CHAPTER – 4

METHODOLOGY

Research methodology is a method of systematically solving the research problem. To do any research in a scientific manner, the investigator generally adopts various steps in a very logical way. The investigator has to be certain which techniques and procedures will be applicable to the problem undertaken in the research work. In this study also the investigator has taken into consideration the above aspects before deciding how to go about solving the research problem. The investigator has in a very logical manner decided the method to be used.

THE SAMPLE

To undertake any research project, study of situations or subjects has to be done. All items in any field of inquiry constitute a ‘population’ or ‘universe’ and when a complete enumeration of all items in the ‘population’ is done it is called census inquiry. In a psychological study this type of study is not required. It is possible to obtain sufficiently accurate results by studying only a part of the total population. The selected respondents constitute what is technically called a ‘sample’ and the selection process is called ‘sampling technique’. The survey so conducted is called the ‘sample survey’. 
The sample for the present study will be mainly confined to the executives of Bhilai Steel Plant which is a unit of the steel giant SAIL (Steel Authority of India Limited), a public sector unit. The population of the executives working in the steel plant is approximately 2280, out of which 400 will be selected randomly for the study. Deciding the size of the sample is a major problem before the researcher. The size of the sample should not be excessively large, nor too small. It should be optimum. An optimum sample is one which fulfils the requirements of efficiency, representativeness, reliability and flexibility. The chart showing the structure of the main functionaries of the steel plant is shown in (fig. IV.0)

Therefore, keeping in view the above mentioned criterions, the size of the population, the parameters of interest in the research, cost that will incur, the researcher decided to select a sample of 400 i.e. 17.5% of the total population.

It has been judged that such a sample will be the true representative sample or true replica of the population. The findings that are derived by the research can be attributed to the population. The results obtained from the sample should be the mirror image of the result of the population, had the study of population been done. Generally sampling is done in the context of funds, time, energy etc available for the research study.

The entire population of the executives of the steel plant can be roughly distributed to be working in two segments i.e. the production segment and the service segment. The production segment deals with the manufacturing side and the various
shops that help in the production of steel in various stages are encompassed in this area. These shops are generally known as hard shops, where the physical working conditions are very tough and rigorous. Some of the hard shops in the production segment are blast furnace, steel melting shop, coke oven, rolling mills, rail mills etc. The service segment deals with the office job, computer departments, finance, human resource development, design sections etc. They are the support systems that help in the smooth functioning of the steel plant. This segmenting of the departments in two chambers – manufacturing and services, is shown in the chart given in (fig.IV.1)

As earlier stated the sample will be randomly selected. The number of executives in the various departments will be kept in mind and the sample selected will be in proportionate to this size. Effort will be taken to consciously cover all the important shops of the steel plant. The number of respondent taken will be more in a large department.

Another consideration that will be kept in mind in the sampling process will be the age, designation and sex of the executives. Effort has to be made to cover people evenly and proportionately from all age groups, different designations and sex. The hierarchical set-up of the executives is shown in (fig. IV.2)
(FIG IV.0) SHOWING ORGANIZATION’S STRUCTURE

Projects  
Works  
Personal & Administration  
Materials Managements  
Finance  
Mines  
Information Technology  
Vigilance  
Marketing & Strategic Planning  
Medical & Health Services  
Communication
(FIG.IV.1) Showing The Distribution Of Departments From Which The Sample Has Been Randomly Drawn.

Production and Services

SAMPLE

PRODUCTION
- Blast Furnace
- Steel Melting Shop
- Coke Ovens
- Rolling Mills
- Refractories

SERVICES
- Materials Management
- Personal & Administration
- Finance
- Center for Engineering & R & D
- Electronic Data Processing
- Bhilai Engineering & Design Bureau
CHART (Fig.IV.2) SHOWING THE HIERARCHICAL LADDER OF EXECUTIVES

Managing Director

Executive Director

General Manager

Dy. General Manager

Asst. General Manager

Senior Manager

Manager

Deputy Manager

Assistant Manager

Junior Manager
NATURE OF THE ORGANISATION

Vision of the Organization:
“To be a respected world class corporation and the leader in Indian Steel Business in quality, productivity, profitability and customer satisfaction”.

Steel Authority of India Limited (SAIL) a “Navratna Company” has been ranked sixth amongst the top hundred wealth creators in India in a Business Today Survey. Bhilai Steel Plant was set up under its (SAIL) parentage by the leadership of free India, who took a decision to set up integrated steel plants under the exclusive responsibility of the state. As a major step towards this goal, Governments of India & USSR entered into an agreement, on 27th January 1955. The plant began its operation on 31st January 1959.

Bhilai Steel Plant has been a consistent performer and has achieved profits for the sixteenth consecutive year.

The plant is headed by Managing Directors, who is member of Board of Directors and reports to Chairman, SAIL. At plant level the top management comprises of M.D. and his DROs (Direct Reporting Officers) at E.D. / G.M. (Executive Director / General Manager) level who are functional heads. The senior level is made up of the Zonal Heads /HOD’s who are Direct Reporting Officers to the functional heads, mostly GMs / DGMs. The middle level is of sectional heads at DGM / AGM level (Deputy General Manager / Assistant General Manager), and the front line executives consists of Senior Managers down to junior Managers. The plant management teams or plant leadership
comprises of M.D., his Direct Reporting Officers and some of the Direct Reporting Officers of Executive Director (Works) who are heads of major shops. Total member of executives as on 31.03.2004 is 2280.

Today, the ISO-9001 : 2000 certified plant has a turnover of over Rs. 10,000 crores with manpower of 36,000 distributed in 110 production and service departments. Bhilai Steel Plant also bagged the prestigious Prime Minister’s Award as the best managed steel plant in the country in public and private sectors, five times during last nine years from the points of view of production, profitability and HR productivity, work culture and work climate.

Global Steel recession, which lasted till 2002, did impact SAIL too. However SAIL media commitments to the Government under MOU (Memorandum of understanding) with ministry of steel for the year 2003-2004 for achieving a financial turn around during the current fiscal along with further improvements in its all round performance. It was achieved and the performance has far exceeded the commitments made under MOU justifying the faith reposed on its people by the President of India.

The Board of Directors have formulated the Core Values of the company called CREDO in August’2003.

CREDO
➢ We build lasting relationship with customers based on trust and mutual benefit.
➢ We uphold highest ethical standards in conduct of our business.
➢ We create and nurture a culture that supports flexibility, learning and is proactive to change.
➢ We chart a challenging career for employees with opportunities for advancement and rewards.
➢ We value the opportunity and responsibility to make a meaningful difference in people’s life.

The corporate vision and CREDO reflects the organisation’s intent in its journey towards excellence. To exemplify, the components of Bhilai Steel Plant’s “Quality Policy” namely achieving continual improvements in productivity, quality and salability of our products and “active involvement of all our people in achieving our goals, objectives and targets” were acknowledged and reaffirmed to be an ongoing source of inspiration and moving force behind the booming production of rails and a gigantic leap ahead by plates with matching resilience shown by other departments like Coke Ovens, Blast Furnaces and Steel Melting Shops. Human Resource (HR) Policy of Bhilai Steel Plant, was revised in 2004 to further intensify HR proactive role in “Promoting a work culture which encourages the employees to contribute their best” and to develop proactive customer focused HR team engaged in continual innovation and change management.

Dr. A.P.J. Abdul Kalam in his book “India 2020 – A Vision for the new Millennium”, has written “We still have a number of persons in our country in Steel Authority of India Limited (SAIL) …….. They have the will to
excel and transform the country, given a long term vision” Page-91.

Pandit Jawaharlal Nehru – “Bhilai is one of those places which have become embedded in the national consciousness as one of the significant symbols of a new age in India … Bhilai is a temple of modern India where work is worship”.

**DESIGN**

According to Selltiz (1962) “A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure”.

It can be said that the design of a research is the conceptual framework within which research should be conducted. It is the blueprint for the collection, measurement and analysis of the data collected. Design gives an outline of what the investigator will have to do from formulating the hypothesis along with its operational implications to the final analysis of data.

This research work has three main variables in its periphery. They are job involvement, life-orientation and occupational stress. The effect of life orientation and occupational stress has to be studied on job involvement in the respondents. This study will be carried out on the executives of Bhilai Steel Plant. Each executive will be given three tests to measure the three variables mentioned above.

The first independent variable life orientation has a two category responses i.e. enlarging & enfolding.
The second independent variable – Occupational Stress has a three category response i.e. high stress, moderate stress and low stress.

Dependent variable – Job Involvement also has three category responses i.e. high involvement, moderate involvement & low involvement.

Mean differences will be calculated for all the groups under study and for different variables. Mean values, and ANOVA will be applied to analyze the data. The results thus obtained will be presented in the next chapter.

**O.S.**

<table>
<thead>
<tr>
<th></th>
<th>High</th>
<th>Moderate</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>L.O</strong> Enfolding</td>
<td>J.I.</td>
<td>J.I.</td>
<td>J.I.</td>
</tr>
<tr>
<td></td>
<td>J.I.</td>
<td>J.I.</td>
<td>J.I.</td>
</tr>
</tbody>
</table>

Association among the variables will be seen by computing the coefficient of correlation. To study the significant difference between different groups of variables, the F-ratios will be computed in a two way ANOVA. Therefore it can be said that it will be a co-relational and differential study.

Apart from the formally mentioned independent variables, some other variables, the demographic ones are also identified. They are the age of the respondents, designation of the respondents, their sex and their field of work. Job involvement of the executives will be compared according to these identified
variables also. Correlation, ANOVA, regression analysis between variables will be computed to establish relationship between them.

Job Involvement scores according to demographic variables.

<table>
<thead>
<tr>
<th>Sex</th>
<th>Job involvement (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Male</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>Job involvement (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Below 38 years</td>
<td></td>
</tr>
<tr>
<td>38 – 48 year</td>
<td></td>
</tr>
<tr>
<td>48 above</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Designation</th>
<th>Job involvement (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Frontline Executives</td>
<td></td>
</tr>
<tr>
<td>Middle-order Executives</td>
<td></td>
</tr>
<tr>
<td>Senior Executives</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Department</th>
<th>Job involvement (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Production</td>
<td></td>
</tr>
<tr>
<td>Services</td>
<td></td>
</tr>
</tbody>
</table>
This research deals with three variables for which three standardized tests will be been used. These tests are as follows:

**Job Involvement Scale:**
The two major scales in the literature of job involvement have been developed by Lodahl and Kejner (1965) and Kanungo (1982). Lodahl and Kejner are considered to be the pioneer in this field of research.

The job involvement scale used in this study has been developed by Singh of Banaras Hindu University. This test was developed in 1984. The preliminary schedule of the scale consisted of 72 items out of which 54 items were finally selected for the scale, on the basis of item analysis. The 54 items which constitutes the scale are related to the following areas:- Intrinsic motivation; Attachment to work; Fulfillment of organizational demands; Commitment for work; Internalization of organizational goals; Organizational identification.

Each statement of the scale has four response alternatives, namely, strongly agree, agree, disagree, and strongly disagree. The items of the scale were framed in such a way that they can be used for measuring the degree of involvement of all the subjects irrespective of the nature of their work, organizations, and machines and tools they use. The job involvement scale was used to measure the employees job involvement in some earlier researches (Srivastava, 1986, 1988; Singh and Srivastava, 1984, 1986).
Reliability and Validity

The reliability of the Job Involvement Scale was computed by the Cronbach’s (1951) Alpha coefficient technique and was found to be .83. The index of homogeneity and internal validity of the scale were determined by computing the point bi-serial coefficient of correlation ($r_{pb} = .40$) to ascertain how the scores on the individual items, ranging from 1 to 4 contribute to total scores on a representative sample of 400 employees. The scores on Job Involvement Scale of Lodahl and Kejner (1965) was used as one of the validation criteria for the present scale. The coefficient of correlation between the scores on the two tests was found to be .93 ($N = 400$). Inter correlations were also run among the items and the matrix thus obtained has been factorized using the principal component method. The results of the factor analysis indicate that 89% of the items had significant loadings on Factor-I indicating the unidimensionality of the scale.

Scoring Procedure

Out of fifty four items constituting the scale, 35 items were true keyed and remaining 19 items were false keyed. The possible scores of each items ranged from one to four.

| Table -1 |
|------------------|------------------|
| True keyed items 35 | False keyed items 19 |
| 3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,19,20,21,22,23,24,26,27,29,30,34,38,46,47,49,50,51,52,53,54 | 1,2,18,25,28,31,32,33,35,36,37,39,40,41,42,43,44,45,48 |

Since the scale consists both true keyed and false keyed items, therefore, two different patterns of scoring have to be adopted.
The scores ranged in ascending order for the false keyed items and in descending order for true keyed items. The following table provides guide line for the scoring:

Table -2

<table>
<thead>
<tr>
<th>True keyed items</th>
<th>Response alternatives</th>
<th>False keyed items</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Strongly agree</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Agree</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Disagree</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>Strongly disagree</td>
<td>4</td>
</tr>
</tbody>
</table>

The job involvement scores will be determined by the arithmetic summation of the scores endorsed to all the fifty four items. Thus, the maximum possible job involvement score will be 216 and the minimum 54. The lower scores indicate less involvement in the job and the high scores indicate more involvement in the job.

Norms for the Job Involvement Scale
Norms have been prepared for the Job Involvement Scale on a representative sample of 570 employees working in a big organization.

Table -3

<table>
<thead>
<tr>
<th>Job Involvement</th>
<th>Scores Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above 152</td>
<td>High Job Involvement</td>
</tr>
<tr>
<td>Between 142 – 152</td>
<td>Moderate Job Involvement</td>
</tr>
<tr>
<td>Below 142</td>
<td>Low Job Involvement</td>
</tr>
</tbody>
</table>

The scores were divided into three categories, i.e. high, moderate and low on the basis of $Q_1$ and $Q_3$ cut points. The individuals
having below $Q_1$ scores may be placed in low job involvement whereas individuals having above $Q_3$ scores may be placed in high job involvement. Individuals scoring between $Q_1$ and $Q_3$ will be placed in moderate job involvement. 

(Test presented in APPENDIX –I)

**Life Orientation Inventory Form-II**

This inventory was developed by Pareek (1997). The life orientation inventory treats enlarging and enfolding styles as two separate dimensions. Life orientation can also be viewed as a continuum, with enlarging and enfolding as two opposite poles. This tool has been developed to study the life style of executives. This inventory consists of 20 pair of items, each pair containing one enlarging and one enfolding item. The respondent has to distribute a total of four scores amongst the two items in each pair.

Reliability & Validity

The split-half reliability coefficient was found to be 0.83. In a group of twenty-five health managers, the enlarging styles on Form-I, were positively correlated with enlarging styles on Form-II, and negatively with enfolding styles on Form-II (both significant at .05 level). Enfolding and enlarging styles on Form-I also had a positive correlation (significant at .05 level).

The internal structure of the instrument, to some extent, gives evidence of construct validity. Factor analysis of responses from 152 respondents in an information technology organization, using principal components analysis with varimax rotation gave seven factors. The first three cover fourteen out of twenty items
and explain 36 per cent variance. The other four factors contribute to 26 per cent variance. We can, therefore, take the first three factors as the main ones.

Scoring
Thus the two styles have a correlation of −1.00.
In the Life Orientation inventory, there are twenty pair of statements. Each statement has to be given a value by distributing a total of 4 marks among the pair as per the personal preference of the respondent. One of the pair is a statement, which denotes enlarging characteristics and the other pair is related with enfolding characteristics. The respondent can give, for example, 3 and 1 or 1 and 3 or 2 and 2 or 4 and 0 or 0 and 4, to the pair of statements. As just mentioned, one statement in each item is an enfolding one while the other is an enlarging one, the enlarging statements in each items are listed below.

1a, 2b, 3b, 4b, 5a,
6a, 7b, 8b, 9b, 10a,
11a, 12a, 13a, 14a, 15b,
16a, 17a, 18b, 19a, 20b
To do the scoring, the scores allotted by the respondent to the enlarging statements have to be added. As there are a total of 20 pairs, there are 20 enlarging statement, hence a minimum of 0 and a maximum of 80 can be scored by the respondent. The mid-point will be 40 and any score above that will be an enlarging score and below will be an enfolding score.
(Test presented in APPENDIX -II)
**Occupational Stress Index**

This test has been developed and standardized by Srivastava and Singh (1984). The Occupational Stress Index purports to measure the extent of stress which employees perceive arising from various constituents and conditions of their job. However, stress researchers have developed the scales which measure the stress arising exclusively from job roles (Rizzo, et al 1970; Pareek 1981). The tool can conveniently be administered to the employees of every level operating in context of industries or other non-production organizations. But it would prove more suitable for the employees of supervisory level and above. The scale consists of 46 items, each to be rated on the five-point scale. Out of 46 items 28 are ‘true-keyed’ and rest 18 are ‘false-keyed’. The items related to almost all relevant components of the job life which cause stress in some way or the other, such as, role over-load, role ambiguity, role conflict, group and political pressures, responsibility for persons, underparticipation, powerlessness, poor peer relations, intrinsic impoverishment, low status, strenuous working conditions, and unprofitability.

Reliability
The reliability index ascertained by split half (odd-even) method and Cronbach’s alpha-Coefficient for the scale as a whole were found to be 0.935 and 0.90, respectively. The reliability indices of the 12 sub-scales were also computed on the (split half) method.

Validity
The validity of the O.S.I. was determined by computing coefficients of correlation between the scales on the O.S.I. and the various measures of job attitudes and job behaviour. The
employees’ scores on the O.S.I. is likely to positively correlated with the scores on the measures of such work-manifest attitudinal and motivational and personality variables which have proved lowering or moderating the level of occupational stress. The coefficients of correlation between the scores on the O.S.I. and the measures of Job Involvement (Lodhal & Kejner, 1965), Work Motivation (Srivastava, 1980), Ego-strength (Hasan, 1970), and Job satisfaction (Pestonjee, 1973) were found to be -.56 (N=225), -.44 (N=200), -.40 (N=205) and -.51 (N=500), respectively. The correlation between the scores on the O.S.I. and the measure of Job Anxiety (Srivastava, 1974) was found to be 0.59 (N=400).

Scoring
Since the questionnaire consists of both true keyed and false-keyed items two different patterns of scoring have to be adopted for two types of items. The following table provides guide line to score the responses given to two categories of items:

<table>
<thead>
<tr>
<th>Categories of response</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>For True-keyed</td>
</tr>
<tr>
<td>Never/Strongly disagree</td>
<td>1</td>
</tr>
<tr>
<td>Seldom / Disagree</td>
<td>2</td>
</tr>
<tr>
<td>Sometimes / Undecided</td>
<td>3</td>
</tr>
<tr>
<td>Mostly / Agree</td>
<td>4</td>
</tr>
<tr>
<td>Always / Strongly agree</td>
<td>5</td>
</tr>
</tbody>
</table>
The true keyed items are as follows:
1, 2, 3, 4, 5, 9
11, 12, 13, 16, 17, 23,
24, 25, 26, 27, 28, 29,
34, 35, 36, 37, 38, 39,
42, 44, 45, 46.

The false keyed items are as follows:
6, 7, 8, 10, 14, 15,
18, 19, 20, 21, 22, 30,
31, 32, 33, 40, 41, 43.

Norms
Norms have been prepared for the Occupational Stress Index (O.S.I) on a representative sample of 700 employees of different cadres operating in various production and non-production organizations. The distribution of scores on the O.S.I. was found to be slightly skewed in negative direction by Srivastava and Singh. The same trend was found by the researcher in this study. Thus to prepare the norms with a normal distribution, cluster analysis method have been used for division of upper and lower halves. In this method first the mean and S.D of the entire occupational stress raw scores was computed. Mean score + SD was the upper limit i.e cut off point for the high occupational
stress, Mean score - SD was the lower limit i.e. cut off point for low occupational stress, in between was the moderate level of occupational stress.

The scores were divided into three categories, i.e. high, moderated and low, following the principles, of normal distribution. The scores falling above $+1\sigma$, between $\pm 1\sigma$, and below $-1\sigma$ were categorized, respectively as to indicate high moderate and low levels of occupational stress.

The following Table provides the norms for the raw scores: (See Norm Table –1)

<table>
<thead>
<tr>
<th>CATEGORY SCORE</th>
<th>Levels of occupational Stress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>(Below $-1\sigma$) 107 &amp; Below</td>
</tr>
<tr>
<td>Moderate</td>
<td>(Between $\pm 1\sigma$) 108-136</td>
</tr>
<tr>
<td>High</td>
<td>(Above $+1\sigma$) 137 &amp; Above</td>
</tr>
</tbody>
</table>

(TEST presented in APPENDIX-III)

**PROCEDURE**

After the finalization of the research topic, review of the related literature, formulation of the hypothesis, tools and sample decided, came the next step in the form of actual procedure of data collection. For this the investigator approached the authorities of the various sections of the Bhilai Steel Plant. Bhilai Steel Plant is a huge set up where the various departments are spread out in an area of 30 Sq. k.m. The investigator requested the heads of the main shops to help in randomly select the executives for testing purpose. Sample
selected belonged to all age groups, various designations and both the sexes and it was in proportionate with the size of the department.

Each executives was given a set of questionnaire which had the three tools mentioned earlier. One was for the testing of the level of job involvement, one for life-orientation and the third was for testing the occupational stress of the executives. The total sample tested was 400 in number i.e. 17.5% of the 2280 executives working in the plant area.

Once the three tests were worked on by the respondents, they were collected. The scoring was done according to the instructions given in the manual. The responses of all the 400 subjects were collected and statistical treatment of the scores were done according to the methods stated earlier. Age, Designation (status), Sex, Area of work of each subject were also recorded.

(Raw scores thus obtained are presented in APPENDIX- IV)