

# Working Design of the Selected Handloom Industry for Providing a Better Quality of Life to the Workers

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**Abstract:** The Handloom sector plays a very important role in the country's economy. It is one of the largest economic activities providing direct employment to over 65 lakhs persons engaged in weaving and allied activities. India has one of the richest traditions of woven textiles manufactured from wide range of different materials using variety of techniques for both functional and aesthetic purpose. Northeast refers to the easternmost region of India which is linguistically and culturally very distinct from the other states of India . Manipur enjoys a distinct place amongst the Handloom zones in India. Handloom industry is the largest cottage industry in the State. This industry has been flourishing since time immemorial. One of the special features of the industry is that there are only women weavers. In the present era of commercialization, handloom sector is also witnessing changes and large numbers of women are adopting the weaving activity as their profession. The activity they performed previously during their leisure time has now been transformed to 8hours job. But, in spite of the increased weaving time spent on loom, the workstation design remains unaltered. The workplace design for traditional handloom remains unchanged which leads to health issues among women weavers. Handloom industries workers have to perform activities mainly in sitting posture. They further have to perform repetitive movements of hands and legs while sitting in upright posture. Working under such condition for longer period of time might affect the physical and mental health of the workers. Many health and work environmental related issues have been faced by many workers. Important factors in the work environment that should be considered include building design and age, workplace layout, workstation set-up, furniture and equipment design and quality, space, temperature, ventilation, lighting, noise, vibration, radiation and air quality. Thus it becomes necessary to maintain the quality of life of the women working in Handloom units. The present research paper will focus on proposing a working drawing for the selected Handloom unit. The details are presented here in the paper.

**Key Words:** Handloom Industry, working design, quality of life, women workers.

## 1. INTRODUCTION:

The Textile industry in India traditionally, after agriculture is the only industry that has generated huge employment for both skilled and unskilled labour in textiles. The textile industry continues to be the second largest employment generating sector in India. It occupies a unique place in our country as one of the earliest to come into existence in India. It accounts for 14% of the total Industrial production, contributes to nearly 30% of the total exports and is the second largest employment generator after agriculture. The Handloom sector plays a very important role in the country's economy. It is one of the largest economic activities providing direct employment to over 65 lakhs persons engaged in weaving and allied activities ([www.gdrc.org/uem/qol-define.html](http://www.gdrc.org/uem/qol-define.html)). India has one of the richest traditions of woven textiles manufactured from wide range of different materials using variety of techniques for both functional and aesthetic purpose. Northeast refers to the easternmost region of India which is linguistically and culturally very distinct from the other states of India (Thoudam, 2008). Manipur enjoys a distinct place amongst the Handloom zones in India. Handloom industry is the largest cottage industry in the State. This industry has been flourishing since time immemorial. One of the special features of the industry is that there are only women weavers. According to the National handloom Census Reports 1988 there are about 2.71 lakh looms in Manipur (*unique handloom* << *official website of Manipur* [manipur.gov.in/?paged=3614](http://manipur.gov.in/?paged=3614)). Hand weaving is a part of socio-cultural tradition of the people of Manipur which has a rich cultural heritage. Handloom industry in the State, which has a legacy of unrivalled craftsmanship, is spread throughout the length and breadth of the State. It is a household cottage industry with decentralized set-up. In terms of employment generation, it is next only to agriculture for the womenfolk of the State. The traditional

skill of handloom weaving is not only a status symbol for the women-folk, but it is an indispensable aspect of socio-economic life in Manipur. The women are found to be involved in weaving, dyeing, bleaching and also trading of finished products and yarn ([www.indianhandloomscluster-dchl.net/imphal/index.asp](http://www.indianhandloomscluster-dchl.net/imphal/index.asp)). The art of weaving has developed more in Manipur as compared to any other part of India. Unlike weaving in other parts of India, the Manipur weaving is entirely the work of women. Weaving is carried out at the porch or inside the house or in open space like courtyard. Almost every house hold in Manipur owns a loom and women folk are alone the weavers (Phurailatpam, 2011). In the present era of commercialization, handloom sector is also witnessing changes and large numbers of women are adopting the weaving activity as their profession. The activity they performed previously during their leisure time has now been transformed to 8hours job. But, in spite of the increased weaving time spent on loom, the workstation design remains unaltered. The workplace design for traditional handloom remains unchanged which leads to health issues among women weavers. Handloom industries workers have to perform activities mainly in sitting posture. They further have to perform repetitive movements of hands and legs while sitting in upright posture. Working under such condition for longer period of time might affect the physical and mental health of the workers. The selected parameters namely physical and mental well-being is adopted to measure the Quality Of Life of the women workers. According to the definition Quality Of Life is the degree to which a person enjoys the important possibilities of his/her life. Possibilities result from the opportunities and limitations each person has in his/her life and reflect the interaction of personal and environmental factors. The best way of approaching Quality of Life measurement is to measure the extent to which people's 'happiness requirements' are met – i.e. those requirements which are a necessary (although not sufficient) condition of anyone's happiness - those 'without which no member of the human race can be happy' [6]. Physical and environmental factors can affect both job performance and job satisfaction of the workers. Despite the progress and improvement made for occupational safety and health, work environment especially in low and middle income countries is still hazardous for the workers. A large number of work related injuries and occupational accidents happens around the world each year (Butt, 2012).

Many health and work environmental related issues have been faced by many workers. Important factors in the work environment that should be considered include building design and age, workplace layout, workstation set-up, furniture and equipment design and quality, space, temperature, ventilation, lighting, noise, vibration, radiation and air quality. Thus it becomes necessary to maintain the quality of life of the women working in Handloom units.

## 2. OBJECTIVES OF THE STUDY:

- Propose a working drawing for the selected Handloom unit

## 3. METHODOLOGY:

For the present study, case study had been adopted. The study was conducted in four selected Handloom industries of Imphal west District of Manipur State. Women workers from the selected Small Scale Handloom industries were the unit of inquiry for the present study. The tool consisted of interview schedule, observation sheet and record sheet. The content of the tool was validated by the experts. The recording of noise level and illumination level and the observation of the physical aspect of the workplace were done by the researcher personally.

## 4. FINDINGS:

### CASE STUDIES

#### *Existing status of the Handloom Unit based on the observations and recording by the respondents*

This section contains the description of the structural details as well as existing status of the handloom unit.

- A. Structural details of the handloom unit
- B. Existing illumination level and noise level inside the handloom unit.

#### Case study 1: Handloom Unit 1

### ***A. Structural details of the handloom unit***

The observation was carried out in the month of November 2015. The Handloom Unit-1 had total 21 respondents. Each respondent had one loom. The area of the Handloom Unit was 1500 square ft. According to the size of the loom and clearance space required (56 sq.ft), the area of the workplace was enough for free movement. The looms were placed in an uneven direction so the respondents were facing problem in movement from one place to another. This Handloom Unit had three walls, one wall was open. The length of the walls was 60ft, 30ft and 60ft and the height of the walls were 15ft, 8ft and 8ft.respectively. Total 2 doors and 2 windows existed in the handloom unit. There was no ventilation in the unit. The doors were located in the east direction and the windows in the west direction.

The size of the doors was 7'x3' and the windows were 4'x3'. Less light entered inside the room due to the placement of windows in the west direction. Drinking water facilities, accommodation facilities were provided but food, transportation facilities and day care centre were not provided.



**Plate 1: Physical aspect of the unit 1**



**Plate 2: Worker engaged in weaving**

There were total 14 artificial light fixtures in the handloom unit. The source of artificial light included five fluorescent lamps and nine compact fluorescent lamps (CFL). The fluorescent lamps were ceiling light with 40 watts while the compact fluorescent lamps (CFL) were pendent light with 15 to 20 watts. The wall was made up of brick having grey colour with matt finish and the flooring was of dark colour with rough finish. The ceiling was made up of tin sheet covered as a roof.

### ***B. Existing illumination level and noise level inside the handloom unit.***

The natural illumination level was recorded three times a day i.e. in the morning 9 a.m., in the afternoon 12 p.m. and in the evening 4 p.m. respectively. At each work centre/spot natural illumination level was taken and artificial illumination level was taken only once in the evening 4 p.m. at each work centre/spot. Average noise level at each work spot was recorded. Average noise level in the units when a) all the looms are not working, b) all the looms are working and c) half of the looms are working was recorded too. Average noise level in the units when all the looms are not working was found to be 65dB, when all the looms are working it was found to be 118dB and when half of the looms are working it was found to be 89dB.



**Plate3: Reading of illumination level taken on a work Centre**



**Plate 4: Reading of noise level taken on a work Centre**



It was found out that the natural illumination level available at the sub task centre (spinning) was 209 lux though no artificial lighting was provided at the spinning centre. The daylight outside the unit (in open surrounding) was found 18900 lux at morning, 56100 lux at afternoon and 84 lux at evening. The daylight quotient resulted 1.94 in morning, 0.62 in afternoon and 49.65 in evening. The average artificial illumination level in the room was found 244.64 lux which was low according to the recommendation level of illumination and the average noise level in the room was found to be 76.19 dB which was little high according to the recommendation noise level.

## Case study 2: Handloom unit 2

### A. Structural details of the handloom unit

The observation was carried out in the month of November 2015. The Handloom Unit-2 had total 16 respondents. Each respondent had one loom. The area of the Handloom Unit was 700 square ft. The size of the walls was 35ft x 20ft and the height of the walls was 15ft. ft. According to the size of the loom and clearance space required (56 sq.ft), the area of the workplace was enough for free movement. Total 1 door and 5 windows existed in the handloom unit. No ventilation was there. The doors were located in the west direction and four windows in the east direction and one window in the north direction. Sufficient light and air entered inside the room during early morning. The looms were randomly place facing in south direction. The size of the doors was 7'x3' and the windows were 4'x3'. Drinking water facilities, accommodation facilities were provided but there was no provision of food and transportation facilities and day care centre was not there.



**Plate 5: Physical aspect of the unit 2**



**Plate 6: Worker engaged in spinning**

There were total 16 artificial light fixtures in the Handloom Unit. The source of artificial light included only compact fluorescent lamps (CFL). The compact fluorescent lamps (CFL) were pendent light with 20 to 35 watts. The colour of the wall was white with matt finish. The flooring was concrete and the colour was grey with matt finish. The ceiling was made up of tin sheet covered as a roof.

### B. Existing illumination level and noise level inside the handloom unit.

The natural illumination level was recorded three times a day i.e. in the morning 9 a.m., in the afternoon 12 p.m. and in the evening 4 p.m. respectively. At each work centre/spot natural illumination level was taken and artificial illumination level was taken only once in the evening 4 p.m. at each work centre/spot. Average noise level at each work spot was recorded. Average noise level in the units when a) all the looms are not working, b) all the looms are working and c) half of the looms are working was recorded too. Average noise level in the units when all the looms were not working was found to be 60.4dB, when all the looms were working it was found to be 62.2dB and when half of the looms were working it was found to be 60.1dB.



**Plate 7: Workers engaged in weaving under CFL light**



**Plate 8: Reading of artificial illumination level taken on a work centre**

It was found out that the natural illumination level available at the sub task centre (spinning) was 106 lux though no artificial lighting was provided at the spinning centre. The daylight outside the unit (in open surrounding) was found 17800 lux at morning, 38700 lux at afternoon and 45 lux at evening. The daylight quotient resulted 0.21 in morning, 0.09 in afternoon and 35.55 in evening. The average artificial illumination level in the room was found 445.31 lux which was low according to the recommendation level of illumination and the average noise level in the room was found to be 60.28 dB which was normal according to the recommendation noise level.

### Case study 3: Handloom unit 3

#### A. Structural details of the handloom unit

The observation was carried out in the month of November 2015. The total numbers of respondents in this Unit were 20. Each respondent had one loom. The area of the handloom unit was 1800 square ft. According to the size of the loom and clearance space required (56 sq.ft), the area of the workplace was enough for free movement. The size of the walls was 60ft x 60ft and the height of the walls was 15ft. A door was located at the corner of the unit and it was directed towards west. 6 ventilations existed in the Handloom Unit and each of 6 ventilations were located in the west direction. Sufficient light and fresh air entered inside the workplace during daytime. The looms were placed unevenly facing each other. The size of the door was 7'x3' and the size of the ventilator was 1'x3'. Drinking water facilities, accommodation facilities were provided but there was no provision of food and transportation facilities and day care centre were not provided.



**Plate 9: Physical aspect of the unit 3**



**Plate 10: Pendant light fixture above the work Centre**

The source of artificial light included 6 fluorescent lamps and 7 compact fluorescent lamps (CFL). The fluorescent lamps were ceiling light with 40 watts while the compact fluorescent lamps (CFL) were pendant light with 20 to 35 watts. The wall was made up of brick and white colour was applied with matt finish and the flooring was concrete with grey colour with smooth finish. The ceiling was made up of tin sheet covered as a roof.



### ***B. Existing illumination level and noise level inside the handloom unit.***

The natural illumination level was recorded three times a day i.e. in the morning 9 a.m., in the afternoon 12 p.m. and in the evening 4 p.m. respectively. At each work centre/spot natural illumination level was taken and artificial illumination level was taken only once in the evening 4 p.m. at each work centre/spot. Average noise level at each work spot was recorded. Average noise level in the units when a) all the looms are not working, b) all the looms are working and c) half of the looms are working was recorded too.



**Plate 11: Recording illumination level at a spot**



**Plate 12: Recording of sound level while performing the task**

Average noise level in the units when all the looms were not working was found to be 65.4dB, when all the looms were working it was found to be 96dB and when half of the looms were working it was found to be 80.6dB. It was found out that the natural illumination level available at the sub task centre (spinning) was 89 lux though no artificial lighting was provided at the spinning centre. The daylight outside the unit (in open surrounding) was found 18100 lux in morning, 35000 lux in afternoon and 56 lux in evening. The daylight quotient resulted 1.29 in morning, 0.66 in afternoon and 29.46 in evening. The average artificial illumination level in the room was found 117.84 lux which was low according to the recommendation level of illumination and the average noise level in the room was found to be 75.86 dB which was high according to the recommendation noise level.

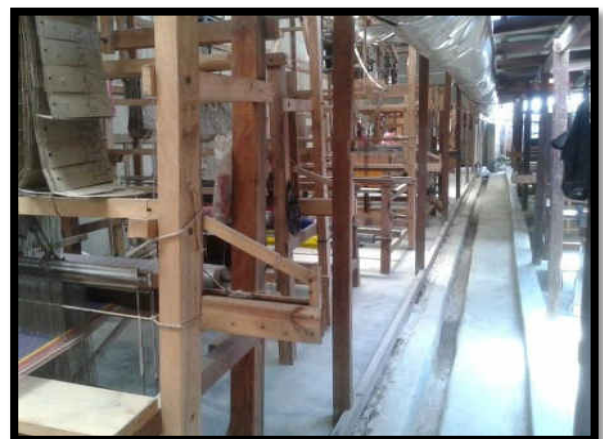
### **Case study 4: Handloom unit 4**

#### ***A. Structural details of the handloom unit***

The observation was carried out in the month of November 2015. The Handloom Unit-4 had total 25 respondents. Each respondent had one loom. The area of the Handloom Unit was 1200 square ft. The size of the walls was 40ft x 30ft and the height of the walls was 10ft. According to the size of the loom and clearance space required (56 sq.ft), the area of the workplace was found to be very small for the placement of 25 looms and for free movement of the workers. A door was located at the centre of a wall and it was directed towards west. The Unit was under construction so windows were not fixed yet. The looms were placed unevenly facing each other.



**Plate 13: Physical aspect of the unit 4**



**Plate 14: Passage between the looms**

The size of the door was 7'x6' and windows of 3'x4'. Drinking water facilities, accommodation facilities were provided but there was no provision of food, transportation facilities and day care centre. Artificial light fixtures were not installed yet in the handloom unit. The natural lights were the only source of light under which the workers were performing their task. The wall was made up of brick and no colour was applied yet and the colour of flooring was grey though finish was not done yet. The ceiling was made up of tin sheet covered as a roof.

### ***B. Existing illumination level and noise level inside the handloom unit.***

The natural illumination level was recorded three times a day i.e. in the morning 9 a.m., in the afternoon 12 p.m. and in the evening 4 p.m. respectively. At each work centre/spot natural illumination level was taken .Average noise level at each work spot was recorded. Average noise level in the units when a) all the looms are not working, b) all the looms are working and c) half of the looms are working was recorded too. Average noise level in the units when all the looms are not working was found to be 70.5dB, when all the looms are working it was found to be 110dB and when half of the looms are working it was found to be 86.3dB.



**Plate 15: Recording natural light at a spot**



**Plate 16: Interaction with a worker**

It was found out that the natural illumination level available at the sub task centre (spinning) was 205 lux though no artificial lighting was provided at the spinning centre. The daylight outside the unit (in open surrounding) was found 19300 lux at morning, 38600 lux at afternoon and 71 lux at evening. The daylight quotient resulted 2.84 at morning, 2.60 at afternoon and 15.26 at evening. The average noise level in the room was found to be 75.86 dB which was little bit high according to the recommendation noise level.

### **CONCLUSION:**

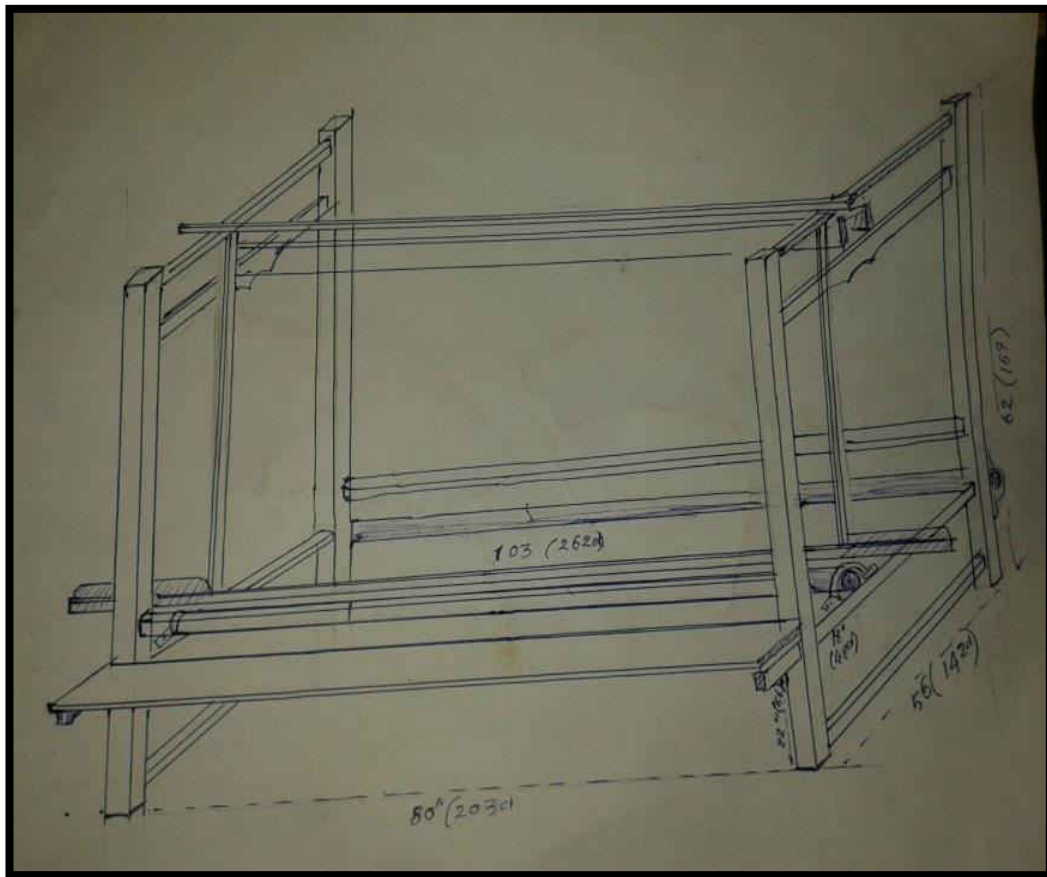
A working drawing was developed for suggesting a better indoor environmental condition of the workplace. Handloom unit-4 was found out having the lowest extent of Physical well-being and mental well-being because proper facilities and sufficient light was not provided. The size of the room was found to be very small due to which the worker faced many problems like hitting and hurting against the loom while moving from one place to another. Thus this unit has been selected for the development of working drawing.

Following are the proposed design of the unit.

- Existing floor plan of the Handloom Unit.
- Proposed floor plan design of the Handloom Unit.
- Proposed presentation drawing of the Handloom Unit.
- Proposed four wall elevation of the Handloom Unit.
- Proposed electrical layout of the Handloom Unit.

The existing floor plan of the unit was 1200sq.ft. There were 25 numbers of looms in this unit. A 7'x6' size of door was located at the centre of the unit. There were 12 windows but it was not fixed yet as the unit was under construction. Taking this advantage, a proposed working drawing was developed for the handloom unit4. The size of a weaving loom is of length 5', breath 4' and height of 5'. A minimum of 3' is required in between the looms

for clearance in movement. Including the clearance space, the size of the weaving loom was found to be 56sq.ft. The ideal space required for the placement of 25 looms is 1400sq.ft. The existing size of the floor plan was found to be small.



**Plate 17: A rough sketch of the weaving loom**

**Proposed drawings of the Handloom unit-4:**

- **Area of the Handloom unit 4:**

An 800sq.ft. of space was found available just next to the Handloom Unit-4. In order to increase the size of the Handloom Unit this 800sq.ft. was merged with the 1200sq.ft. space available for the Unit. This was done in consultation with the Handloom owner in order to make the place suitable for accommodating 25 looms in it. The size of the Handloom Unit now was proposed as 50ft x 40ft and height of the wall was proposed as 15 ft.

- **Placement of doors, windows and ventilations:**

Two doors were suggested in the proposed drawing and it was placed in the east direction and windows were provided in all the direction of the room. The height of the ventilation was suggested at 10ft from the surface. The Placement of doors and windows was done in such a way that it provided proper air circulation and entering of adequate amount of natural lighting at the workplace. It will also help in maintaining cross ventilation which will help in maintaining stable indoor temperature.

- **Size of the doors, windows and ventilation:**

2 doors of size 8'x4', 18 windows of 4'x3' and 20 ventilations of size 1'x3' were suggested in the proposed drawing.

- **Arrangement and placement of looms.**

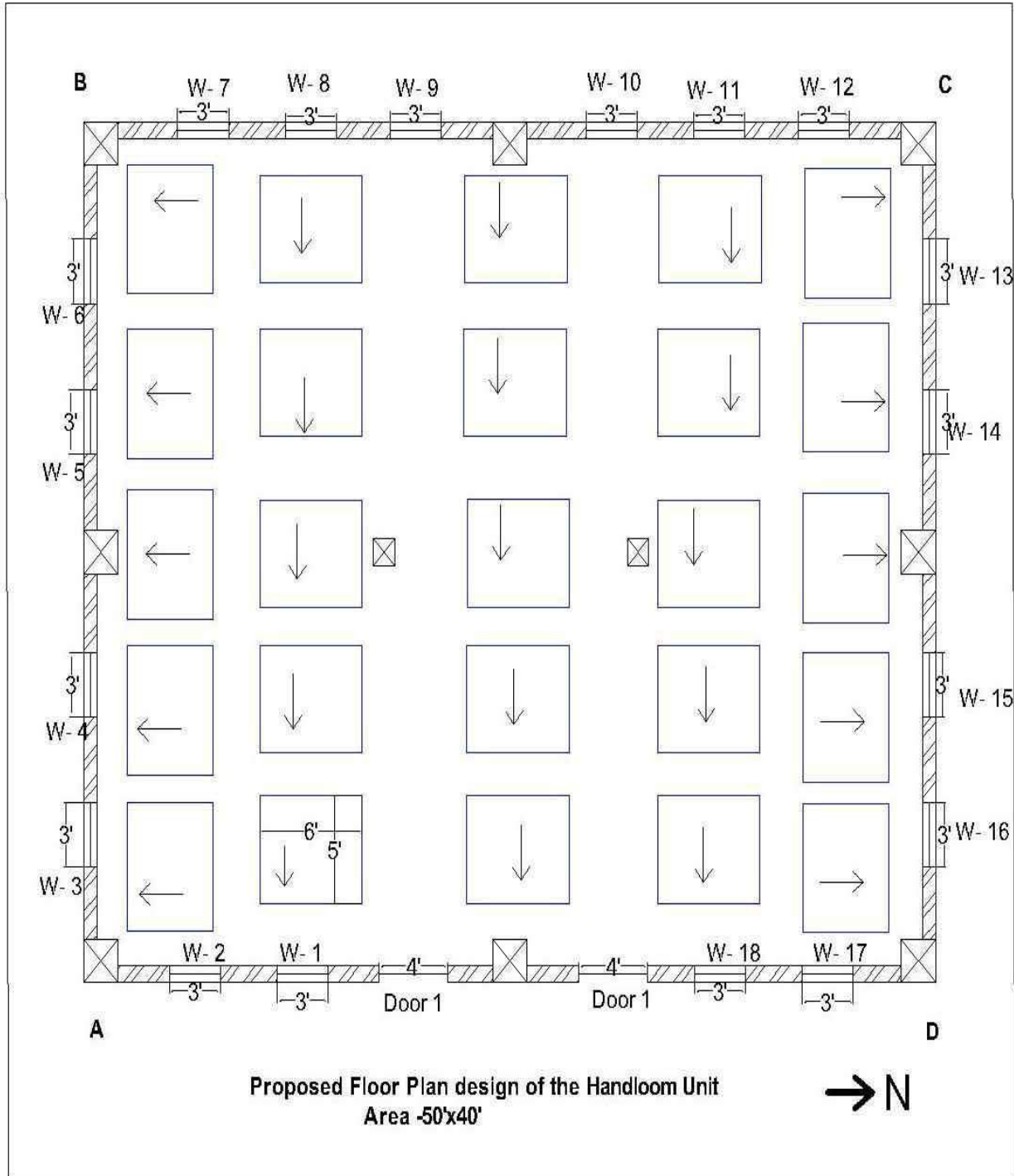
In the existing floor plan the loom was placed randomly in any direction. In the proposed floor plan the looms were suggested to place systematically in five rows providing enough space of movement for the workers. Five looms were installed facing in the south direction, ten looms in the east direction and five more looms in the north direction.

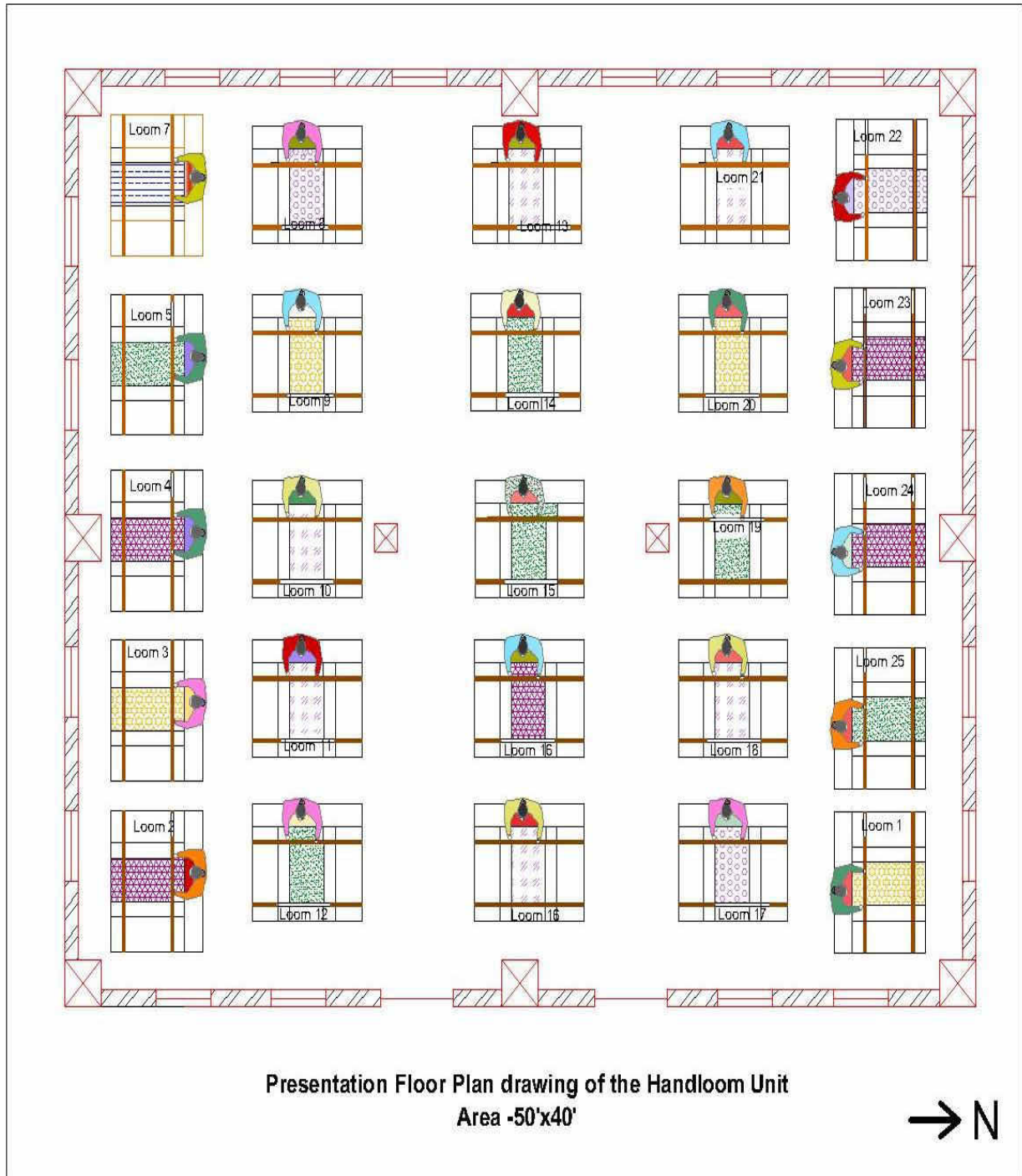
- **Lights, colours and other facilities:**

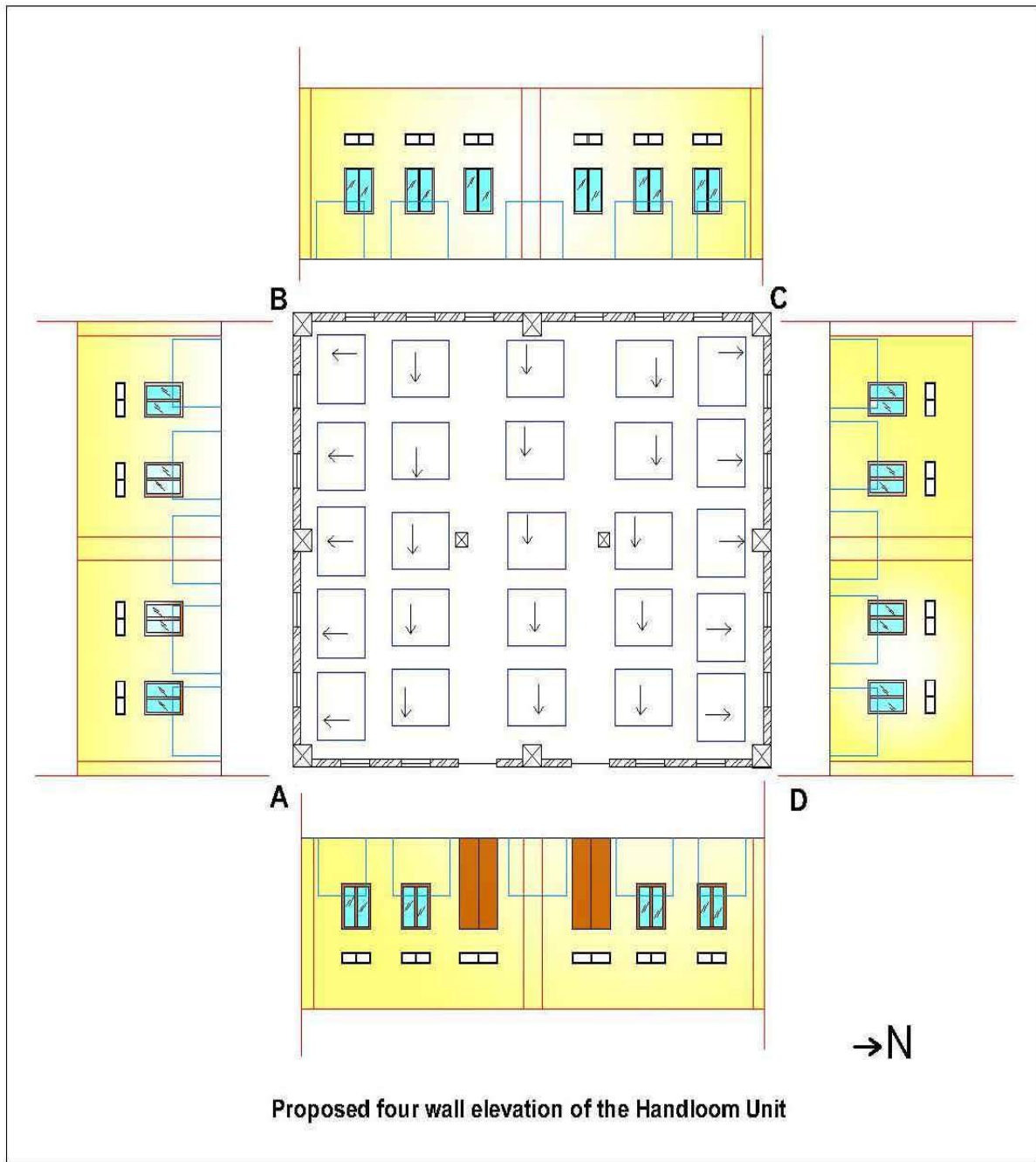
Various fluorescent lamps of 20 watts were suggested to be installed inside the workplace and compact fluorescent lamps (pendent light) of 25 to 30 watts were installed at above of each work centre. Sufficient drinking water facility should be provided. Provision of proper sanitation facilities near the workplace was



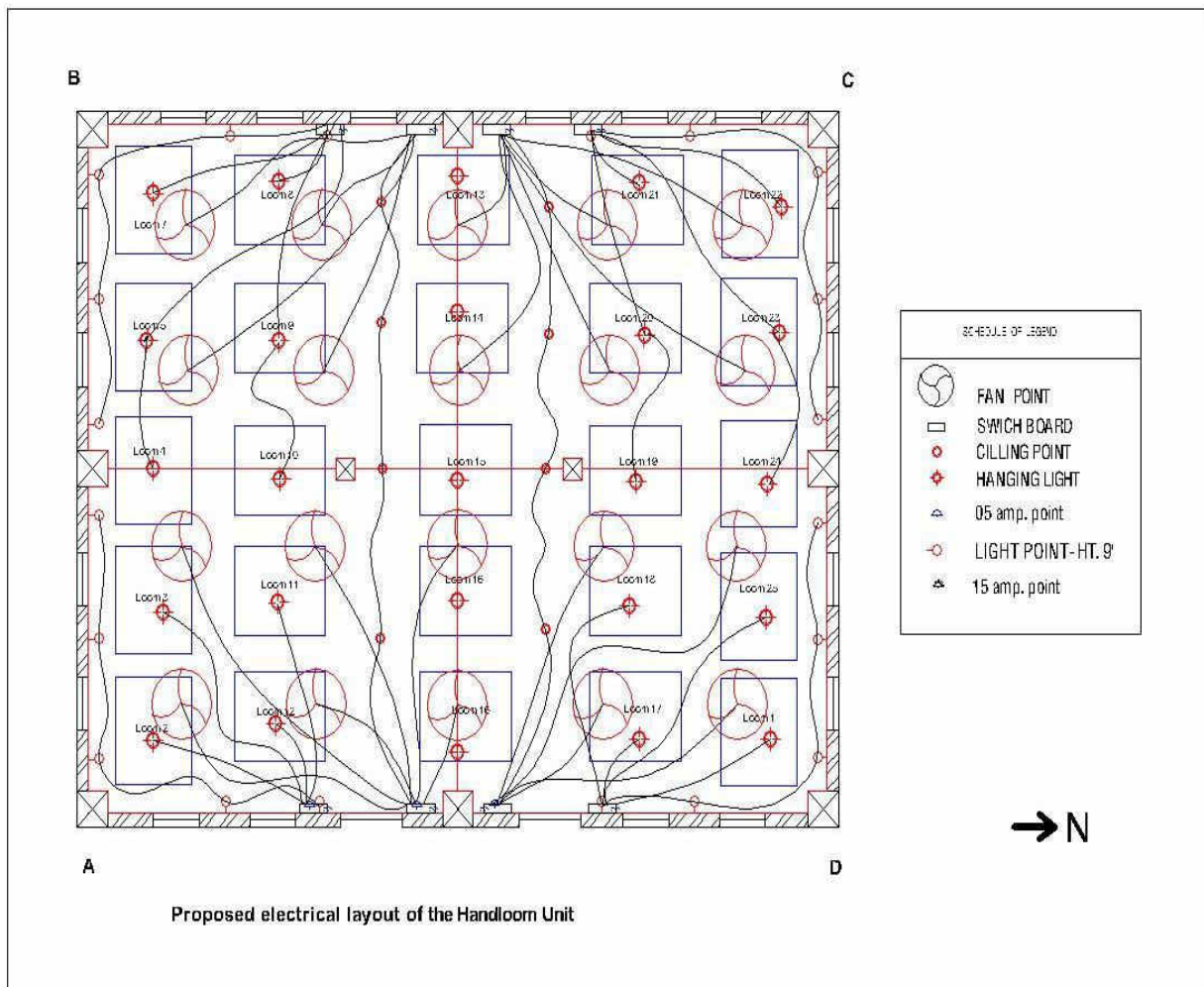
suggested. Fan points were suggested inside the units. The colour of the wall and flooring was suggested of white colour or light yellow or cream colour so that it will reflect large quantity of light and make the room bright and comfortable for working. For the flooring of the workplace it was suggested to apply white vitrified tile of smooth finish. Colours play a vitally important role. It can sway thinking, change actions, and causes reaction. Thus appropriate colours were suggested for the workplace.











### IMPLICATIONS OF THE STUDY:

The finding of the study will enrich the research data base for the Handloom industries and related industries at National and International level. The finding will help the owner in proper planning and development of the workplace environment to improve the quality of life of every individual working in the industries.

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