

**A STUDY ON WELFARE & SAFETY MEASURES ADOPTED IN  
MANUFACTURING INDUSTRIES – A CASE STUDY OF THYSSENKRUPP  
INDIA LTD.**

**MS. AAMENA ZEBA**

**PROF. K. RAJANATH**

**ABSTRACT**

In a fast growing industrialisation, particularly the Indian manufacturing field of activities, welfare and safety measures assume a significant importance. As the market environment is becoming more competitive, retention of employees not only is based on the quantum of salaries, measures deployed by the management of respective enterprises also depends a lot on safety and welfare measures initiated and implemented in the respective organizations to arrest the exodus of employees. It is in this context “A study on Welfare & Safety measures adopted in manufacturing industries – a case study of ThyssenKrupp India Ltd.”, was taken up. ThyssenKrupp Industries India Pvt. Ltd. Hyderabad (TKII) is one of the subsidiaries of a well known and established German company has grown over a period of time and became one of the trusted names in the fields of Sugar Plants & Machinery, Cement Plants & Machinery and Industrial Boilers & Power plants etc.

**Key Words:** Safety, Welfare, Accidents, Manufacturing

**I. INTRODUCTION:**

In the current Indian manufacturing scenario, which is never ending, ever growing competition, the “**Welfare**” and “**Safety**” of the employees is becoming a major factor to arrest the exodus of their experienced employees and motivate them to continue to contribute to the productivity of the organisation; the topic of “**Employee Safety and Welfare**” is gaining a greater significance.

Safety (Business dictionary, 2017) of an employee in an organization may be defined as “relative freedom from danger, risk, or threat of harm, injury, or loss to personnel and/or property, whether caused deliberately or by accident”

Welfare (Merriam-Webster dictionary, 2017) is defined as the state of doing well especially in respect to good fortune, happiness, well-being, or prosperity of personnel/employees.

Manufacturing industry are those industries which involve in the manufacturing and processing of items and indulge in either creation of new commodities or in value addition. Manufacturing sector is the backbone of any economy. It fuels growth, productivity, employment, and Strengthens agriculture and service sectors. According to a study conducted by global management consulting firm McKinsey (Dhawan, Swaroop & Zainulbhai, 2017) the Indian manufacturing industry is expected to touch US\$ 1 trillion by 2025. Around 90 million domestic Jobs are waiting to be created by that timeframe with the manufacturing segment contributing about 25-30% of India's gross domestic product. India's rapidly expanding economy is giving both international entrepreneurs and home players an array of opportunities to venture out and grow. As per the study by ASSOCHAM (Chakraborty, 2014), India's manufacturing sector is all set to create 3.2 million manufacturing jobs during the period of 2012-17. Despite deceleration in performance in the past few years, the Indian manufacturing industry is getting back on track to create 3.2 million work opportunities during the 12<sup>th</sup> Plan period (2012-2017).

Thyssen Krupp is a German multinational conglomerate corporation based in Duisburg and Essen, Germany. The corporation consists of 670 companies worldwide. While Thyssen Krupp is one of the world's largest manufacturers of steel, the company also provides components and systems for the automotive industry, elevators, escalators, material trading and industrial services.

ThyssenKrupp, spread over worldwide, has 5,500 employees and generates €1.6 billion turn over. ThyssenKrupp Industries India Pvt Ltd. (TKII) is one of the subsidiaries, located at Hyderabad has grown over a period of time to become one of the most trusted names in the fields of Sugar Plants & Machinery, Open Cast Mining & Bulk Material Handling Systems, Cement Plants & Machinery and Industrial Boilers & Power plants. The company firmly believes in delivering total customer satisfaction spanning from concept to commissioning to after sales service. TKII Integrated Management System Policy on Quality, Safety, Health and Environment involves among various other aspects, complying with all applicable legal, statutory, regulatory and other requirements to maintain workplaces to ensure the occupational health and safety of the employees and continually improve the effectiveness of Quality through adopting Safety, Health aspects of Management Systems and in this context, the company has obtained

certificates of ISO 9001, Quality Management System and Organizational Safety and Health Administration OSHA 18001.

The Hyderabad unit has 90 personnel at managerial level and work force of 450. The firm caters to the need of 4 business verticals such as Cement, Boiler, Material handling equipment and Sugar plant. The turnover, depending on product mix, is 800MT and 200 crores.

## II. LITERATURE REVIEW

Ezekiel M. Makori(Makori, Nandi, Thuo & Wanyonyi, 2012), in their study on *“Influence of Occupational Health and Safety Programmers on Performance of Manufacturing Firms in Western Province, Kenya”* stated that occupational health and safety continues to be one of the most critical of human resource management. The study findings showed a moderate positive relationship between occupational health and safety programmes (OHSP) and organizational performance of manufacturing firms. Management of firms must put in place policies and structures for improving occupational health and safety.

Chandra Sekhar Patro (Patro, 2012) in his study on *“Employee Welfare Activities in Private Sector and Their Impact on Quality of Work Life”* stated that during the last few years the private organizations are playing an important role in the overall development of the economy. In today's competitive economy, the business organizations need to focus explicitly on providing the welfare facilities to the employees as it results in their satisfaction towards the organization and it results in improved quality of work life.

The activity of nurturing and nourishing constitutes is called "Welfare". Welfare facilities enable the employees to live a richer and more satisfactory life. The various Welfare activities that can be provided to the employees include provision of loans, free medical facilities, retirement benefits, education facilities for the employee's and their families, housing benefits, etc

S. Prabakar( Prabakar, 2013) in his article *“Employees satisfaction & welfare measures - a case study with special reference to Don Bosco college of Arts & Science”*, stated that the term welfare proposes many ideas, meanings and connotations, such as the state of well-being, health, happiness, prosperity and the development of human resources. As a total concept of welfare, it is a desirable state of existence involving physical, mental, moral and emotional well-being.

Emma Seppala (Seppala, Cameron, 2015) states that a large and growing body of research on positive organizational psychology demonstrates that not only is a cut-

throat environment harmful to productivity over time, but that a positive environment will lead to dramatic benefits for employers, employees, and the bottom line.

26th Conference of ILO (2010), conventions and recommendations(1949) sets forth a fundamental principle at its 26th conference held in Philadelphia recommended some of the measures in the area of welfare measures which includes adequate protection for life and health of workers in all occupations, provision for child welfare and maternity protection, provision of adequate nutrition, housing and facilities for recreation and culture, the assurance of equality of educational and vocational opportunity etc.

Shobha (Mishra & Bhagat, 2016) in their *“Principles for Successful Implementation of Labour Welfare Activities”*, stated that labour absenteeism in Indian industries can be reduced to a great extent by provision of good housing, health and family care, canteen, educational and training facilities and provision of welfare activities.

While describing the Welfare in Indian industrial sector, A.J.Todd (Todd, 1933) has analyzed that the labour welfare is the voluntary efforts of the employers to establish, within the existing industrial system, working and sometimes living and cultural conditions of the employees beyond what is required by law, the custom of the industry and the conditions of the market.

### **III. NEED FOR THE STUDY**

Employee Welfare is defined as initiatives taken by any manufacturing firm, to make the employees life worth living in the firm and contribute to its growth and productivity on a continuous basis ThyssenKrupp India, cannot be an exception.

Industrial Safety refers to the management of all operations and events within an industry, for protecting its employees and assets by minimizing hazards, risks, and accidents. Industrial safety includes aspects such as general safety, operational, process and production, work place safety etc.

It is in the above context, the present study of “A study on Welfare & Safety measures adopted in manufacturing industries – a case study of ThyssenKrupp India Ltd” is taken up.

### **IV. OBJECTIVES OF THE STUDY:**

The objective of the study is to examine the employee working facilities and safety measures undertaken at ThyssenKrupp India and as well to study the employee satisfaction levels towards welfare facilities provided by the firm.

## **V. RESEARCH METHODOLOGY:**

The research pedagogy includes identifying sources of information, research instrument, sampling size and data presentation. Both primary & secondary sources of information were used. The primary source of information included responses collected from employees of the firm through a specific research instrument, questionnaire, designed for the purpose. Structured questionnaire was used to elicit information from employees of ThyssenKrupp India. The responses were collected on the following 17 parameters under category of Safety and Welfare:

### **A. Safety Measures:**

- a. Adequacy of Safety Training Programs Conducted,
- b. Attended any Safety Programmes,
- c. Awareness Programmes with regard to Safety,
- d. Usage of the Safety Measures Provided,
- e. Layout of Workplace to Avoid Accidents,
- f. Safety Measures Reduce the Severity of Accidents
- g. Immediate Actions taken to Investigate Accidents,
- h. Risk Factor while Working,

### **B. Welfare Measures:**

- a. Working Environment of the Organization,
- b. Medical Benefits provided by the Organization,
- c. Working Hours,
- d. Conveyance Allowance Offered,
- e. Leave Policy,
- f. Release of Increments Regularly,
- g. Canteen Services,
- h. Secure feel, and
- i. Advantages of Welfare Measures

The research instrument used was a structured questionnaire consisting of multiple choice and close ended questions. Secondary source of information included data collected from sources such as Websites, Books and Journals. Sample size was 80, employees from ThyssenKrupp India. Simple random sampling method was used to arrive at the size of sample. Data thus obtained was tabulated and analysed with the help of statistical tools such as ratios/percentages.

## VI. DATA ANALYSIS:

The data obtained was analysed and presented in the different tables available in appendix:

### <Table 1>

Inference from table 1 is found that 95% of employees positively responded that adequate safety programmes were conducted and 5% negated.

### <Table 2>

Inference from table 2 is found that 90% of employees have attended the training programmes and 10% of employees did not attend the same...

### <Table 3>

From table 3 it is observed that 85% of employees agree that management provides awareness programs relating to safety and 15% of employees respond negatively.

### <Table 4>

Inference from table 4 is observed that 85% of employees always use the safety measure provided to them, 10% of employees sometimes use the safety measures and 5% of employees use the safety measures to some extent only.

### <Table 5>

Table 5 suggest that 75% of employees responded that workplace is properly designed to avoid accidents, 20% of employees agree to some extent and only 5% of employees say that workplace is not designed properly to avoid accidents.

### <Table 6>

Inference from table 6 is found that 75% of employees say that safety measures help in reducing the severity of accidents, 5% of employees do not agree and 20% of employees agree to some extent only.

### <Table 7>

Inference from table 7 is found that 90% of the respondents positively respond that always immediate actions are taken to investigate accidents and only 10% of negated.

### <Table 8>

Inference from table 8 is found that 15% of employees only positively responded that they perceive risk factor while working, 55% responded that they do not perceive any risk factor and 20% of employees respond that they perceive risk factor.

**<Table 9>**

Table 9 suggest that 35% of employees responded that working environment of the organization is highly satisfactory, 25% of employees stated that it is average and 40% of employees respond that i am satisfactory.

**<Table 10>**

Inference from table 10 suggest that 35% of employees equally respond 35% highly satisfactory & average towards medical benefits provided by the Organization 40% of employee's state that they are satisfactory.

**<Table 11>**

Inference: While 30% equally respond positive to highly satisfactory and satisfactory, 40% of employees' state that they are average.

**<Table 12>**

From table 12 it is found that only 15% of the employees state that conveyance allowance offered by the organization is highly satisfactory, whereas 45% of employees state that they are average and 40% of the employees are satisfied with the conveyance allowance.

**<Table 13>**

Inference: from the table 13 it is observed that 30% of the employees are highly satisfied with the leave policy of the organization, 55% rate it as average and 15% stated that the leave policy as satisfactory.

**<Table 14>**

Inference from table 14 suggest that 90% of the respondents state that they get regular increments and 10% of employees say that they do not get regular increments.

**<Table 15>**

Inference: While 20% respondents rate the canteen services as highly satisfactory, 55% of respondent's rate as average and 25% of respondents are satisfied by the canteen services.

**<Table 16>**

Inference from table 16 is 95% of respondents feel secure while working in the organization and 5% of respondents do not feel secure.

**<Table 17>**

Inference from table 17 is 5% of employees say that welfare measures helps in creating better industrial relations, 40% of employees say that welfare measures helps in building greater Majority agree loyalty to the company, 5% of employees

say that it helps to fasten team spirit while 50% of employees agree to all the above.

## VII. STUDY FINDINGS:

| SN | Parameter  | Response  |
|----|--|---|
| 01 | Adequacy of safety training programs             | Majority responded positively   |
| 02 | Attended any Safety Programmes                   | Majority responded positively   |
| 03 | Awareness Programmes with regard to Safety       | Majority responded positively   |
| 04 | Usage of the safety measures provided            | Majority responded positively   |
| 05 | Layout of workplace to avoid accidents           | Majority endorse that layout at work place reduce the accidents                   |
| 06 | Safety measures reduce the severity of accidents | Majority agree measures reduce the accidents                                      |
| 07 | Immediate actions taken to investigate accidents | Immediate actions are .taken up   |
| 08 | Risk Factor while working                        | Majority negated.   |
| 09 | Working Environment of the Organization          | Majority satisfactory to average  |
| 10 | Medical Benefits provided by the organization    | Majority satisfactory to average  |
| 11 | Working Hours                                    | Majority respond are satisfied  |
| 12 | Conveyance Allowance offered                     | Majority state it to be average to satisfactorily                                 |
| 13 | Leave Policy                                     | Majority respond the services to be average                                       |
| 14 | Regular release of Increments                    | Increments are released regularly.  |
| 15 | Canteen Services                                 | Majority respond the services to be average                                       |
| 16 | Secure feel                                      | Feel secure while working in the organization                                     |
| 17 | Advantages of Welfare Measures                   | Majority of employees felt that it helps in creating better industrial relations. |



## VIII. CONCLUSION:

### A. Safety Aspects:

The findings summarize that in all aspects of Safety parameters such as building awareness and conducting Safety training Programmes, usage of Safety Measures, deployment of suitable layout of work place, Undertaking preventive measures, and providing immediate actions should there be any actions and taking appropriate actions to reduce the risk factors etc, the company ThyssenKrupp India has accomplished its task as majority of the responses has positively responded.

### B. Welfare Measure:

With regard to Welfare measures such as working environment, medical benefits, working hours, conveyance allowance, leave policy and canteen services, the response is found to be satisfactory to average. However, this may not be considered as negative on the performance of the firm, since these are highly qualitative in nature and differ from employee to employee.

The study concludes that the company ThyssenKrupp India has perfected in its management system the tasks of implementing adequate measures towards Safety and Welfare of its employees.

## BIBLIOGRAPHY

- A. J. Todd, 1933, *“A-Study-on-Employee-Welfare-Activities-in-Cement-Industry”*. Website: (<https://www.scribd.com>.)
- Anasua Chakraborty. (2014) *Manufacturing Industry*. Retrieved from <http://info.shine.com/industry/manufacturing/>
- Chandra Sekhar Patro, *“Employee Welfare Activities in Private Sector and Their Impact on Quality of Work Life”*. International Journal of Productivity archive Volume 1 Issue 2, April 2012, Pages (19-3)
- Emma Seppala and Kim Cameron (2015), *“Proof That Positive Work Cultures Are More Productive”*, Harvard Business Review, December 01, 2015
- Ezekiel M. Makori\*, O. M.JNandi, J. K. Thuo and Kadian W. Wanyonyi, *“Influence of occupational health and safety programmers on performance of manufacturing firms in Western Province, Kenya”* African Journal of History and Culture (AJHC) Vol. 4(4),pp. 46-58, 2012
- ILO, Conventions and Recommendations of ILO (1949) (Retrieved June 11, 2010, from website: <http://www.workinfo.com>)

Rajat Dhawan, Gautam Swaroop, and Adil Zainulbhai, McKinsey & Company  
*"fulfilling-the-promise-of-India's-manufacturing-sector"*  
[www.mckinsey.com/business.../](http://www.mckinsey.com/business.../)

Safety. BusinessDictionary.com. Retrieved November 26, 2017, from BusinessDictionary.com.

Shobha Mishra & Manju Bhagat, in their *"Principles for Successful Implementation of Labour Welfare Activities"*, Asian Research Journal of Business Management, Issue 3 (Vol. 3) 2016

S. Prabakar, *"Employees satisfaction & welfare measures - a case study with special reference to Don Bosco college of Arts & Science"*, Asia Pacific Journal of Research, October 2013, Volume: III, Special Issue: X

Welfare. merriam-webster.com. Retrieved November 17, 2017, from merriam-webster.com website:(<https://www.merriam-webster.com/dictionary/welfare>)

#### Appendix Tables:

##### A. Table - 1: Adequate Safety Training Programs Conducted

| <i>Opinions</i> | <i>Number of respondents</i> | <i>Percentage</i> |
|-----------------|------------------------------|-------------------|
| <i>Yes</i>      | 76                           | 95                |
| <i>No</i>       | 4                            | 5                 |
| <i>TOTAL</i>    | 80                           | 100               |

##### B. Table – 2: Attended any Safety Training Programs

| <i>Opinions</i> | <i>Number of respondents</i> | <i>Percentage</i> |
|-----------------|------------------------------|-------------------|
| <i>Yes</i>      | 72                           | 90                |
| <i>No</i>       | 8                            | 10                |
| <i>TOTAL</i>    | 80                           | 100               |

##### C. Table - 3: Awareness Programmes Relating to Safety

| <i>Opinions</i> | <i>Number of respondents</i> | <i>Percentage</i> |
|-----------------|------------------------------|-------------------|
| <i>Yes</i>      | 68                           | 85                |
| <i>No</i>       | 12                           | 15                |
| <i>TOTAL</i>    | 80                           | 100               |

**D. Table - 4: Usage of the Safety Measures Provided**

| <i>Opinions</i>       | <i>Number of respondents</i> | <i>Percentage</i> |
|-----------------------|------------------------------|-------------------|
| <i>Always</i>         | 68                           | 85                |
| <i>Sometimes</i>      | 8                            | 10                |
| <i>Never</i>          | 0                            | 0                 |
| <i>To some extent</i> | 4                            | 5                 |
| <i>Total</i>          | 80                           | 100               |

**E. Table - 5: Layout of Workplace to Avoid Accidents.**

| <i>Opinions</i>       | <i>Number of respondents</i> | <i>Percentage</i> |
|-----------------------|------------------------------|-------------------|
| <i>Yes</i>            | 60                           | 75                |
| <i>No</i>             | 4                            | 5                 |
| <i>To some extent</i> | 16                           | 20                |
| <i>Total</i>          | 80                           | 100               |

**F. Table - 6: Safety Measures Reduce the Severity of Accidents.**

| <i>Opinions</i>       | <i>Number of respondents</i> | <i>Percentage</i> |
|-----------------------|------------------------------|-------------------|
| <i>Yes</i>            | 60                           | 75                |
| <i>No</i>             | 4                            | 5                 |
| <i>To some extent</i> | 16                           | 20                |
| <i>Total</i>          | 80                           | 100               |

**G. Table - 7: Immediate Actions Taken to Investigate Accidents.**

| <i>Opinions</i>       | <i>Number of respondents</i> | <i>Percentage</i> |
|-----------------------|------------------------------|-------------------|
| <i>Always</i>         | 72                           | 90                |
| <i>Sometimes</i>      | 8                            | 10                |
| <i>Never</i>          | 0                            | 0                 |
| <i>To some extent</i> | 0                            | 0                 |
| <i>Total</i>          | 80                           | 100               |

**H. Table - 8: Risk Factor While Working**

| <i>Opinions</i>       | <i>Number of respondents</i> | <i>Percentage</i> |
|-----------------------|------------------------------|-------------------|
| <i>Yes</i>            | 12                           | 15                |
| <i>No</i>             | 44                           | 55                |
| <i>To some extent</i> | 20                           | 20                |
| <i>Total</i>          | 80                           | 100               |

I. Table - 9: Working Environment of the Organization.

| <i>Opinions</i>            | <i>Number of respondents</i> | <i>Percentage</i> |
|----------------------------|------------------------------|-------------------|
| <i>Highly Satisfactory</i> | 28                           | 35                |
| <i>Average</i>             | 20                           | 25                |
| <i>Satisfactory</i>        | 32                           | 40                |
| <i>Dissatisfactory</i>     | 0                            | 0                 |
| <i>Total</i>               | 80                           | 100               |

J. Table -10: Medical Benefits Provided by the Organization.

| <i>Opinions</i>            | <i>Number of respondents</i> | <i>Percentage</i> |
|----------------------------|------------------------------|-------------------|
| <i>Highly Satisfactory</i> | 28                           | 35                |
| <i>Average</i>             | 28                           | 35                |
| <i>Satisfactory</i>        | 24                           | 30                |
| <i>Dissatisfactory</i>     | 0                            | 0                 |
| <i>Total</i>               | 80                           | 100               |

K. Table - 11: Working Hours of the Organization

| <i>Opinions</i>            | <i>Number of respondents</i> | <i>Percentage</i> |
|----------------------------|------------------------------|-------------------|
| <i>Highly Satisfactory</i> | 24                           | 30                |
| <i>Average</i>             | 32                           | 40                |
| <i>Satisfactory</i>        | 24                           | 30                |
| <i>Dissatisfactory</i>     | 0                            | 0                 |
| <i>Total</i>               | 80                           | 100               |

L. Table - 12: Conveyance Allowance offered by the Organization.

| <i>Opinions</i>            | <i>Number of respondents</i> | <i>Percentage</i> |
|----------------------------|------------------------------|-------------------|
| <i>Highly Satisfactory</i> | 12                           | 15                |
| <i>Average</i>             | 36                           | 45                |
| <i>Satisfactory</i>        | 32                           | 40                |
| <i>Dissatisfactory</i>     | 0                            | 0                 |
| <i>Total</i>               | 80                           | 100               |

M. Table - 13: Leave Policy of the Organization

| <i>Opinions</i>            | <i>Number of respondents</i> | <i>Percentage</i> |
|----------------------------|------------------------------|-------------------|
| <i>Highly Satisfactory</i> | 24                           | 30                |
| <i>Average</i>             | 44                           | 55                |
| <i>Satisfactory</i>        | 12                           | 15                |
| <i>Dissatisfactory</i>     | 0                            | 0                 |
| <i>Total</i>               | 80                           | 100               |

**N. Table - 14: Regular Increments.**

| <i>Opinions</i> | <i>Number of respondents</i> | <i>Percentage</i> |
|-----------------|------------------------------|-------------------|
| <i>Yes</i>      | 72                           | 90                |
| <i>No</i>       | 8                            | 10                |
| <i>TOTAL</i>    | 80                           | 100               |

**O. Table - 15: Canteen Services provided**

| <i>Opinions</i>            | <i>Number of respondents</i> | <i>Percentage</i> |
|----------------------------|------------------------------|-------------------|
| <i>Highly Satisfactory</i> | 16                           | 20                |
| <i>Average</i>             | 44                           | 55                |
| <i>Satisfactory</i>        | 20                           | 25                |
| <i>Dissatisfactory</i>     | 0                            | 0                 |
| <i>Total</i>               | 80                           | 100               |

**P. Table - 16: Secure feel in the organization.**

| <i>Opinions</i> | <i>Number of respondents</i> | <i>Percentage</i> |
|-----------------|------------------------------|-------------------|
| <i>Yes</i>      | 76                           | 95                |
| <i>No</i>       | 4                            | 5                 |
| <i>TOTAL</i>    | 80                           | 100               |

**Q. Table - 17: Advantages of Welfare measures**

| <i>Opinions</i>                             | <i>Number of respondents</i> | <i>Percentage</i> |
|---|------------------------------|-------------------|
| <i>Create better industrial relations</i>   | 4                            | 5                 |
| <i>Build greater loyalty to the company</i> | 32                           | 40                |
| <i>Helps fasten team spirit</i>             | 4                            | 5                 |
| <i>All the above</i>                        | 40                           | 50                |
| <i>Total</i>                                | 80                           | 100               |

## ABOUT AUTHOR

**AAMENA ZEBA** has Graduate in Bachelor of Engineering in Information Science (2014) from Visvesvaraya Technological University, Belagavi, Karnataka and Post Graduate in Master of Business Administration in Human Resource (2016) from Osmania Univesrsity, Hyderabad. Presently I am working as an Assistant Professor at Academy of Management Studies, Hyderabad.



**Prof. K. Rajanath** Graduate and Post Graduate in Metallurgical Engineering from IIT, Kharagpur, obtained MBA (Gold Medalist) from Osmania University and PhD in Management Science from JNTU, Hyderabad. Has more than forty five years experience as faculty, researcher, trainer, consultant and executive. Worked as faculty, NIT, Warangal, Professor and Dean, Institute of Public Enterprise, Director, Vignan Institute of Technology and Science, Dean, Icfai School of Marketing Studies, Officer on Special Duty (Pro Chancellor) of Icfai University, Tripura, Agartala. Presently, working as Retainer Consultant with Tata Quality Services, a unit of Tata Projects, Hyderabad. Being a Certified ISO lead Assessor and Auditor facilitated several educational and business enterprises for ISO certification. Guided four scholars for their doctoral degrees and a few more are in the pipe line. Have several publications both in National and International journals.

