GENDER INEQUALITY OF CONSTRUCTION WORKERS IN TIRUCHAPPALLI (TRICHY)

BY

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16/30GP002

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Certification

This is to certify that this project was carried out by **ABDULKAREEM, Lawal Babaita** of Matriculation Number 16/30GP002, for the award of Bachelor of Science B.Sc (Hons) degree in the Department of Mathematics, Faculty of Physical sciences, University of Ilorin, Ilorin, Nigeria.

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Dedication

This project work is dedicated to Almighty Allah uncreated creator and my entire family.

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The effort of the non-academic staff of the department are equally appreciated. I give all glory, honor and reverence to God Almighty for the exceeding grace and love that He bestowed on me and sustaining me in my journey, and also for ability to write this project.

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Alhaja Kareemat Babaita for their love and support in my entire program and in this project. May God bless you all for your love and support.

Abstract

Gender inequality plays an important role in establishing the description and quantifying the distribution of certain variables in the study of of population at one point of time, and cover the following socio-economic ethics of men construction workers, the reasons for involving women in mansory.

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Chapter 1

1.1 INTRODUCTION TO INEQUALITIES

Mathematicians as well as Mathematics educators can attest to the importance of inequalities not only in the study of Mathematics but also n the normal life activities.

Consider building blocks for many Mathematical areas, inequalities are studied for three particular reasons, which are as follows;

- Practical
- Theoretical and
- Aesthetic

1.1.1 PRACTICAL

At the practical level, from the early involvement with problem solving, one must learn to build variables or learn to write restrictions for the unknowns, and these are expressed as inequalities.

1.1.2 THEORETICAL

Theoretically, inequalities used to express the domain of a function to prove limits, to setup research questions that relate equations to special cases that are inequalities or to prove equality by means of inequalities.

Moreover, Mathematicians testify that there are many aesthetic aspects in inequalities as well as in some of their proofs.

1.1.3 AESTHETIC

Aesthetic in Mathematics encompasses an appreciation of the beauty elegance and significance of Mathematical entities. A generation of hormonions and permanent patterns, a perseverance in continuing a journey even when one is lost in misleading positions. All these aspects are present in the work of a Mathematicians concerned with inequalities.

1.2 DEFINITION OF INEQUALITIES

DEF 1.1 Inequalities is comparison of two values or expressions. An inequalities compares two statements with different values.

DEF 1.2 In Mathematics, Inequalities is a relationship between two different quantities or values.

Inequalities is a Mathematical expression that one quantity is greater than or less than another quantity.

For Example

"a **is less than** b"

NOTE: The above expression can be written symbolically

$a < b$ [i.e the left hand side is lower than { i.e less than} the right hand side]

Also,

"a **is greater than** b"

It can also be written symbolically as,

$a > b$ [i.e the left hand side is greater than { i.e higher than} the right hand side]

The above expressions are examples of inequalities.

Also, the express x greater than 10 {i.e symbolically $x > 10$ } is an inequality, whereas, x equal to 10 { i.e symbolically $x = 10$ } is an equation.

Recall that an equation is a statement declaring the equality of two expressions.

For example; $5x + 5 = 3$ is an equation

And inequality compares two statements with different values. Example $5x + 5 \leq 30$ is an inequality.

1.3 THE USE OF SYMBOLS IN INEQUALITIES

The use of symbols make inequalities expression in Mathematics more easier to express.

The inequality expression "a is less than b" is easily denoted by "$a < b$", also the inequality expression "a is greater than b" is easily denoted by "$a > b$".

Also, we can also have the inequality expression "a is greater than or equal to b" and "a is less than or equal to b" which is also symbolically denoted by "$a \geq b$" and "$a \leq b$" respectively.

Therefore, we can easily say inequalities is defined whenever we have two expressions linked with one of the following five(5) symbols

1. $<$ — less than {the left hand side is less than the right hand side}
2. $>$ — greater than {the left hand side is greater than the right hand side }
3. $\leq$ — less than or equal to {the left hand side is less than or equal to the right hand side }
4. $\geq$ — greater than or equal to {the left hand side is greater than or equal to the right hand side}
5. $\neq$ — not equal to {the left hand side is not equal to the right hand side}

1.4 RULES FOR INEQUALITIES

1. $A \leq B \implies A + C \leq B + C$
2. $A \leq B \implies A - C \leq B - C$
3. if $C > 0$, then $A \leq B \implies CA \leq CB$
4. if $C < 0$, then $A \leq B \implies CA \geq CB$
5. if $A > 0$ and $B > 0$, then $A \leq B \implies \frac{1}{A} \geq \frac{1}{B}$
6. if $A \leq B$ and $C \leq D$, then $A + C \leq B + D$

1.5 NOTATIONS IN INEQUALITIES

1. $a < b$ (means a is smaller than b)
2. $a > b$ (means a is greater than b)
3. $a \leq b$ (means a is smaller/less than or equal to b)
4. $a \geq b$ (means a is greater than or equal to b)
5. $a \neq b$ (means a is not equal to b)

1.6 TYPES OF INEQUALITIES

1. LINEAR INEQUALITIES
2. QUADRATIC INEQUALITIES

3. COMPOUND INEQUALITIES

4. ABSOLUTE VALUE INEQUALITIES

1.6.1 LINEAR INEQUALITIES

A Linear inequality is an inequality which involves a linear function. A linear inequality looks exactly like a linear equation with the inequality sign replacing the equality sign.

Examples of Linear Inequalities

1. $x^2 + 5x \leq 22$ (i.e $x^2 + 5x$ is less than or equal to 22)
2. $5x + 7 < 7$ (i.e $5x + 7$ is less than 7)
3. $7y^2 - 4 \geq 6$ (i.e $7y^2 - 4$ is greater than or equal to 6)
4. $4x + 14 > 10$ (i.e $4x + 14$ is greater than 10)
5. $2x^3 - 4 \neq 5$ (i.e $2x^3 - 4$ is not equal to 5)

1.6.2 QUADRATIC INEQUALITIES

A quadratic inequalities is a function whose degree is 2 and where the y is not always exactly equal to the function. These types of functions use symbols called inequality symbols that include the symbols we known **"less than, greater than, less than or equal to and greater than or equal to**. So instead of seeing an equal sign, you will see these inequality symbols.

All quadratic inequalities are of the form $\mathbf{ax^2 + bx + c}$, where **a**, **b** and **c** are numbers. The numbers **b** and **c** can be **0**, but **a** must be equal to a number. It cannot be **0**. This is because our quadratic inequality must have an $\mathbf{x^2}$ value. The other two terms do not need to be there.

Examples

1. $x^2 + 5x \leq 10$ (i.e $x^2 + 5x$ is less than or equal to 10)
2. $x^2 + 2x \geq 5$ (i.e $x^2 + 2x$ is greater than or equal to 5)

1.6.3 COMPOUND INEQUALITIES

A compound inequalities is an equation with two or more inequalities joined together with either **"and"** or **"Or"**

Examples

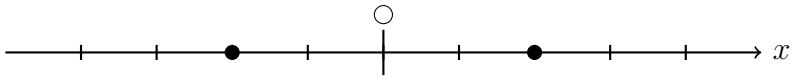
1. $x \geq b$ and $x < 3$
2. $x < -12$ or $x \geq 8$

When two inequalities are joined with **"and"**, they are often written simply as a double inequality, for example $-6 \leq x < 3$. The solution of an **"and"** in inequalities is the intersection of each individual inequality in the sentence.

1.6.4 ABSOLUTE VALUE INEQUALITIES

Let first return to the original definition of absolute value;

Absolute Value (x) is the distance of x from zero. For instance, both -2 and $+2$ are two units from zero, as it is shown in the image below



This means that these absolute values will both be 2: that is, we have $|-2| = |+2| = 2$

With this definition and image in mind, let's now define Absolute Value Inequalities.

Absolute Value Inequality is an inequality that has an absolute value sign with a variable inside.

Examples

$|x| < 4$ (means that the distance between x and 0 is less than 4)

$|x| > 3$ (means that the distance between x and 0 is greater than 3)

PROPERTIES OF AN ABSOLUTE VALUE INEQUALITIES

1. $|x| < C \implies -C < x < C$ (i.e the distance between 0 and x is less than C)

2. $|x| \leq C \implies -C \leq x \leq C$ (i.e the distance between 0 and x is less than or equal to C)

3. $|x| > C \implies -C > x > C$ (i.e the distance between 0 and x is greater than C)

4. $|x| \geq C \implies -C \geq x \geq C$ (i.e the distance between 0 and x is greater than or equal to C)

1.7 EXAMPLES OF INEQUALITIES IN DAILY LIFE

(1) If Ade has N100 and wants to buy some biros and pencils, how many biros and pencils can he buy? Using inequality expression, write this statement Mathematically.

Solution

Let number of biros be x

and let number of pencils be y

Amount owned by Ade = N100

Therefore; $x + y \leq 100$

(2) Ibrahim receives N200 daily for his daily needs if he need to buys some books and bottle of water, how many books and bottle of water can he buy using inequality expression, thus, write this statement Mathematically

Solution

Amount owned by Ibrahim = N200

Let number of books bought be $= a$

and let number of bottle of water bought be $= b$

Therefore, $200 \geq a + b$

(3) Ola is a father of three children (Ade, Ope, and Tade). If the ages of the three children is added together and subtracted from Ola's age. How old is Ola. Use the inequality expression and write this statement Mathematically.

Solution

Let Ola's age be Q

Let the ages of Ola's children (Ade, Ope and Tade) be x, y, z respectively,

Therefore; $x + y + z \geq Q$

Chapter 2

PROPERTIES OF INEQUALITIES

(1) TRANSITIVE PROPERTY

The transitive property of inequality state that, for any real number a, b, c,

1. if $a > b$ and $b > c$, then $a > c$ (if a is greater than b and b is greater than c, then a is greater than c)

2. if $a > b$ and $b \geq c$, then $a > c$ (if a is greater than b and b is greater than or equal to c, then a is greater than c)

3. if $a < b$ and $b < c$, then $a < c$ (if a is less than b and b is less than c, then a is less than c)

Example

(1)If Ola is older than Ore and Ope is older than Tola, then Ola is older than Tola

(2) If Tola has 4 mangoes and Ope has 3 mangoes, but Ola has 1 mango,

Let represent mangoes owned by Tola to be X

Let represent mangoes owned by Ope to be Y

and, let represent mangoes owned by Ola to be Z

then, $X > Y, \quad Y > Z,$ then $X > Z$

(2) REVERSAL PROPERTY

The Reversal property of inequality states that; for any real value a and b,

(1) if a is greater than b, the b is less than a. i.e if $a > b$, then $b < a$

Example

If Ola is older than Ope, then Ope is younger than Ola.

(3) LAW OF TRICHOTOMY

The law of trichotomy states that only one of the following is true: $a < b$, or $a = b$, or $a > b$

Example

If Ola has more money than Ope, then we could write it like $a > b$ (representing Ola and Ope with a and b respectively)

Also, we know that

Ola does not have less money than Ope (Not $a < b$)

And, Ola does not have equal or the same money as Ope (Not $a \neq b$)

(4) SQUARE ROOT PROPERTY

It says taking a square root will not change the inequality but only when both a and b are greater than or equal to zero. That is, if $a < b$ then $\sqrt{a} \leq \sqrt{b}$ (for $a, b \geq 0$)

The above expression means if a is less than or equal to b, then $\sqrt{a}$ is less than or equal to $\sqrt{b}$, if a, b is greater than or equal to zero.

Example

Let $a = 4 \quad$ and $\quad b = 25$

So, if $a \leq b \quad$ is $\quad 4 \leq 25$

then $\sqrt{a} \leq \sqrt{b} \quad$ is $\quad \sqrt{4} \leq \sqrt{25}$ (for $a, b \geq 0$)

(5) ADDITION AND SUBTRACTION

It says that a common constant c may be added or subtracted from both side of an inequality.

That is, if $a < b$, then $a + c < b + c$

Also, for any real numbers a, b, c

1. if $a \leq b$, then $a + c \leq b + c$ and $a - c \leq b - c$
2. if $a \geq b$, then $a + c \geq b + c$ and $a - c \geq b - c$

(6) ADDITIVE INVERSE

The Additive Inverse property states that; for any real numbers a and b, negation will invert the inequality use

1. if $a \leq b$, then $-a \geq -b$
2. if $a > b$, then $-a < -b$

As we just away, putting minuses(-) in from of real numbers a and b changes the direction of the inequality.

This is called the Additive Inverse

- if $a < b$, then $-a > -b$
- if $a > b$, then $-a < -b$

This is really the same as multiplying by (-1), and that is why it changes direction

(7) MULTIPLICATIVE INVERSE

The property for the multiplication inverse state that; for any non-zero real number a and b, that are both positive or both negative, taking the reciprocal $\left(\text{i.e } \frac{1}{\text{value}}\right)$ of both a and b can change the direction of the inequality.

When a and b are both positive or both negative, i.e;

- if $a < b$ then $\frac{1}{a} > \frac{1}{b}$
- if $a > b$ then $\frac{1}{a} < \frac{1}{b}$

These can also be written in chained notation as follows:

for any non-zero real numbers a and b;

1. if $0 < a \leq b$, then $\frac{1}{a} \geq \frac{1}{b} > 0$
2. if $a < b < 0$, then $0 > \frac{1}{b} > \frac{1}{a}$
3. if $a < 0 < b$, then $\frac{1}{a} < 0 < \frac{1}{b}$
4. if $0 \geq 0 > b$, then $\frac{1}{b} < \frac{1}{a} \leq 0$
5. if $a > b > 0$, then $0 < \frac{1}{b} < \frac{1}{a}$

2.1 POWER INEQUALITIES

A Power Inequality is an inequality containing terms of the form a^b, where a and b are real positive numbers or variable expressions.

Examples

for any real number x,

1. $e^x \geq 1 + x$
2. if $x > 0$ and $p > 0$, then
   $\frac{x^p - 1}{p} \geq \ln(x) \geq \frac{1 - \frac{1}{x^p}}{p}$

   In the limit of $p \to 0$, then upper and lower bounds converge to $ln(x)$
3. if $x > 0$, then
   $x^x \geq (\frac{1}{e})^{\frac{1}{e}}$

4. $x \geq 1$, then

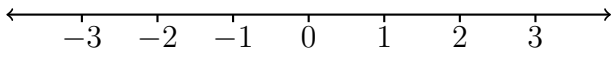
   $(x+y)^z + (x+z)^z + (y+z)^x > 2$

5. for any real distinct numbers a and b

   $\dfrac{e^b - e^a}{b-a} > e^{(a+b)/2}$

2.2 THE NUMBER LINE

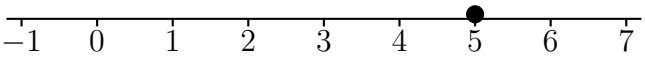
a number line is a line with numbers on it i.e



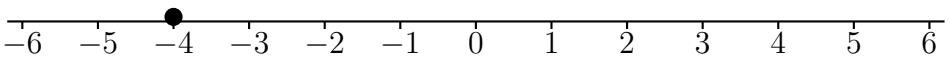
We use a number line to count and to graphically show numbers

Example

1. Graph $x = 5$ is expressed as

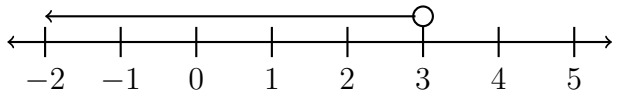


2. Graph $x = -4$ is expressed as

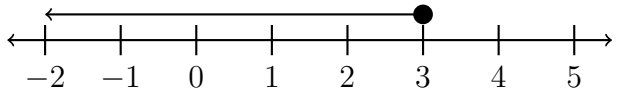


2.3 GRAPHING INEQUALITIES

Graph $x < 3$



Also, Graph $x \leq 3$



Note:

- The solid shows that range of value that x can take.
- The open circle on 3 shows that although the solid line goes from 3, but x cannot actually be equal to 3.
- The painted circle shows that x can either be less than or equal to 3.

Examples

(1) Solve the inequality $4x+6 > 3x+7$ and represent the result on a number line

Solution $4x + 6 > 3x + 7$

firstly, we subtract 6 from both sides:

we get; $4x + 6 - 6 > 3x + 7 - 6$

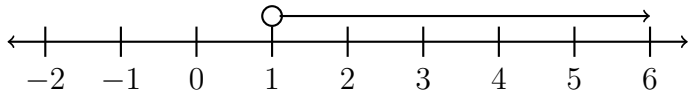
$= 4x > 3x + 1$

Now, we subtract $3x$ from both sides

We get, $4x - 3x > 3x - 3x + 1$

$= x > 1$

representing $x > 1$ on a number line



(2) For what values of x are both the inequalities $9 + 2x > 0$ and $7 - 3x > 0$ are true?

Solution

if $9 + 2x > 0$

subtracting 9 from both sides,

we get; $9 + 2x - 9 > 0 - 9$

$9 - 9 + 2x > 0 - 9$

$= 2x > 0 - 9$

$= 2x > -9$ 0r $x > -\dfrac{9}{2}$

Also, if $7 - 3x > 0$

Subtracting 7 from both sides

We get; $7 - 3x - 7 > 0 - 7$

$-3x > -7$ (negative cancels negative)

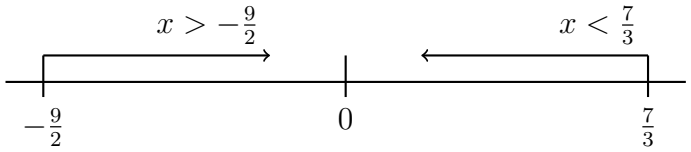
$\implies 3x < 7$ or $x < \dfrac{7}{3}$

(Note: the reversed of the sign occurs when we divided both of the inequality by a negative numbers)

We see that both sides inequalities are true for

$$-\frac{9}{2} < x < \frac{7}{3}$$

representing the above inequality expression on a number line, we have;



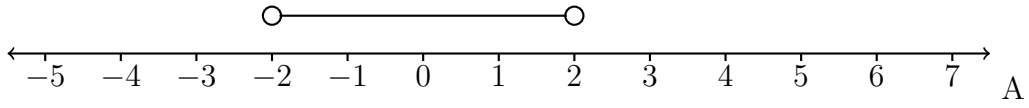
2.4 INEQUALITIES USED WITH A MODULUS SYMBOL

Inequalities often appear in conjunction with the modulus, or absolute value symbol "| |" e.g $|x| < 2$

Recall that the modulus of a number is simply its magnitude, or absolute value, regardless of its signs. So,

$$|2| = 2 \text{ and } |-2| = 2$$

Now, $|x| < 2$, it implies that x must lies between 2 and -2, we can write it as $-2 < x < 2$, the range of value is shown in the number line, as shown below;



number line showing $-2 < x < 2$

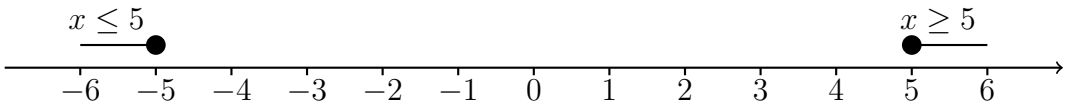
Example

Suppose we want to solve the inequality $|x| \geq 5$

Solution

If $|x| \geq 5$; This mean that the absolute value of x must be greater than or equal to 5.

This also means that x can be greater than or equal 5, or can be less than or equal to -5, we write $x \leq -5$ or $x \geq 5$. The range of values is shown below;



A number line showing $|x| \geq 5$

Chapter 3

RESEARCH METHODOLOGY

3.1 Objectives of Study

The objectives of the study are to find out the reasons why women construction workers should be empowered to become masons, to determine the process by which men are being trained in construction sector, to determine the willingness of women construction workers to become masons and the willingness of men construction workers and contractors to train and employ women as masons. There are many studies on construction sector which recommend that women could be empowered by training to do the tasks of masons in India (Baruah. 2008).

But there is hardly any study in India which identifies the barriers which prevent women construction workers from undertaking masonry work and the

process by which these women could be empowered in the construction sector. This study is again an attempt to determine the 5Women have only one job title chithal, which means one who is small in the local language. Women enter as chithal and retire as chithal and they also receive the wages of chithal, which remains the same. Men have many job titles like centering laborers, periyal (one who is big), manvettial (one who digs), masons, supervisors and contractors. Thus men can be promoted to masons, supervisors and finally contractors, whereas women have no scope for promotion. Which prevent women construction workers from being promoted as masons and find out a methodology for training women construction workers in Tamil Nadu (India).

3.2 AREA OF STUDY

This is a descriptive study conducted in the Indian state of Tamil Nadu. Tamil Nadu is located in the southernmost tip of the Indian Peninsula bordered by Kerala to the west, Karnataka to the northwest, Andhra Pradesh to the north and Bay of Bengal to the east (Pan India Networks, 2009a). The total area covered by the state is 130,058 sq. kms. According to the Indian Census (2001), Tamilnadu has a total population of 62,405,679.

Tiruchirapalli District is located along banks of the River Kaveri in Tamil Nadu state of India (Pan India Networks, 2009b). Trichy is a municipal corporation and the administrative headquarters of Tiruchirapalli District. Tiruchirapalli, has a population of 2,418,366 (Census of India, 2001). Males constitute 49.97 per cent of the population and females 50.03 per cent. The

total number of workers are 1,064,521, they constitute 687,814 male workers (64.6 per cent) and 376,707 female workers (35.4 per cent).

3.3 DATA COLLECTION METHOD AND TOOLS

In this study, stratified sampling was used. A sample of 440 women construction workers in Tiruchirapalli district was interviewed to find out their views on women in masonry and their skills to be trained as women masons. A sample of 440 men construction workers in Tiruchirapalli district was interviewed to find out the way in which they are trained for masonry work. A sample of 51 Contractors/ Engineers in Tiruchirapalli district was asked to fill questionnaire to find out their views on women in masonry work in construction sector. The construction workers were selected from Santhai (place where they are recruited for work), workplaces and wage disbursement centers.

The Primary data collected, is through interview schedule. As majority of the construction workers are illiterate, two schedules were prepared, one for women construction workers and another for men construction workers, and the construction workers were interviewed in the local language (Tamil) and the responses were noted in the schedule.

3.4 FINDINGS AND DISCUSSION

(Findings and Discussion Reasons for Empowering Women Construction Workers)

As a first step to find out a methodology to empower women, the factors that favour women construction workers becoming masons were studied. All the women interviewed in this study were working only as chithal. Disparity in Wages for Women Construction Workers This study reveals that there is a vast disparity in wages between women and men construction workers. The contractors and the men construction workers say that most of the women construction workers are paid less than Rs. 100 and no women gets wage more than Rs. 160. The actual wages of women studied range from Rs. 51 to Rs. 160 whereas the wages that men receive range from Rs 71 to more than Rs. 250. Many women get wages below the minimum wage set by the government, which is Rs. 120 per day (The Gazette of India, 2008). Disparity in Promotions for Women Construction Workers The women and men construction workers and the contractors were asked to specify the barriers which prevent women from being promoted to work as masons and their responses are shown in Table 1.

The men construction workers and the contractors are of the opinion that the important barrier for women to become masons in construction sector is that the job involves working for long exhaustive hours and women are not fit physically; there is also no training in other areas like laying foundation, erection of structural frame, and plastering. The common belief is women are scared of heights. There is absolute complicity of both male and

female workers in the maintenance of this 'lie' The prejudices like women are scared of heights and physically not fit have to be challenged and changed. At present, women climb up the scaffolding carrying loads of bricks and sand on the head, work in multi-floor buildings with ease as chithals, and they perform all the tasks done by men like digging, breaking stones and some of the tasks of the masons. So women have the same potential and the courage like men to do masonry work.

The study has shown that more women agree that there are no women masons because they consider it a difficult task, men will not accept it, they are not trained, scared of heights and they are not given opportunities. Recognition of the women laborers' ability means parity in wages. So, it is a collective denial of their ability to perform the masonry tasks. Women laborers agree with the view that cultural habits die hard, but those cannot be cited as the reason for denying women their place in the work spot. The men are also well entrenched in their expectation of passivity, obedience, and respect from women laborers. Conceding women the roles of masons or supervisors will challenge the hierarchy and even the notion of men's work. This is consistent with the findings of Hodgkinson (2006) about the barriers to women entering construction trade in New Zealand. According to Hodgkinson's study, 46% of employers (contractors) say women lack physical strength, majority of women workers say that it is a male dominated industry and men workers say women are not fit physically for the industry. Nearly half (40%) of men workers in the present study feel women do not become masons because there is no training for them (Table 1). Gatta (2002) reports the same about

the construction trades in New Jersey where women are often excluded from informal training venues. Women are not able to break through many of the male dominated informal training and mentoring activities that occur onsite.

The men and women construction workers in this study were asked to give the reasons why women can do mason's work and the results are tabulated in Table 2. The results show that nearly half of women and more than half of men and contractors say that if women take up masonry work they will receive more remuneration. The interesting discovery in this study is that many women and men say that women can do masonry work since women perform well in other professions.

3.4.1 WOMEN SPEND THEIR INCOME MOSTLY ON FAMILY

The women and men construction workers were asked to identify the ways in which they spend their income and the findings are given in Table 3. The results show that men are spendthrift while majority of women spend most of their meager income on meeting the basic needs of the family. The study shows that ninety eight per cent of women do not drink whereas two thirds of men construction workers waste their income on drinking and smoking which will affect their health and family. Women, when compared to men do not drink or smoke or waste resources. Majority of women manage without cell phones. More than four out of five women use their wages only to meet their basic needs and more than half of the men construction workers go for a loan from money lenders to meet their needs during unemployment (heavy

interest rates bleed them) whereas less number of women avail loan. When compared to men, more women are willing to go without food at the time of unemployment, which is the natural quality of women. This is consistent with the findings of Mencher (1988) in 20 villages in Tamil Nadu and Kerala6, that women who earn tend to hold back less of their own income for themselves. On average, women contributed 98 percent of their earnings toward family maintenance whereas men contributed only 78 percent and kept the rest for personal use. Women contribute a large share of their earnings than men for their family's nutrition, health and education (Bennet, 1992, p.60). The present study shows that the family and society are benefited when women get more wages for their skills and enable them to attain their full potential for the improvement of the family which is the basic unit in any society.

3.4.2 SINCERITY IN THE WORK OF WOMEN CONSTRUCTION WORKERS

The contractors were asked about the sincerity of women construction workers in construction sector and the findings are shown in Table 4. The study shows that 80.4 per cent of women obey the instruction of contractors and 72.5 per cent of women are always sincere in their work. Sincerity means reporting to work in time and working during the assigned hours without shirking and completing the tasks as told by the superiors. The disobedience rate for women is negligible which shows that women will also excel as masons or supervisors or contractors because of their sincerity and obedience. This is consistent with the findings of Hodgkinson (2006) in New Zealand, who has reported that the employers of women working in construction trade

have said that women raise onsite behavioral standards.

3.4.3 CAPABILITY OF WOMEN TO CARRY OUT MASONRY WORK

In this study an attempt was made to find out the various types of masonry work tried by women in construction sector, to find out the capacity of women to do masonry work. The masonry work tried by women is given in Table 6. The study shows that some women have performed the tasks of a mason like concreting, leveling and plastering. So the study shows that women have the ability and capacity to do the masonry work. Hodgkinson (2006) also reports that in New Zealand, when the employers of women were asked about the quality of work done by skilled women workers, they did not find any fault and said women were very meticulous in their work.

3.4.4 WILLINGNESS OF WOMEN CONSTRUCTION WORKERS TO BECOME MASONS

The willingness of women construction workers to become masons was studied and the findings are shown in Table 9. More than one third of women say that they are willing to do the mason's work. One out of four women says that they are willing to do the work of masons - laying bricks, leveling and plastering. Majority of women are willing to be trained for masonry work. Table 10 shows that nearly all of the women who are willing to be trained as masons are willing for on the job training. Only about five per cent of the women workers ask for off days or institutional training. Women workers if

trained institutionally must be provided with stipend.

3.5 METHODOLOGY PROPOSED TO TRAIN WOMEN CONSTRUCTION WORKERS

(Role of Trade Unions in Implementing the Informal Training to Women Construction Workers)

Trade unions have played a positive role in the past in many countries to improve diversity in construction, in particular through challenging discrimination in the workplace against women (Craw et al., 2007). So the union awareness and membership among construction workers was studied to find out how unions could support in organising informal training in the construction sector in India. Table 12 shows the involvement of women construction workers in union activities. This study reveals that only one third of women construction workers are aware of union activities and only one out of ten of these women had become members in the union.

The women who have got union benefit are negligible and only a considerable number of women join union to get the welfare support. This is due to the absence of the knowledge of the role of unions for the advancement of the welfare of the working class people.

This study has also revealed that women could be empowered by informal training. The unions in construction sector must be strengthened and

motivated to take steps to offer this informal training to women. All women should be encouraged to become members of unions. These women groups must be educated and motivated to demand informal training through the union. Unions can also conduct basic literacy and masonry skill training programmes for women and motivate men mason members of unions to offer informal training to women and give placement opportunities.

Chapter 4

DATA ANALYSIS AND RESULT

Table 1

Barriers for Women not being Promoted as Masons

Barriers		n_1Total=440	% of n_1	n_2Total=440	% of n_2	n_3Total=51	% of n_3
Not given	Yes	109	24.8	112	25.5	8	15.7
Opportunity	No	331	75.2	328	74.5	43	84.3
Man's job	Yes	84	19.1	61	13.9	13	25.5
	No	356	80.9	379	86.1	38	74.5
No	Yes	122	27.7	177	40.2	12	23.5
training	No	318	72.3	263	59.8	39	76.5
Difficult	Yes	147	33.4	118	26.8	35	68.6
	No	293	66.6	322	73.2	16	31.4
No motivation/ not tried	Yes	102	23.2	112	25.5	9	17.6

	No	338	76.8	328	74.5	42	82.4
Men will	Yes	82	18.6	77	17.5	4	7.8
not Accept	No	358	81.4	363	82.5	47	92.2
Physically	Yes	127	28.9	97	22.0	22	43.1
Not fit	No	313	71.1	343	78.0	29	56
Scared of	Yes	127	28.9	212	48.2	31	60.8
heights	No	313	71.1	228	51.8	20	39.2

n_1 Number of women construction workers, n_2 - Number of men construction workers, n_3 - contractors

Table 2

Reasons for Encouraging Women to do Masonry job

Reasons	n_1Total=440	% of n_1	n_2Total=440	% of n_2	n_3Total=51	% of n_3
Women perform well in many other professions	48	10.9	135	30.7	7	13.7
To earn more	208	47.3	232	52.7	27	52.9
To prevent exploitation	3	0.7	11	2.5	5	9.8
To stop female discrimination	13	3.0	5	1.1	3	5.9
They can't	168	38.2	57	13.0	9	17.6

n_1 Number of women construction workers, n_2 - Number of men construction workers, n_3 - contractors

Table 3

Spending of Income

		n_1Total=440	% of n_1	n_2Total=440	% of n_2
Drinking	Yes	9	2.0	16	36.6
	No	431	98.0	279	63.4
Smoking	Yes	7	1.6	149	33.9
	No	433	98.4	291	66.1
Cell Phone	Yes	45	10.2	140	31.8
	No	395	89.8	300	68.2
Basic Needs Only	Yes	368	83.6	138	31.4
	No	72	16.4	302	68.6
Course Of Action During Unemployment	Take Loan	161	36.6	224	50.9
	Husband/parent is Working	159	36.1	78	17.7
	Saving	77	17.5	86	19.5
	Go without food: eating	10	2.3	3	0.7
	Once a day	33	7.5	49	11.1
	Other...				

n_1 Number of women construction workers, n_2 - Number of men construction workers

Table 4

Opinion of Contractors on Service of Women Construction Workers

Opinion of Contractor on Service of Women Construction Workers		n_3Total=51	% of n_3
Women Obey	Always	41	80.4
	Sometimes	7	13.7
	Rarely	2	3.9
	Never	1	2.0
Women Sincere	Always	37	72.5
	Sometimes	11	21.6
	Rarely	3	5.9

n_3 - contractors

Table 5

Daily work description of Women Construction Workers

Daily work		n_1Total=440	% of n_1
Women Work - Load Carrying	Yes	392	89.1
	No	48	10.9
Women Work - Breaking Stones	Yes	310	70.5
	No	130	29.5
Women Work - Mixing Mortar	Yes	229	52.0
	No	211	48.0
Women Work - Digging	Yes	80	18.2
	No	360	81.8

Women Work - Laying Bricks	Yes	32	7.3
	No	408	92.7
Women work - Concreting	Yes	29	6.6
	No	411	93.4
Women Work Levelling	Yes	30	6.8
	No	410	93.2
Women Work Plastering	Yes	28	6.4
	No	412	93.6
Mason Work Tried	Yes	54	12.3
	No	386	87.7

n_1 Number of women construction workers

Table 6

Mason work tried by Women Construction Workers

Mason work tried	n_1Total=440	% of n_1
Laying Bricks And Constructing Walls	30	6.8
Concreting	5	1.1
Leveling	3	.7
Plastering	4	.9
Operating Mixer Machine	2	.5
Laying Tiles	1	.2
Concreting, Leveling, Plastering	9	2.0
Not Applicable	386	87.7

Total	440	100.0

n_1 Number of women construction workers

Table 7

Training given to Men Construction Workers

Training given to Men Construction Workers	n_2Total=440	% of n_2	n_3Total=51	% of n_3
On the job (informal)	419	95.2	45	88.2
Institutional (month): diploma/ certificate	5	1.1	1	2.0
Attended training 2/3 days conducted by institutions (NIT, SIT)	1	.2	0	0.0
NA (no training)	15	3.4	5	9.8

n_2 - Number of men construction workers, n_3 - contractors

Table 8

Time Taken By Men Workers To Become Masons

To Become Masons	n_2Total=440	% of n_2
1 month	9	2.0
2 months	1	.2
3 months	9	2.0
6 months	68	15.5

1 year	231	52.5
> 1 year	89	20.2
Depends on person	33	7.5

n_2 - Number of men construction workers

Table 9

Willingness of women construction workers to become skilled masons

No Willingness of women construction workers		n_1Total=440	% of n_1
Laying Bricks Willing	Yes	113	25.7
	Not sure	65	14.8
	No	262	59.5
Leveling Willing	Yes	117	26.6
	Not sure	50	11.4
	No	273	62.0
Plastering Willing	Yes	115	26.1
	Not sure	46	10.5
	No	279	63.4
Women can become Skilled	Yes	164	37.3
	Not sure	105	23.9
	No	171	38.9

n_1 Number of women construction workers

Table 10

Method of Training Women Construction Workers as Masons

Mason work tried	n_1Total=440	% of n_1
On the Job	223	95.3
On Off Days	9	3.9
Institutional Training	2	0.8

n_1 Number of women construction workers

Table 11

Opinion of men construction workers and contractors

		n_2Total=440	% of n_2	n_3Total=51	% of n_3
Women can Become Skilled Mason	Yes	222	50.5	31	60.8
	Not sure	162	36.8	9	17.6
	No	56	12.7	11	21.6
Willingness to Train Women	Yes	212	48.2	26	51.0
	Not sure	69	15.7	15	29.4
	No	159	36.1	10	19.6
Willing to Employ Women Mason	Yes	303	68.9	32	62.7
	Not sure	92	20.9	15	29.4
	No	45	10.2	4	7.8

n_2 - Number of men construction workers, n_3 - contractors

Table 12

Involvement of Women Construction Workers in Union Activities

Union Details of Women Construction Workers		n_1Total=440	% of n_1
Union awareness	Yes	160	36.4
	Not sure	280	63.6
	No	262	59.5
Union member	Yes	54	12.3
	No	386	87.7
Union benefit claimed	Insurance	2	.5
	Accident compensation	2	.5
	Children's education	10	2.3
	Any other	9	2.0
	Not applicable	417	94.8
Reason for joining Union	Welfare activities	23	5.2
	Pension in old age	25	5.7
	For crisis support 6	1.4	
	Not applicable	386	87.7

n_1 Number of women construction workers

Table 13

Socio-demographic characteristics of men and women construction workers

Socio-demographic Characteristics		n_1Total=440	% of n_1	n_2Total=440	% of n_2
Marital Status	Married	261	59.3	282	64.1
	Unmarried	94	21.4	156	35.5
	Divorced	20	4.5	1	0.2
	Widow	65	14.8	1	0.2
Entry Why	Widow/abandoned by husband: no other employment	75	17.0	121	27.5
	Forced by Poverty	249	56.6	115	26.1
	Many family members in this job	44	10.0	49	11.2
	Parents died to look after younger ones	7	1.6	0	0.0
	Own choice	65	14.8	155	35.2

n_1 Number of women construction workers, n_2 - Number of men construction workers

Table 14

Status of Spouse of Men Construction Workers

Status of spouse of men construction workers		n_2Total=440	% of n_2
Wife Working	Working construction	62	14.1
	Working other job	40	9.1
	Not working	182	41.4
	Unmarried	156	35.5

n_2 - Number of men construction workers

Chapter 5

SUGGESTIONS AND CONCLUSION

5.1 SUGGESTIONS FOR EMPOWERING WOMEN CONSTRUCTION WORKERS

The present study has shown that there is disparity in wages and promotion opportunities between men and women in the construction sector. The study also shows that women were found to use their income profitably - for the welfare of the family and they are capable of doing masonry work. They have the competency, capability, ability, skills and work culture to become masons. Most of the women want to become masons and they have tried and are already doing some of the tasks carried out by men masons, which shows that women have the potential to become masons.

So steps can be taken to train and employ women and quasi governmental agencies and Non Governmental Organizations can come forward to honor such women masons and the contractors who employ them and can give wide media publicity. Women Groups can take up the task of sensitizing male masons and contractors. This study has revealed that contractors and masons do not conduct any formal training for men in masonry work, but men workers start working as assistants to masons and receive the informal practical training for about one year with wages. This type of informal training is absent for women construction workers in India.

In the same manner, it is proposed that women in this sector could also be encouraged to get practical training by working as assistants to the masons. This will ensure women of their wages during the time of training. The construction sector unions must also be motivated to work with masons, who are members of the unions to train women informally by employing women as job assistants. In many construction sites, the relatives of masons work as a team because they move to cities as a group. So, men masons in the team can train their wives, sisters and other relatives informally. After they are trained, the trained women can work independently as masons, earn more wages and offer informal training to other women empowering many women in the construction sector.

5.2 CONCLUSION

Women in the construction sector are involved only in unskilled work. Their potential as masons is still untapped.

This study analyzed the reasons why women could be empowered and it has been found that women should be empowered because of their skills, good spending habits, capability, potential, and their aptitude to work sincerely.

The study has also shown that women are willing to be trained and are already carrying out some of the tasks of masons. Men are willing to train women and give them opportunity to work along with them.

So it is proposed that the methodology of offering informal training now practiced in construction sector to train men workers could be extended to train and empower women for masonry work. To implement this informal training it is proposed that union membership of women has to be increased and men union workers must be motivated to come forward to train women informally. The male construction workers must also be motivated to give informal training to their wives and relatives. If some women are trained and employed as masons, they will in turn become mentors to other women and encourage and train other women to do the job of masonry. Legislation could be enacted in India to make it mandatory for the contractors to offer informal training to women construction workers in government sites and employ a certain percentage of women masons in all sites.

These positive steps will enhance the resource potential among women construction workers and empower them leading to the growth of the families and the advancement of nation

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