grievance mechanism for them. All the available mechanisms that exist are so complicated that they are beyond the reach of ordinary worker to approach. (Sangathan, 2010) The women labour currently get lower wages as compared to men labour and have not been provided by special facilities so as to cater their clothing needs in particular. These women belong to migrant lot who have shifted from rural slums to the urban slums in order to earn their bread. They are not allowed to wear sarees on the construction sites neither are they provided with any alternative. The women end up wearing layers of clothing so as to meet their cultural social needs along with the field needs. The result is such that they wear 4-5 layers of clothing on their body which leads discomfort, lack of total work output and disinterest.

(Sangathan, 2010) , went on to study 65 construction sites comprised of both big and small sized sites in Delhi to assess the ground level situation and observe how many rules of the Construction Workers Act are being implemented. The results were extreme that none of the sites that were studied practiced these rules. No visible Welfare or Occupational Safety Committee were spotted during the study. None of the workers were aware of the laws that comprised of a safety committee.

## PROBLEMS FACED BY WOMEN ON CONSTRUCTION SITES

Women are mostly the unskilled lot of construction site and face a lot of serious work related problems, viz., gender and sexual harassment, wage discrimination, unhealthy job satisfaction. Despite these female labour still gets attracted to construction jobs. They are supposed to perform only certain types of work and assist male work force. India is among fastest growing economies. Construction labourers are one of the utmost vulnerable segments of the unorganized sector as there are very less job opportunities for the unskilled. (Anu Rai 1, 2012). Triple Burden on the Woman Worker: The female lot of workers have triple burden of working on the site and at home and also the responsibility of raising children. Some basic issues are discussed as follows. (Advani, 2005)

Restricted Access to Basic Necessities such as sanitary and drinking water facilities

Discrimination in wage- Women being unskilled labour are paid low compared to men labour.

Women construction labourers consider their jobs as a hazardous occupation, as the activity process includes serious health and safety related problems hampering women labourers adversely.

Women Sexual harassment at work place is at alarming stage. The insecure nature of employment, particularly for women, is a vicious trap for women.

Accidents at Workplace: Construction site are marked as one of the most hazardous occupation with critical risks involved, related to physical injuries and accidents. Few of them are Struck by falling/flying objects, Skin problems due to chemicals and sharp objects, Eyes endangered by sharp materials & objects, Respiration problems due to chemicals, polluted air and weather change, Physical damage caused by falls & slips, Scaffolding collapse or its failure.

## FACTORS AFFECTING WOMEN PARTICIPATION IN CONSTRUCTION INDUSTRY

The Paper states the women in construction are considered as inappropriate gender for the construction sites to be in and around for the construction occupation. The women on the construction sites are required to maintain a balance

between their work life and managing their family. The paper has discussed about the various reasons for why women labour escapes from the construction industry. Benette et al, in a study figured common reasons as construction sites considered to be inappropriate for women, social acceptance level of women as labour to be very low, working conditions such as extreme weather, long working hours and risk to hazards. Sexual harassment and physical incapability are also pinned on to this list.

The strength of actively working women in such countries if found on construction sites as labour. A study reveals 97% of women on construction sites in India contribute to the informal segment. Thus increasing the proportion of women in the informal sector. Similarly the women labour in African countries are either self-employed or unpaid labours in the family business. Furthermore the study indicate that construction industry's male dominated, skilled jobs and craft based culture contributes to the barriers for women labour recruitment, their carrier upliftment and keen participation.

Few of the issues faced by women are:

The traditional assumptions- women not being physically strong to take up the task. In a study women have agreed that scope developing psychologically so as to maintain their place in the industry and cope up with the environment. Construction sites are prone to MSD Musculoskeletal disorder as compared to men. Women are almost twice under danger to suffer MSD. They tend to complain pain and injury than men, and as a result leave job. Overlooking the self-capability limit also results into MSD and other physical issues. Control over work, support from peer and professionalism tends to be hampered by personal gender offences. The female workers have also complained about the ill-fitted PPE and PPC which instead of easing the job increases the chance of accidents. A study conducted by OSHA 1999, figured that most of the PPE & PPC availed women on sited are not as per the women's physique. They tend to percolate the men's PPC & PPE to women which turn causes damage.

The culture of long working hours is a matter of great concern to the health of women on sites who are already multitasking between managing families and the work place. The fear amongst male workers regarding women taking their position by performing well also hinders their chances of growth and promotion in the industry. Also, omen are seen as threats to the existing upper level men workers. Providing proper training and opportunities in a healthy working environment can contribute to strengthen the women labour contribution on the construction sites.

## **HAZARDS FOCUSED**

The Hazards focused under this study will be a combination of Physical and Chemical Hazards for example, substance such as benzene is both toxic and flammable.

Typical Physical Resistance concerns include abrasion resistance, cut resistance, puncture resistance, tear strength, tensile strength, flammability, and resistance to the effects of heat and cold. Accidents due to non-visibility.

Chemical Hazards caused by dusty materials and substances that contain harmful chemicals. Such as Silica from cement, plaster. Man-made materials such as rock wool, exposure to lead and other metals in welding operations, pesticides etc.

## **RESEARCH METHODOLOGY**

The target of the study is to assess the problems faced by women on construction site and understand their working patterns. These insights would contribute to acquire the knowledge of key requirements of women labour on the construction site in terms of clothing. The area focused in the study is Delhi Construction Sites.

## **OBJECTIVES**

To design a range of Protective clothing against Physical Hazards faced by women in construction sites.

## **SUB OBJECTIVES**

To understand the problems and needs of Indian Women in construction site.

To evaluate potential hazards faced when completing the assigned work.

Understanding the user behavior and develop prototype.

## RESEARCH DESIGN

Descriptive method was used by the researcher for the study. The researcher was directed towards the understanding of clothing needs of women on construction sites. Questionnaires and expert Interviews were used as survey tools.

## SAMPLING

In this research 46 women labor were randomly chosen to conduct the study. The sample covered all age segments so as to understand needs at various ages of a women labor.

## DATA COLLECTION TOOLS

The researcher collected the data with the employment of self-prepared questionnaires. The questionnaire was translated from English to Hindi/ Bengali by the researcher while conducting in person data collection as all the women Labour belonged to same communities.

## ANALYSIS

### NATURE OF WORK

	No. Of Respondents (46)	Percentage
Skilled	43	93%
Unskilled	3	7%

93% of the sample is unskilled labour. They have all the work related to loading and unloading of materials.

### DESCRIPITON OF WORK AND TIME

	8-10 hours	9-11 hours	12-15 hours
Concreting Work (7-8 Kg)	3	4	3
Mansory Work - Carrying bricks (10-12 bricks)	6	3	2
Earth Work- Shifting Mud (13-15 Kgs)	2	3	1
Crowbar- to dig (15 times in a minute)	4	2	0
Curing- Carrying water ( 8 Ltrs )	5	2	1
Breaking Jalis- using hammer (48 times a minute)	2	2	1

There majority of work mentioned above is headed under the category of unskilled work.

Concreting: It was studied that 50 bundles each weighing 7-8 kg, was moved by female labour in every 15 minutes.

Mansory work: Each female carried 10-13 bricks (each weighing nearly 2.5 kg) on their loader and moved along the scaffolding. While they carried same weight 50 times during the entire day.

Earth work: each women carried approximately 13-15 kg of mud on their head to walk down 40 feet to deposit the mud and return. Same task was done for 170 times a day.

Crowbar to dig: During the course of digging into the earth a female worker would hit 15 times in a minute.

Curing: women carried water pots each containing 8 ltrs of water to pour over the constructed structures, repeated the same 15 times per hour.

Breaking jalis: In breaking Jalis, Female labour used hammer to hit on metal for 50 times in a minute and went doing the same for a nine hours of shift with an hour break in between.

### CLOTHING PATTERN OF WOMEN ON CONSTRUCTION SITE

	No. Of Respondents (46)	Percentage
Saree	31	67.39
Suit	6	13.04
Both	9	19.56

67.39% wore saree on their work sites, addressing social and cultural reason for the same. Women comprising of 13.04% wore only suits as it provided a great level of comfort on the site. 19.56% of women claimed that they wear both suit and saree on the work sites.

#### UNDERSTANDING AND USAGE OF PERSONAL PROTECTIVE CLOTHING TO THE WOMEN ON SITES

	Understood Importance	Hard Hats	Gloves	Shoes
Strongly Agree	10	5	4	6
Agree	25	13	6	9
Disagree	7	3	2	4
Strongly Disagree	4	0	1	3

54.34% of female workers strongly agreed to the importance of protective clothing to them while on the work sites. These were found to be wearing hard hats, gloves and shoes with On contrary there were women with 39.13% Hard Hats, 21.73% Gloves and 32.60% Shoes.

#### UNDERSTANDING CAUSES FOR ABSENCE OF PERSONAL PROTECTIVE WOMEN CLOTHING

Causes	No. Of Respondents (46)	Percentage
Unavailable when needed	23	50%
Poor Fitting	30	65.21%
PPC in poor condition	21	45.65%
Uncomfortable	33	71.73%
No special clothing for women on Indian work sites	38	82.60%

50% do not receive the protective clothing when they needed resulted into various injuries. 65.21% of women mentioned that the available clothing was ill-fitted which makes it more difficult. 71.73% of women felt uncomfortable by wearing the clothing that is available to them so they pick up shirts of large size so as to cover the loose "Palla" falling out from saree. No clothing available for women on Indian construction sites.

#### FINDINGS: PREFERENCES IN THE CLOTHING FEATURES FOR THE DEVELOPMENT OF PROTECTIVE CLOTHING FOR WOMEN ON CONSTRUCTION SITES, NEW DELHI

82.60% of female workers wanted semi fit kurta for the comfortable body movement.

They preferred full sleeves in the majority of 86.95%.

60.86% of women preferred medium neck width along.

84.78% of women preferred knee length kurta along with the medium width flare

73.91% preferred Kurta with opening.

84.78% preferred buttons of women as it helps while changing the clothes.

65.21% of women preferred to have pockets on the waist side so as to have a little keeper in their clothing.

89.13% preferred loose fitted salwar over semi fit salwar.

78.26% of female workers wanted length of salwar to drop near the ankle

69.56% of women preferred elasticated waist band

23.91% of women who preferred cord as they are in habit of wearing.

## PREFERENCES COLOR & MATERIAL

60.86% of women labour medium colored kurta for their construction site wear. Too dark was not preferred. 100% cotton was on top preference of 91.30% stated it as one of the most favorable material for their worksite. It does not create any irritation on the skin. 93.47% of respondents preferred dark colored bottom against zero selection for light colored bottoms. On contrary to kurta, along with dark color they also preferred the bottom to be medium in weight in terms of make. 65.21% of women chose medium weighted material. 61% of the total sample preferred orange as their preference. Orange is otherwise also provided to them to wear on the construction sites as a reflective Jacket. With 33% of majority women on site supported for light blue color. 6% Dark blue was preferred by women for bottom wear specifically.

## AGE OF THE RESPONDENTS

Age Group	Number Of respondents	Percentage
18-25 Years	7	15%
26-35 Years	28	61%
36-45 Years	6	13%
Above 45 Years	5	11%

Average age of the women on the construction sites is 32.2 years. Around this age women are all married and they have raised their children. They are also working on the construction sites to help their family.

## DESIGN SOLUTION

Analysis of the questionnaire and interview with the women on the construction sites provided with the information to be used for the development of the prototype. There are many features that can be added to the Protective clothing for the women on the construction sites. Following are the clothing features:

- Minimal number of layers in the garment
- Medium flared garments enough for walking
- Bifurcated bottom to make the body movement swift
- Loose enough making room for air and fit enough for avoiding any accidents
- Opening in the upper garment
- Loops on the shoulder for holding jacket and "Dupatta"
- Full sleeve garments with adjustable lengths
- Reflective Trims on the upper garment
- Lighter shade for upper garment
- Darker shade for lower garment
- Cotton fabric is preferred
- Fully elasticated bottom
- Bottom fabric to be more durable

## PROPOSED SOLUTION

The whole concept of designing protective clothing for women revolves around providing a comfort edge to the female workers on the construction sites. The main focus is to address the basic needs of women regarding their clothing on sites and provide them with a solution which would help them make their work easier and improve the level of comfort. The clothing has been designed keeping all the age categories in alignment. It has simple yet effective features to fit the work nature of the women workers on the construction site and also be feasible for the mass execution. It is designed to be comfortable and reduce level of skin related problems faced by women.

## CONCLUSION

Women on Indian construction sites are at present indispensable part of the Industry. There is a huge scope of improvement in the upliftment of their working conditions. Such step would motivate them to deliver the desired work outcomes and also retain their interest in work along with that maintain their health and safety too. In the booming country like India there is a huge demand and scope for women labor in the construction Industry.

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