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Contents

RISK MANAGEMENT IN CONSTRUCTION PROJECTS

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A B S T R A C T

This thesis describes the development of a framework for a systematic approach to risk management in construction projects, whose application in construction practice would lead to changes and improvements in the construction industry.Before showing how the framework was developed, there is a survey of what has been written on the subject and a systematic analysis of risk management, risk in construction and process in construction. This led to the conclusion that realizing a construction project is a process and the risk management process should be subordinated to the construction process. A new approach was therefore introduced to managing risk, process driven risk management. This approach will give all the participants in the project better understanding of the construction process, enable changes in the construction industry, and contribute to improvement of quality and efficiency in construction.Risk has a great impact on the performance of project in India in term of cost, time, and quality. It has increase the size and complexity of the projects and has become the ability to manage risk in all phase of the construction process a central element to prevent unwanted consequences. Key risks are identified in the framework, which are independent of the size, type and purpose of the project being realized. Project related risks should be separately identified for each specific project. Depending on available data, quantitative and qualitative analysis is carried out for the identified risks, their risk probability and risk impact determined, and the corresponding risk exposure calculated. Then the adequate risk response is given for each identified risk, depending on its exposure. As the process unfolds new risks appear in each phase and the management process begins new.

Keyword: *Project Risk, Risk Management, Risk Allocation, Construction Project*

1. INTRODUCTION

Every construction project passes through phases, each of which has a purpose, duration and scope of work. Risk and uncertainty are inherent in all the phases through which the construction project passes, from demonstrating the need do operation and maintenance. Latham said that no construction project is risk free. Risk can be managed, minimized, shared, transferred or accepted. It cannot be ignored. Risks do not appear only in major projects. Although size may be a cause of risk, complexity, construction speed, site and many other factors that affect time, cost and quality to a greater or lesser degree cannot be overlooked. All the participants in the deciding process should observe risks and their effects on all key points of decision making before and during project realization.

Process in construction needs important changes and should be continuously improved. The process itself, and the changes and improvement made to it, are accompanied by risks whose adverse effects may

increases planned costs and time necessary for project completion and decrease execution quality. Efficient and quality management of risks should make these changes in the construction industry possible and enhance quality and efficiency. Changes may be brought to the construction industry through improved risk management in several ways. One possibility is to study the causes of risk, their probability and their imp-act on time, cost and quality for a particular type and size of facility.

Risk management is a continuous process needing an integral risk management system in all the phases that the construction project passes through, which is accomplished by developing a framework for process driven risk management. It is necessary to identify the key risks that appear in all the phases through which the construction project passes, regardless of the type and size of the facility

II. OBJECTIVE OF THE STUDY

To investigate how to deal with risks and uncertainties in each phase of the project.
To investigate and assess key-risks in each phase of the project.
To suggest risk response for identified key-risks.
To implement and test the proposed framework using a real case which will demonstrate the benefit of the proposed framework.

III. REVIEW OF LITERATURE

There are several examples of research studies involving risk management in construction project in various forms and application which has practically been implemented as well. The projects as such or in parts have been articulated along with their pros and cones by various firms, organizations and authors. Some of such glimpses are highlighted in the following review components.

1. Amita Pawar et.al., (2017): Gaps and inconsistencies in the knowledge and treatment of construction and project risk are identified. The paper describes, on the basis of a questionnaire survey of general contractors and project management practices in Pune, the construction industry's perception of risk associated with its activities and the extent to which the industry uses risk analysis and management techniques. It concludes that risk management is essential to construction activities in minimizing losses and enhancing profitability. Construction risk is generally perceived as events that influence project objectives of cost, time and quality. Risk analysis and management in construction depend mainly on intuition, judgment and experience. Formal risk analysis and management techniques are rarely used due to a lack of knowledge and to doubts on the suitability of these techniques for construction

2. C. Borysowich (2008): Most organizations are aware that risks do not appear on a linear basis and for this reason risk cannot be identified and measured in this way. Assessing and understanding the interrelation of risk and their associated correlated impact is the real challenge. These complex relationships require a different set of tools. Through the use of tools to simulate multiple risk scenarios and correlating risk interdependencies the organization can begin to build an effective map of their risk landscape. The goal of study was to understand the cumulative impact of risks on performance and value in order to select the appropriate mix between risk retention and risk treatments.

3. Mehdi Ebrat et.al., (2013): Managers require a good understanding about the nature of risks involved in a construction project because the duration, quality, and budget of projects can be affected by these risks. Thus, the identification of risks and the determination of their priorities in every phase of the construction can assist project managers in planning and taking proper actions against those risks. Therefore, prioritizing risks via the risk factors can increase the reliability of success. In this research, first the risks involved in construction projects has been identified and arranged in a systematic hierarchical structure. Next, based on the obtained data an Adaptive Neuro-Fuzzy Inference System (ANFIS) has been designed for the evaluation of project risks. In addition, a stepwise regression model has also been designed and its results are compared with the results of ANFIS. The results show that the ANFIS models are more satisfactory in the assessment of construction projects risks.

IV. METHODOLOGY

Phase I - Identifying and structuring risk within Process Protocol Each Process Protocol phase is divided into sub-processes, activities that should be performed during the phase. A systematic analysis of the division helped identify and describe the key risks that appear in all construction projects, regardless of size or type.

Phase II - Developing a framework for managing risk in construction projects The results of Phase I and Phase II served as a foundation for developing a framework for managing risk in the construction project. The framework provides holistic risk assessment from Demonstrating the Need to Operation and Maintenance.After determining risk probability and risk impact, and thus also risk exposure, for each identified key risk or project related risk, a priority risk list is formed and, depending on risk acceptability, a strategy of risk response. If risk response leads to the appearance of new risks, a new cycle of identification, analysis and risk response begins.

Phase III - Application and Verification of the process-driven risk management framework The last

phase shows the application and verification of the proposed process-driven risk management framework using the PP-Risk computer programme developed in the preceding phase.

i) To successfully realise a project it is necessary to identify events that may cause unwanted effects, this means, to identify potential risk sources. Once a risk is identified, it is necessary to assess the probability that it will occur, risk probability, and to estimate the damage that it may cause to the project, risk impact. The concept of risk exposure as the product of risk probability and risk impact is introduced to enable the relative comparison of several risks within a project. The values of risk exposure are used to make a risk priority list and define the appropriate response to each risk depending on its exposure and position on the risk priority list. Risk response may produce new events that may adversely affect the project and which it is necessary to identify, analyse and anticipate the appropriate response. This is why the risk management process is by its nature cyclical, and why risk management is part of project management and cannot be viewed as a separate whole.

ii) RISKMAN is a risk-driven project methodology. However, even this methodology does not make an allowance for the fact that the construction‘s life cycle is a process and that risk management should be adapted to this process. Therefore, what is necessary is process-driven risk management.

iii) the Process in construction needs significant changes and continuous improvement. These changes and improvements are accompanied by risks that may have a detrimental effect on planned costs, project duration and project quality. Efficient risk management must enable changes in construction and contribute to quality improvement and greater efficiency.The framework for risk management in construction proposed in this work is based on process-driven risk management, which completely subordinates the risk management process to the construction process.

iv) To increase efficiency in the construction industry it is also necessary to develop and to continuously advance the group of activities needed for successful project realisation. Process Protocol I resulted in 10 phases through which the construction project passes in its evolution. High-level processes that have to be performed are identified in each phase. Process Protocol II proclaimed these high-level processes as Level I, and then proceeded to divide the Level I processes into Level II sub-processes, and these, in turn and if necessary, into Level III sub-processes. Thus the realisation of any construction project is broken up elementary processes. The processes on any level are potential risk sources and may serve as the basis for a risk list in each phase. The risk list in the proposed framework has a total of 49 risks, that is, an average of 5 risks per phase, to which project related risks can be added in each phase. This makes risk management part of a generic process leading to the development of process-driven risk management.

v) The priority list is created using the qualitative approach when there is no database about earlier projects to use for the probability distribution function and for determining risk probability. All the necessary indicators for the direct calculation of the consequences, that isthe impact that the risky event would have on time, cost or quality, are also missing. Three techniques are offered for qualitative risk analysis in the proposed framework: Multi-attribute Utility Theory, Fuzzy Analysis and Analytical Hierarchy Process (AHP). All the three are programmable and can be included in the corresponding software for decision-making support. A detailed analysis of all the three techniques shows that AHP is the most complete and most adaptable.

vi)The quantitative approach to forming the risk priority list implies that risk probability and risk impact can be explicitly calculated using one of the known quantitative methods of risk analysis. To do this the relevant database must be available to serve for forming the probability distribution, that is to enable the direct calculation of the impact on time, cost and quality.

Table 1: Result of risk analysis for Phase 1

Risk	Probability	Impact	Exposure	Acceptability
101	0.245	0.251	0.061	Acceptable
102	0.044	0.068	0.003	Negligible
103	0.043	0.076	0.003	Negligible
104	0.184	0.189	0.035	Acceptable
105	0.485	0.416	0.202	Undesirable

Table 2: Result of risk analysis for Phase 2

Risk	Probability	Impact	Exposure	Acceptability
201	0.144	0.126	0.018	Acceptable
202	0.289	0.251	0.073	Acceptable
203	0.213	0.162	0.034	Acceptable
204	0.073	0.120	0.009	Negligible
205	0.092	0.153	0.014	Acceptable
206	0.189	0.188	0.036	Acceptable

Table 3: Results of risk analysis for Phase 3

Risk	Probability	Impact	Exposure	Acceptability
301	0.204	0.171	0.035	Acceptable
302	0.384	0.406	0.156	Undesirable
303	0.224	0.259	0.058	Acceptable
304	0.069	0.042	0.003	Negligible
305	0.119	0.122	0.015	Acceptable

Table 4: Result of risk analysis for Phase 4

Risk	Probability	Impact	Exposure	Acceptability
401	0.141	0.134	0.019	Acceptable
402	0.237	0.172	0.041	Acceptable
403	0.136	0.145	0.020	Acceptable
404	0.412	0.342	0.141	Undesirable
405	0.074	0.207	0.015	Acceptable

VI. SUMMARY AND CONCLUSION

The author developed and verified a framework for risk management in construction projects, the development of the framework was preceded by systematic analysis of prior studies of risk management and construction process, which resulted in several conclusions that were used for developing the framework for risk management in construction:

Risk management is by nature a cyclical process. Risks must be identified before the beginning of project realisation or the realisation of any phase through which the project passes. The environment in which the project is realised produces new risks during project realisation. The new risks must be analysed together with those identified and analysed earlier, in a continuous attempt to assess the probability and adverse

effect of new risks in relation to existing ones. This creates the need for continuous risk management in all phases of project realisation.

The execution of a construction project is a process. The process in construction contains many special features in comparison with the process of other industries, which are an impediment for changes leading to process improvement. The risk that the project might unsuccessful is in fact the risk that particular elements in the construction process might be unsuccessful. Risk management should be subordinated to the construction process. This means that the approach to risk management in construction should be changed from riskdriven project management to process-driven risk management. Improving certain elements of risk management lead to better understanding and to changes, in other words, to improvement of the construction process, which is one of the main goals of the construction industry.

The Construction Process Protocol is by nature a generic process and is thus suitable for the construction process within which the framework for process-driven risk management will be situated. As a plan of work, Process Protocol enables managing the project from Demonstrating the Need to Operation and Maintenance regardless of the type, size and purpose of the project that is being realised. According to Process Protocol, every project can be executed through the successful execution of 10 phases grouped in 4 stages. Every phase contains so-called high-level processes as a group of activities that must be realised for the successful conclusion of that phase. High-level processes are broken down into sub-processes in as many levels as the Protocol user deems necessary for the project. The break down of the process in sub-processes provides a good foundation for identifying key risks that are independent of the project being realised. Sub-processes are potential risk sources so risk management in fact means ensuring the success of each sub-process within the entire construction process. Ensuring the successful execution of the construction process leads to process improvement, which gives additional weight to Process Protocol.

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EMPLOYEES SATISFACTIONAFTER MERGER AND ACQUISITION OF FINANCIAL INSTITUTIONS IN NEPAL

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A B S T R A C T

Background -*Merger and acquisition refer to the aspect of corporate strategy, corporate finance, and management dealing with the buying, selling, and the combination of another company that can help a growing company in a given industry to grow rapidly without having to create another business entity. Merger and acquisition can be threatening for employees and produce anxiety and stress. Patterns of emotional reactions experienced by employees have been identified during merger or acquisition.*

Purpose – *The purpose of the study is to examine the impact of merger and acquisition on employees' satisfaction in Nepal.*

Methodology – *Due to the specific nature of research objectives, descriptive-cum-analytical research design has been used.*
Findings – *Employees are satisfied after merger and acquisition of the Financial Institutions of Nepal.*

Keywords – *Merger and Acquisition, Working Condition, Employees Turnover, Job Stress and Employees Satisfaction*

Paper Type – *Research paper.*

Background of the Study

Mergers and acquisitions practice are increasing in the organizations to enhance their competitive advantages and expand their operations. Mergers and acquisitions are undertaken on the assumption that _the combined company will have greater value than the two companies alone' (Cartwright & Cooper, 1993). Merger is the operation by which two companies join together to form a single one. This enables the consolidation and increasing competitive capacity of enterprises. Furthermore, (Buono & Bowditch, 1989) explains a merger transaction is where both parties agree to combine their businesses, and for this purpose form a new company that issues shares which replace the shares of both businesses. Companies do pay considerable attention to human resource issues during merger and acquisitions beside financial and strategic issues. It is argued that problems of human resources and organizational culture should, however, be given a high priority, along with strategic issues, to increase the likelihood of a successful combination.

Historically, merger failures were only discussed with financial and strategic explanations. Recently there has been growing acceptance among researchers that the human dynamics or the human resource issues after and following the actual merger or acquisition of two or more organizations are significant

determinants of merger success or failure (Buono & Bowditch, 1989 and Cartwright & Cooper, 1993). Two reasons have been cited for the failure of merger & acquisitions with regards to human-resource issues or problems. First, the macro level is the issue of cultural compatibility between the merging organizations (Cartwright & Cooper, 1993). Second, a micro level is the role of individuals or employees in the merger process.

The Nepalese financial sector has witnessed a tremendous growth in the number of financial institutions after the 1980's by adopting an economic liberalization regulation with a mixed economic model. Today there are 28 commercial banks, 36 development banks, 25 finance companies and 39 insurance companies are there in Nepal (Economic Survey 2018).However, the unnatural increment of the Banking and Financial Institutions has brings several financial challenges and complexities. The financial indicator had indicated that the Nepalese financial sector was weak, vulnerable and at the verge of a collapse.Merger and acquisition are contemporary in the Banking and Financial Institutions of Nepal and will likely remain so for the next few years since the recent moves of NRB policies seems concerned about the mushrooming financial institutions. Monetary policy 2072/2073 that has increased the paid-up capital of Banking and Financial Institutions- 8 billion for commercial bank, 2.5 billion for development bank, and 800 million for finance companies, is a greater issue in the financial sector of Nepal.

Banking and Financial Institutions employees faced an uncertain future after the merger, as new policies were implemented. This resulted in some employee's even resisting change. The management of the BFIs should be focused on human side after merger and acquisitions to minimize the risk of the failure rates of merger and acquisitions.

Objectives of the Study

The main objectives of the study are

a. To examine the impact of merger and acquisition on employee's satisfaction.
b. To analyze different human resource issues with respect to merger and acquisition of Banking and Financial Institutions in Nepal.
c. To explore the effects of merger and acquisition to working condition, employees' turnover and job stress in Banking and Financial Institutions in Nepal.

Rationale of the Study

Merger and acquisitions are the emerging issue in Nepal. There are many reasons for doing merger and acquisition.

a. This study emphasizes on human resources management through the process of merger and acquisition.

b. In Nepal human resource issue seems to be neglected after merger and acquisition, so this study supports the improvement of results in the future.

c. Other researchers may also be benefited from this study; it may serve as a basis for more research in this area i.e. banking and financial or other sectors that involve in mergers.

d. The result also gives clear ideas to the different organizations about their employees' response, to improve their human resource policy and practices for retention of human capital after merger.

Methodology Used

This study follows both the descriptive and analytical research design. In this study, employee satisfaction is considered as the dependent variable and employee turnover, job stress and working environment are the independent variables.

Two commercial banks one from merger group i.e. NMB Bank Limited (merger with Pathibhara Bikas Bank, Bhrikuti Bikas Bank, Clean Energy Development Bank and Prudential Finance) and another from acquisition group i.e. Citizen Bank Limited (acquiesced Premier Finance, Nepal Housing & Merchant Finance and People Finance) have been taken as sample for the study. These organizations were selected on the basis of judgmental and convenient sampling methods.

Altogether 35 employees working in different departments in different levels have been selected judgmentally and in a convenient basis as respondents but priority has been given to include respondents from every financial institution involved in merger and acquisition process.

Primary data has been used in this study for finding the relationship between employee satisfaction and merger of the banking and financing sector. 39 structured questionnaires related to different variables were distributed to all the respondents for the study.

Questionnaires were then collected by personal visit to the each and every respondent of sample banks. The five-point Likert scale (with 5= strongly agree to 1 strongly disagree) has been used for each of the statement. Cronbach's alpha test has been done for reliability of data.

All collected data has been tabulated and essential statistical values like mean and standard deviation has been calculated to draw the inferences. Correlation and Regression analysis has been used in order to compare and analyze the relationship of the variables.

The data collected from the respondent are presented, analyzed and interpreted for attaining the objectives stated in the study

Table 1

Profile of respondents

Level	NMB Bank Limited			Citizen Bank Limited		
	Male	Female	Total	Male	Female	Total
Upper Level	6	4	10	5	4	9
Middle Level	6	6	12	7	5	12
Lower Level	7	6	13	8	6	14
Total	19	16	35	20	15	35

Source: Field survey 2018

Table 1, shows that number of male respondents is greater than the number of female respondents, i.e. 19 and 20 male respondents in NMB Bank and Citizen Bank respectively.

Higher numbers of male respondents have been seen on Lower Level i.e. 7 in NMB Bank & 8 in Citizen Bank. Lower numbers of female respondents i.e. 4 each from both banks have been in found in Higher Level.

Analysis and Findings

Working Environment after merger and acquisition

In this section altogether 12 questions were asked nine related to the working environment and three for employee satisfaction to the respondents of both banks

Table 2

a. NMB Bank Limited

Working Environment	Gender	Upper Level		Middle Level		Lower Level		Average Mean Value
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
Supervisor support and interaction with employees	Male	3.20	1.75	3.34	2.70	3.33	2.96	3.29
	Female	3.45	1.68	3.40	1.98	3.34	3.96	3.40
Satisfied remuneration and other benefits	Male	3.05	1.25	3.50	2.35	3.56	2.75	3.37
	Female	3.12	2.35	3.45	3.01	3.45	2.90	3.34
Enough logistics support for doing work	Male	3.67	0.75	3.55	3.25	3.22	3.21	3.48
	Female	3.50	0.96	3.25	2.95	3.42	2.97	3.39
	Average Mean Value							3.38
Employee Satisfaction	Male	3.32	2.35	3.25	2.89	3.52	2.02	3.36
	Female	3.45	3.21	3.12	2.90	3.35	2.05	3.31
Value of Cronbach's Alpha			0.69	Average Mean Value				3.285

Table 3

b. Citizen Bank Limited

Working Environment	Gender	Upper Level		Middle Level		Lower Level		Average Mean Value
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
Supervisor support and interaction with employees	Male	3.27	1.70	3.38	1.75	3.35	2.06	3.45
	Female	3.48	1.58	3.45	1.90	3.45	3.01	3.47
Satisfied remuneration and other benefits	Male	3.35	1.35	3.65	2.11	3.65	2.65	3.55
	Female	3.32	1.90	3.50	3.35	3.80	2.25	3.54
Enough logistics support for doing work	Male	3.47	2.75	3.35	2.95	3.62	3.20	3.48
	Female	3.35	2.85	3.45	2.85	3.47	2.35	3.43
Average Mean Value								3.49
Employee Satisfaction	Male	3.34	2.25	3.75	3.36	3.45	2.27	3.51
	Female	3.40	2.80	3.50	3.02	3.25	2.25	3.38
Value of Cronbach's Alpha			0.78		Average Mean Value			3.44

Table 2 and Table 3 show that mean value of overall working environment for both banks have been more than 3, i.e. 3.38 for NMB Bank and 3.49 for Citizen Bank.

Similarly, mean value of employee satisfaction is also more than 3 in both cases i.e. 3.49 and 3.44 for NMB Bank and Citizen Bank respectively.

Value Cronbach's Alpha has been 0.69 and 0.78 for questionnaires of working environment and employee satisfaction which is sufficient to explain the consistency of the questionnaire.

Supervisory support, satisfactory remuneration and enough logistic support indicates that working environment after merger has been satisfactory to the employee of both banks. Hence it is concluded that all levels employee either male or female of both banks have been satisfied after merger.

Employee Turnover after merger and acquisition

In this section altogether 12 questions were asked nine related to employees turnover and three for emplovee satisfaction to the respondents of both banks

Table 4

NMB Bank Limited

Employees Turnover	Gender	Upper Level		Middle Level		Lower Level		Average Mean Value
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
Opportunities for career growth in the banks	Male	3.35	1.60	3.18	1.55	3.25	2.12	3.26
	Female	3.49	1.52	3.15	1.95	3.35	2.05	3.33
Any humiliation / misbehave from the co-workers	Male	2.30	1.95	2.15	2.05	2.05	2.95	2.17
	Female	2.22	1.99	1.50	2.35	1.95	2.85	1.89
Bank's policy for retention of its employee	Male	3.25	2.25	3.25	3.05	3.66	2.27	3.39
	Female	3.15	2.35	3.40	2.95	3.78	2.85	3.43
Average Mean Value								2.92
Employee Satisfaction	Male	3.39	2.35	3.35	3.15	3.75	2.97	3.50
	Female	3.48	2.85	3.55	2.52	3.55	2.86	3.53
Value of Cronbach's Alpha			0.65		Average Mean Value			3.15

Table 5

Citizen Bank Limited

Employees Turnover	Gender	Upper Level		Middle Level		Lower Level		Average Mean Value
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
Opportunities for career growth in the banks	Male	3.15	2.10	3.28	2.55	3.35	2.22	3.26
	Female	3.14	2.12	3.45	2.25	3.25	2.15	3.28
Any humiliation / misbehave from the co-workers	Male	2.25	2.55	2.25	2.25	2.15	2.57	2.22
	Female	2.12	2.19	1.57	2.15	1.85	2.48	1.85
Bank's policy for retention of its employee	Male	3.35	2.45	3.26	3.02	3.47	2.32	3.36
	Female	3.45	2.55	3.42	2.25	3.27	2.55	3.38
	Average Mean Value							2.89
Employee Satisfaction	Male	3.30	2.49	3.37	3.05	3.37	2.37	3.35
	Female	3.42	2.39	3.58	2.47	3.35	2.26	3.45
Value of Cronbach's Alpha			0.72		Average Mean Value			3.40

Table 4 and Table 5 shows that mean value of employee turnover for both banks have been near to 3, i.e. 2.92 and 2.89 for NMB Bank and Citizen Bank respectively.

Similarly, mean value of employee satisfaction is also more than 3 in both banks i.e. 3.15 and 3.40 for NMB Bank and Citizen Bank respectively.

Value Cronbach's Alpha has been 0.65 and 0.72 for questionnaires of employee turnover and employee satisfaction which is sufficient to explain the consistency of the questionnaire.

Positive response on opportunity for career growth and bank's policy of retention of its employee indicates that employee turnover after merger has been low, which is also supported by below average value of humiliation and misbehave from the coworkers after merger. All levels employee either male or female of both banks have been satisfied after merger.

Job Stress after merger and acquisition

In this section altogether 15 questions were asked 12 related to job stress and three for employee satisfaction to the respondents of both banks

Table 6

NMB Bank Limited

Job Stress	Gender	Upper Level		Middle Level		Lower Level		Average Mean Value
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
Fear about losing job	Male	3.05	3.10	3.18	3.15	3.26	2.12	3.16
	Female	3.10	3.15	3.35	3.05	3.22	2.35	3.22
Working condition of banks i.e. problem in working with different groups	Male	3.20	3.65	3.25	2.75	3.15	2.50	3.20
	Female	3.12	3.29	3.50	2.67	3.65	2.42	3.42
Adoption of change	Male	3.25	3.12	3.65	3.12	3.42	2.38	3.43
	Female	3.15	3.155	3.48	2.75	3.47	2.35	3.37
Grievance handling mechanism	Male	3.32	3.19	3.35	3.12	3.49	2.32	3.39
	Female	3.32	3.27	3.50	3.47	3.45	2.33	3.42
	Average Mean Value							3.33
Employee Satisfaction	Male	3.17	3.10	3.25	3.25	3.55	2.86	3.32
	Female	3.16	2.92	3.25	3.45	3.65	2.95	3.35
Value of Cronbach's Alpha			0.83		Average Mean Value			3.34

Table 7

Citizen Bank Limited

Job Stress	Gender	Upper Level		Middle Level		Lower Level		Average Mean Value
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
	Male	3.11	2.90	3.19	2.85	3.36	2.82	3.22
Fear about losing job	Female	3.13	3.10	3.27	2.87	3.28	2.75	3.23
Working condition of banks i.e. problem in	Male	3.21	3.05	3.26	2.65	3.19	2.59	3.22
working with different groups	Female	3.22	3.22	3.47	2.66	3.55	2.52	3.41
	Male	3.23	3.02	3.35	3.02	3.29	2.36	3.29
Adoption of change	Female	3.25	3.17	3.38	2.99	3.27	2.39	3.30
	Male	3.22	3.12	3.45	3.07	3.18	2.41	3.28
Grievance handling mechanism	Female	3.27	3.22	3.60	3.28	3.20	2.45	3.36
	Average Mean Value							3.29
	Male	3.27	3.16	3.65	3.26	3.36	2.66	3.43
Employee Satisfaction	Female	3.26	2.85	3.63	2.89	3.54	2.49	3.48
Value of Cronbach's Alpha			0.86		Average Mean Value			3.46

Table 6 and Table 7 show that all employees either male or female of all levels have not felt job stress since the value of all have been more than 3. Value of working with other employees, fear of losing job, adoption of change and grievance handling mechanism have been more than 3 clearly support that employees of both banks have not feel any kind of job stress after merger and acquisition. Value of employees‘ satisfaction due to job stress after merger has been more than 3, i.e. 3.46 also indicates the satisfaction level of employees.

Value Cronbach's Alpha has been 0.83 and 0.86 which is sufficient to explain the consistency in the responses of for questionnaires of job stress and employee satisfaction.

Relationship between Employee Satisfaction with Working Environment, Employee Turnover and Job Stress

Correlation matrix and regression have been computed to assess the extent of relationship in between the variables of employees‘ satisfaction with working environment, employee turnover and job stress.

Table 8

Correlation among the study variables

	Employees Satisfaction	Working Environment	Employees Turnover	Job Stress
Employees’ Satisfaction	1			
Working Environment	.630**	1		
Employee Turnover	.325**	.352**	1	
Job Stress	.403**	.373**	.531**	1

Table 8 clearly shows that all the variables have been positively correlated to each other at 5% level of significance. Correlation between employee satisfaction and job stress & employee turnover has been low i.e. .403 and .325 indicate that job stress and employee turnover have lower impact on employees’ satisfaction after merger.

Regression among the variables

Table 9

Details	Working Environment	Employee Turnover	Job Stress
b (Coefficient)	2.126	1.102	2.253
R Square (%)	82.2	74.4	68.6
"t" Value	1.915	2..421	2.189
Significance	.002	0.025	0.115

On simple observation of table 9, it has been clear that there exists a positive relationship between Employee Satisfaction with Working Environment, Employee Turnover and Job Stress. About 68% to 82% of variance of employee satisfaction has been explained by job stress, employee turnover and working environment.

Conclusion

Merger and acquisitions significantly affect the performance and contribution of the employees. Therefore, banks should focus on providing better working environment, minimizing job stress and turnover rate of the employees to achieve better performance from their employees. Banks should identify the different factors of employee satisfaction after merger and acquisitions which has positive and negative impact on employee satisfaction. All the employees who are working in different banks are satisfied when they are exercising the authority, quality of work life and overall satisfaction with working environment. Employees of both banks i.e. NMB Bank Limited and Citizen Bank Limited are satisfied after merger and acquisition. The correlation among the working condition, employee turnover & job stress show positive relation with employee satisfaction. This shows that all the factors are equally responsible for the employee satisfaction after merger. This is also supported by the regression result giving the significant impact of worker condition, employees turnover and job stress on employee satisfaction after merger.

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OPTIMIZATION OF PROCESS PARAMETERS OF MILLING OPERATIONS USING VORTEX TUBE COOLING SYSTEM

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A B S T R A C T

The purpose of this work is to study and analyze the effectiveness of Vortex tube as a cooling system for milling operation. The vortex tube, also known as the Ranque-Hilsch vortex tube, is a mechanical device that separates a compressed gas into hot and cold streams. It is a simple and useful device without any moving parts, electrical or chemical power input or special equipments which produces desired cold or hot air economically. Use of vortex tube reduces the need for liquid coolant, which is messy, expensive, and environmentally hazardous. In this work surface finish of mild steel is compared after milling operation when dry machining is done without using any coolant and when cold air from vortex tube is used as a coolant in milling operation. It has been found that the _Cutting speed' and the _Feed' are the two major factors that significantly affect the surface finish and their optimum values were determined. Finally, the production trials were conducted with optimized process parameters value and other suggested countermeasures, it resulted in high surface finish and neat and clean machining environment.

Key words: *Milling, Coolant, Vortex tube, Surface Roughness*

INTRODUCTION

Metal cutting generates heat which influences the quality of a finished product, the force needed in cutting as well as limiting the life of the cutting tool. There are various attempts by researchers all over the world to understand the mechanism and theory behind the temperature built-up during machining in order to achieve optimized machining procedure and best workpiece results. Higher production rate with required quality and low cost is the basic principle in the competitive manufacturing industry. This is mainly achieved by using high cutting speed and feed rates. Nevertheless, elevated temperatures in the cutting zone under these conditions shorten tool life and adversely affect the dimensional accuracy and surface integrity of component. It is known that cutting fluids, when properly chosen and applied, are used to minimize problems associated with high temperature and high stresses at the cutting edge of the tool during machining because of the lubrication, cooling, and chip flushing functions of the fluids. Also, the effectiveness of fluids depends on their ability to penetrate the chip-tool interface and to form a thin layer in the shortest available time, either by chemical attack or by physical adsorption, with lower shear strength than the strength of the material in the interface.

VORTEX TUBE COOLING SYSTEM

The vortex tube, also known as the Ranque-Hilsch vortex tube, is a mechanical device that separates a compressed gas into hot and cold streams. Fig. 1.1 depicts the basic construction of a Ranque-Hilsch vortex tube in which the air emerging from the "hot" end can reach temperatures of 150° C, and the air emerging from the "cold end" can reach -30° C. It has no moving parts. Pressurized gas is injected tangentially into a swirl chamber and accelerated to a high rate of rotation. Due to the conical nozzle at the end of the tube, only the outer shell of the compressed gas is allowed to escape at that end. The remainder of the gas is forced to return in an inner vortex of reduced diameter within the outer vortex.

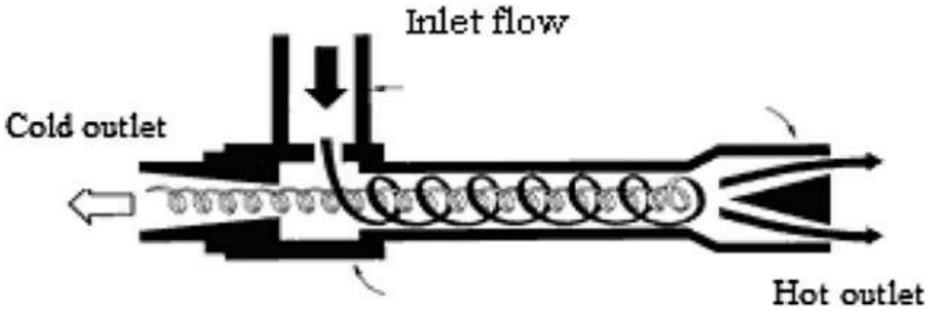

Fig 1.1 Vortex tube

SELECTION OF SIGNIFICANT PROCESS PARAMETERS OF MILLING

Milling is one of the important machining operations. In this operation the workpiece is fed against a rotating cylindrical tool. The rotating tool consists of multiple cutting edges (multipoint cutting tool).There are various process parameters in a milling operation. Some of them are very important which affects the output to a great extent and some are less important. Surface finish is mainly the result of process parameters such as tool geometry and cutting conditions (feed rate, cutting speed, depth of cut), but in addition there is also a great number of factors influencing surface roughness. The significant milling parameters which are primarily responsible for the surface finish was selected by studying the milling and previous research papers. The non significant process parameters were dropped and the significant parameters are selected for the further analysis and optimization. The four parameters, cutting speed, depth of cut, feed and type of coolant were found Table 1.1 displays the significant process parameters and their level.

TABLE 1.1: PROCESS PARAMETERS FOR MILLING OF MILD STEEL

Response Variable – Average surface roughness value

Process Parameters	Level 1	Level 2	Level 3	Level 4
Cutting speed (RPM)	400	500	600	700
Depth of cut (mm)	1	1.5	2	2.5
Feed (mm/rev)	0.5	1	1.5	2
Type of coolant	Limited to two levels (i) Dry machining and (ii) Using vortex tube as cooling system			

OPTIMIZATION OF PROCESS PARAMETERS USING TAGUCHI METHOD

Optimization of significant process parameters was done by using Taguchi method. In present study, an L16 orthogonal array was used. This array has fifteen degrees of freedom and it can handle three process parameters. Each milling parameter was assigned to a column and sixteen milling parameter combinations were tested. The four most significant process parameters, cutting speed, depth of cut, feed and type of coolant were selected and tried different combination of process parameter level. From the four significant parameters one process parameter i.e. type of coolant could not be divided into different levels, only two levels were taken. Once the experimentation was performed without any coolant i.e. dry machining and second variation involved was the case of machining with vortex tube cooling system. Hence the combinations of remaining three most process parameters were tried for different levels within the permissible range according to workpiece material characteristics and machinability. In this regard, brain-storming was done with the lab technician of the Neelkanth Institute of Technology, Meerut, (U.P) and industry personnel.

The main aim of the study was to reduce the surface roughness for which the ideal value is zero, the analysis was carried out by using MINITAB-17 statistical software in which the ratio was computed by using the smaller the better quality characteristics; n = [-10 log10 (mean of sum of squares of measured data)]. In the Taguchi method, the signal to noise ratio (S/N) was used as the data transformation method that consolidates the data for each control array row over the various noise levels into one value which computes both the mean and variation present in the data. The equations for calculating the signals to noise ratios were based on the characteristics of the response variables being evaluated; nominal the best, smaller the better and larger the better. In the present work the main objective was to reduce the surface roughness value. The surface roughness value for each trial was evaluated and the report generated was obtained from MINITAB-17 statistical software.

The S/N ratio was obtained using Taguchi‘s methodology. Here, the term _signal‘ represents the desirable value (Mean) and the _noise‘ represents the undesirable value (standard deviation). Thus, the S/N ratio represents the amount of variation presents in the characteristic. Here the desirable objective was to optimize the response variables Ra. Hence a smaller-the-better type S/N ratio was applied for transforming the raw data for surface roughness as smaller values of Ra was desirable.

Total sixteen experiments were conducted as suggested by L16 orthogonal array. Sixteen samples of mild steel of size 48 x 46 x5 mm were prepared. Each experiment was performed on a different mild steel sample of standard size. Surface roughness of each sample was measured using surface roughness tester.

Three values of surface roughness were recorded and average of these three values was taken for further analysis. The average values of surface roughness are tabulated in table 1.2.

TABLE 1.2: AVERAGE SURFACE ROUGHNESS VALUE OF TRIAL AND S/N RATIO

S. No.	Cutting speed in (RPM)	Depth of cut in (mm)	Feed in (mm/rev)	Average surface roughness R_a in (µin)	S/N Ratio
1	400	1	0.5	16.55	-24.3760
2	400	1.5	1	8.07	-18.1375
3	400	2	1.5	15.50	-23.8066
4	400	2.5	2	15.20	-23.6369
5	500	1	0.5	3.18	-0.256744
6	500	1.5	1	1.15	-1.21396
7	500	2	1.5	2.50	-7.95880
8	500	2.5	2	5.20	-14.3201
9	600	1	0.5	10.50	-20.4238
10	600	1.5	1	6.50	-7.95880
11	600	2	1.5	8.50	-18.5884
12	600	2.5	2	3.25	-10.2377
13	700	1	0.5	1.32	-2.41148
14	700	1.5	1	1.13	1.023
15	700	2	1.5	3.50	6.02060
16	700	2.5	2	1.50	-3.52183

FABRICATION OF VORTEX TUBE

Vortex tube was fabricated by using PVC pipes. Dimensions of each part were selected by studying various research papers related to the design of vortex tube. Fabrication detail of all parts is explained as follows:

I. Main Body

Main body of the vortex tube is the middle part of the tube as shown in the fig. 1.2. It is a PVC pipe of diameter 38 mm and length 70 mm. Inlet nozzle was fitted to this part which receives compressed air from the compressor.

II. Cold Tube

Cold tube is the short length tube on the right side of the main body. It is also a PVC pipe of diameter 25 mm and length 100 mm. One end of cold tube was fitted into the main body and other end was open and reduced to a size of 10 mm with a reducer as shown in fig. 1.2.

III. Hot Tube

Hot tube is the long tube on the left side of the main body. It is also a PVC pipe of diameter 25 mm and length 280 mm. One end of hot tube was fitted into the main body and in other end conical wooden valve was inserted as shown in fig. 1.2.

IV. Inlet Nozzle

Inlet nozzle is a very important part of the vortex tube which provides the required kinetic energy to the compressed air. In the given vortex tube inlet nozzle used, was a mild steel nozzle of 10 mm diameter. It was inserted into the main body of the vortex tube and leak sealant was applied on the joint to prevent leakage.

V. Conical Valve

Conical valve controls the flow of hot air from the hot tube. It was fabricated from a wooden piece of 30 mm diameter and 100 mm length. It was further machined to conical shape on a lathe machine. Angle of conical valve used at the hot end is 45°. This valve was adjustable at the hot end of the vortex tube.

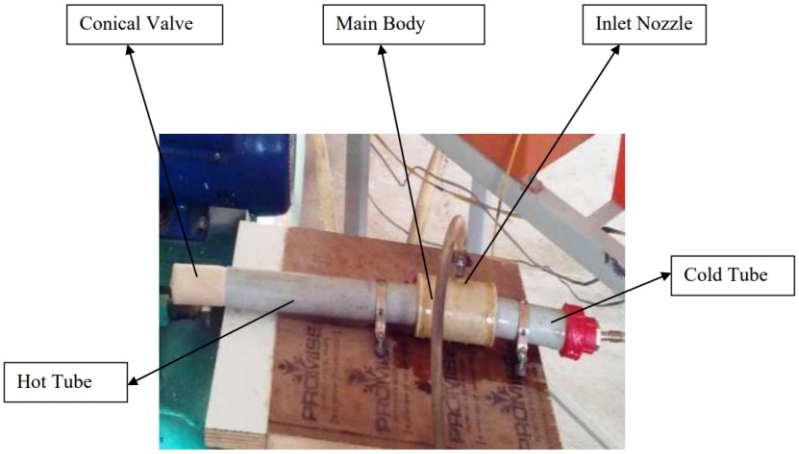

Fig 1.2 Fabrication of vortex tube

EXPERIMENTAL VALIDATION

Milling is a widely used manufacturing process in the industry. After deep study of all the factors it was observed that the major factors responsible for surface roughness of the productwere cutting speed, depth of cut, feed and type of coolant, amount of coolant used. The process parameters of milling using vortex tube as a cooling system were optimized to get a least value of average surface roughness. Taguchi Method was adopted for this specific purpose which had capabilities to design a set of experiments according to process parameters and their stages under the fixed tolerance limits.

COMPARISON OF SURFACE FINISH ON MILD STEEL SPECIMENS

Main objective of this work was to utilize vortex tube as a cooling system and to use cold air from the cold end of the vortex tube as coolant in milling operation. Milling operation was performed on mild steel specimens of dimensions 48 x 46 x 5 mm. milling machine with a horizontal arbor of 25 mm diameter was used for this work. Eight samples were taken from prepared standard size mild steel specimens and milling operation was carried out with optimized process parameters i.e. speed, depth of cut and feed. These samples were machined without using any coolant and with vortex tube cooling system. Surface roughness was measured using Surftest SJ-210 measuring instrument.

RESULTS AND DISCUSSION

The average value of S/N ratio for each level for each factor obtained is shown in Table 1.3. The table includes ranks based on delta statistics, which compare the relative magnitude of effects. The delta statistic is the highest minus the lowest average for each factor. Minitab assigns ranks based on delta values; rank 1 to the highest delta value, rank 2 to the second highest, and so on. The ranks indicate the relative importance of each factor to the response. The ranks and the delta values show that cutting speed has the maximum and the depth of cut has the minimum effect on surface roughness value.

TABLE 1.3: RESPONSE TABLE FOR SIGNAL TO NOISE RATIOS

[Smaller is better [-10*Log$_{10}$ (sum(Y**2)/n)]

Process Parameters	Level-1	Level-2	Level-3	Level-4	Δ (Max-min)	Rank
Cutting speed	-22.4892	-5.9374	-16.3770	0.0218	22.5111	1
Feed	-11.9250	-5.6528	-14.6376	-12.5664	8.9848	2
Depth of cut	-11.8670	-8.9024	-11.0833	-12.9291	4.0267	3

Fig. 1.3 shows the main effect plots for signal to noise ratio. These graphs show the variation of mean of S/N ratio with levels of selected process parameters. Plot of cutting speed shows that at minimum value of cutting speed in selected range i.e. 400 RPM, signal to noise ratio is also minimum. S/N ratio increases when speed increases from 400 to 500 RPM, because surface roughness value decreases when cutting speed increases during milling. S/N ratio decreases when speed increases from 500 to 600 RPM which means surface roughness value increases for this range of cutting speed. This increment in the surface roughness value was either due to the non homogeneous material or due to use of older milling machine.

S/N ratio again increases when speed increases from 600 to 700 RPM. Hence for cutting speed, the optimum value is 700 RPM as the S/N ratio is maximum at this speed. Plot of depth of cut shows that S/N ratio is minimum at maximum value of depth of cut in the selected range i.e. 2.5 mm because surface roughness increases when depth of cut increases. The optimum value of depth of cut for which S/N ratio has maximum value is 1.5 mm. Plot of feed shows that S/N ratio increases between 0.5 to 1 mm/rev and decreases afterword because excessive feed decreases the surface finish. For the parameter feed, the optimum value is 1 mm. Maximum value of S/N ratio indicates that particular parameter has maximum desirable effect on objective of the experimentation.

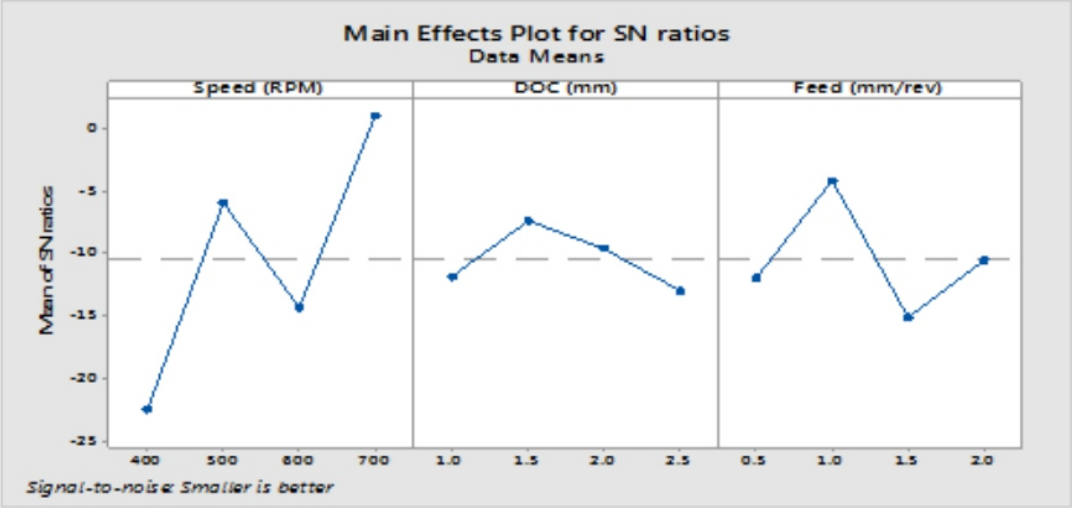

Fig 1.3 Main effects plot for S/N ratios

ANALYSIS OF VARIANCE

The analysis of variance (ANOVA) for S/N ratio was computed in order to identify the milling process parameters which significantly affect the surface roughness. The data for each factor was tested for F value to find significance of each factor. The Null hypothesis testing is valid when computed F value is less than standard F value and computed P value is higher than the standard P value, otherwise the factors significantly affect the quality characteristic. For the present experiment the standard F value is 19.00 and the standard P value is 0.05 for F distribution curve with 95% confidence level. It is evident from the Table 1.4 that:

The computed F values for the cutting speed (F value 56.3) and feed (F value 22.78) were higher than standard F(19.00) value and the computed P value was lower than the standard P value indicating that these were the factors that significantly affect the surface finish.

The computed F value for depth of cut (F value 1.32) was less than the standard F value thus the effect of this factor was found insignificant.

TABLE 1.4: ANALYSIS OF VARIANCE FOR S/N RATIOS

Source	DF	Seq SS	Adj SS	Adj MS	F	P
Cutting speed	3	1231.49	1231.49	410.497	56.39	0.000
Depth of cut	3	34.91	34.91	11.636	1.32	0.354
Feed	3	172.92	172.92	59.975	22.78	0.024
Error	6	53.09	53.09	8.848		
Total	15	1499.41				

Table 1.5 shows the significant factors and their corresponding values.

TABLE 1.5: SIGNIFICANT FACTORS AND THEIR VALUES

S. No.	Factors	Affecting variation	
		Contribution	Best level
1	Cutting speed,	Significant	700 RPM
2	Feed,	Significant	1 mm
3	Depth of cut,	Insignificant	_

CONFIRMATION TRIALS

The final step was to predict and verify the reduction in the average roughness value after implementing the suggested process parameters. The Taguchi method for design of experiment specifies that level of parameters which has the maximum S/N ratio as the optimum parameter. Therefore the level of process parameters which had the maximum S/N ratio was selected as the optimum process parameter for the final trial tests to verify. Table 1.6 and 1.7 shows the values of average surface roughness in case of no coolants and in case of vortex tube cooling system.

TABLE 1.6: CONFIRMATION TRIAL RESULTS FOR USING NO COOLANTS

S. No.	Cutting speed in (RPM)	Depth of cut in (mm)	Feed in (mm/rev)	Average surface roughness R_a in (µin)
1	700	1.5	1	2.54
2	700	1.5	1	3.30
3	700	1.5	1	1.80
4	700	1.5	1	2.70
5	700	1.5	1	3.65
6	700	1.5	1	2.80
7	700	1.5	1	5.15
8	700	1.5	1	2.51

TABLE 1.7: CONFIRMATION TRIAL RESULTS FOR VORTEX TUBE COOLING

S. No.	Cutting speed in (RPM)	Depth of cut in (mm)	Feed in (mm/rev)	Average surface roughness R_a in (µin)
1	700	1.5	1	1.23
2	700	1.5	1	1.30
3	700	1.5	1	1.35
4	700	1.5	1	1.70
5	700	1.5	1	1.13
6	700	1.5	1	**1.03**
7	700	1.5	1	1.05
8	700	1.5	1	1.41

The Average value of surface roughness obtained in eight trials for the case of without using any coolant during milling operation is 3.056 µin. Whereas the average value of surface roughness obtained in eight trials for the case in using vortex tube cooling system during milling operation is 1.275 µin.

The percentage reduction in surface roughness by using vortex tube cooling system is calculated as 58.27%.

CONCLUSIONS

In the present work, experimental investigations of milling operation were carried out to obtain an improved quality surface finish by using vortex tube as a cooling system. The following conclusions are drawn from the present investigation:

It is concluded that vortex tube can be utilized as a cooling medium in the milling operation. Fabrication of vortex tube was made possible by PVC pipes.

The temperature difference between hot end and cold end of the vortex tube was recorded as 12.6 °C.

It is concluded that cutting speed and feed are major factors that significantly affect the surface roughness of the mild steel during the milling operation. The other factor, Depth of cut is found to be insignificant. It is concluded that optimum value for cutting speed is found to be 700 RPM and for feed it is 1mm/rev.

Percentage reduction in surface roughness by using vortex tube cooling system is calculated as 58.27%.

Vortex tube cooling serves as a neat and clean coolant for milling operation and gives a pollution free machining operation with a good surface finish.

LIMITATIONS OF THE PRESENT WORK

Although an optimum experimental work has been done to investigate the application of vortex tube as a cooling system for milling operation but still there are some limitations of present work. While carrying out the present work, the following limitations were encountered.

Temperature of the cold air used as coolant during milling operation can not be decreased much.

The experiment was conducted on the semi automatic milling machine available in the lab of Neelkanth Institute of Technology, Meerut, (U.P).

Cold air jet from vortex tube was directed toward tool workpiece interface manually due to which quality of surface finish was reduced in some experiments.

Conical valve at the hot end side of the vortex tube was also operated manually which caused some disturbance in the value of cold air temperature.

SCOPE FOR FUTURE WORK

The following research areas are recommended to be undertaken for obtaining minimum surface

roughness in milling operation.

Study need to be conducted to obtain the minimum temperature at the cold end of the vortex tube.

Study need to be conducted for fabrication of the vortex tube from different type of materials.

Study need to be conducted for more levels of the milling process parameters.

Study need to be conducted for different angles of conical valve.

Study need to be conducted for automatic movement of the conical valve during operation.

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STUDY ON THE COMPRESSIVE STRENGTH OF SELF-COMPACTING CONCRETE WITH PERCENTAGE REPLACEMENT OF CEMENT WITH GROUND GRANULATED BLAST FURNACE SLAG

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A B S T R A C T

In the last few years, the use of Self Compacting Concrete (SCC) is increasing and there has been a lot of research and amendments to produce self compacting concrete, which have the desired characteristics. In the form of raw materials in concrete, there is a current trend around the world to treat and treat untreated industrial by household wastes etc. Not only do they help reuse waste products, but also create a clean and green environment. The current study focuses on the use of ground granular blast furnace slag (GGBS) as partial replacement of fine aggregate and cement respectively in SCC. In this paper, experimental study is done on fresh and rigorous properties such as the ability to flow, ability to pass, the compressible strength of the M50 grade of the SCC. In this investigation, SCC made with partial change with granite sludge with GGBS and cement. Five mixes with different percentages of Granite Sludge (0%, 5%, 10%, 15% and 20%) as partial replacement for cement (0%, 10%, 20%, 30% and 40%) of GGBS as partial replacement for fine aggregate (M-sand) is considered. Functional and rigid test are conducted for each mixture respectively. Examination results for strict quality are done in 7, 28 days respectively. The purpose of this research is to know the behavior and mechanical properties of self compacting concrete after connecting industrial wastes in different proportions by a test such compressive strength. The results obtained are discussed and the conclusion is finally concluded accordingly.

Keywords—*SCC, GGBS, Granite Sludge, Compressive strength.*

INTRODUCTION

The improvement of new innovation in physics is moving forward quickly. In the recent three decades, a great deal of research worldwide has been completed to increase the performance of self compacting concrete, as far as strength and durability are concerned. Consequently concrete is no longer a building material containing cement, composite and water, although the construction industry has changed into a specially adapted material with some new components to meet the special needs. In the SCC, focused on the use of granite mud and GGBS respectively, which is in the form of a fine aggregate (M-sand) and partial replacement of cement. Self-Compacting Concrete (SCC) is a streaming concrete mix that can be consolidated under its special weight. The extremely liquid nature of the SCC makes it suitable for keeping it in difficult conditions and in the section with overcrowded reinforcement. The use of SCC can also help in narrowing the loss related to hearing on the workplace incited by concrete vibrations. Another advantage of SCC is that the time needed to keep the larger section is widely used. Convergent convergence in limited areas, where consolidation can not be appropriate. For example, repairs of the

base sides of columns, girders and slabs often require limited and difficult filling to achieve access points. To encourage concrete placement and to ensure stability, the SCC can be used in various categories, including filling complex formwork and casting of tunnel lining sections with limited access to consolidation. Due to industrialization, there is heavy use of granite waste, GGBS etc. and there are industrial wastes and this creates a threat to the environment, hence the cost of the structure is reduced. Similarly to make the structure more sustainable, the issue of this material is reduced.

The purpose of this researchThis research has been started so that it can be utilized for subsequent efforts to create the effort made.

a) To study the properties of self compacting concrete.
b) Made by GGBS to replace cement by granite mud and M-sand.
c) Finding new and rigid properties of SCC by different methods.
d) Studying comparisons

Literature Review Now the one-day concrete is around the accepted and most used construction material. Essentially concrete cement, fine aggregate, thick aggregate, water is made and in addition there is some time with the increase of mineral and chemical mixture. Due to the increase in development, the demand for concrete is increasing and at the same time the access to various components of cement and concrete can be ended. It may be less than the use of industrial by products as a replacement material, which will not affect the properties of concrete. Previous research has argued that the use of granite waste and GGBS produces mechanical properties of concrete and apart from this, the expansion of these materials in self-compacting concrete will not change the properties further. In [1,2,3] Dosages of superplasticizers used for mixing, packing, combing water, and additions are key points affecting SCC properties. Thus, he proposed another mix design method for self-compacting concrete. Finally Nan Su method could be used to produce effectively SCC of high quality. Compared with the other technique created by the Japanese Ready-Mixed Concrete Association (JRMCA), this method is less complex, easier for implementation and less time-consuming, requires a smaller amount of binders and saves cost. From [4, 5, 6, 7, and 8] Maximum 20% partial replacement of cement with granite waste has expanded the quality parameters of self compacting concrete. In [9, 10, 11, 12] The correct aggregate has been changed to 30% with GGBS. It has been found that compressive strength, tensile strength and flexure power increment have been divided with increasing the replacement rate of fine aggregates with GGBS. Concrete is to be kept 0%, 5%, 10%, 15% and 20% for the same, and the fine gross is replaced by GGBS as 0%, 10%, 20%, 30% and 40%.

Cement

Cement may be defined as the binding material posses binding property which helps in combining with other inert material to form a dense assembly.

Corporal properties

Cement is generally characterized according to its corporal properties for aiming quality control. Corporal properties of cement are accustomed to differentiate and to analogize the various cements.
Following are the various corporal properties of cement

Time of setting
Soundness
Fineness
Strength

Composition of Portland Pozzolona Cement

The major ingredients of PPC are as follows.

Calcium
Alumina
Silica
Iron

Calcium is generally obtained from limestone, marl or chalk. While silica, alumina and iron come from sand, clays and iron ores.

Contents	Percentages
CaO	60 – 67
SiO_2	17 – 25
Al_2O_3	3 – 8
SO_3	2 - 3.5
Alkalis	0.3 – 1.2
MgO	0.5 - 6
Fe_2O_3	0.5 – 6

Table1: Percentage of materials present in cement

The major compound generally form after the addition of water in cement known as Bogus Compounds are as follows

Tri calcium Aluminate (C3A)

Tetra Calcium Alumino Ferrate (C4AF)

Tri Calcium Silicate (C3S)

Di Calcium Silicate (C2S)

Setting and Hardening

When water is assorted with Pozzolona Cement, The various ingredient of cement undergoes a chain of chemical reactions which causes it to harden. This process of chemical reaction is known as hydration process and heat generates from these reaction is known as heat of hydration. These chemical reactions give some compounds which are known as BOUGs compound responsible for the properties of cement. These compounds plays an important role in the hardening of cement are described as follows as per their formation

Tri calcium Aluminates (C3A) – This compound form after the addition of water in cement within 24 hours. This compound generates maximum hydration‘s heat and accountable for the precociously strength of cement.

Tetra calcium Alumino ferrite (C4AF) – This compound also forms after the addition of water in cement within 24 hours but after the configuration of C3A.This compound contributes very little amount of energy in the cement.

Tri calcium silicate (C3S) - This compound gives major contribution in hydration‘s heat also accountable for precociously strength of cement.

Di calcium silicate (C2S)- This compound forms after one year of addition of water in cement. This compound is responsible for the progressive strength of cement. This compound generates least heat of hydration.

Grounded Granulated Blast -furnace Slag

The grounded granulated blast furnace slag (GGBS) is a by- product produced from iron factory during formation of iron. Iron ore, coke and lime stone through in blast furnace and treated at temperature 1400 °C to 1600°C than it flowing on the top of molten iron in the form of fane. When the metallurgical smelting technique is complete, the lime in the flux has been chemically combined with the aluminates and silicates of the ore and coke ash to form a non-metallic product called blast furnace slag.

During the period of cooling and hardening from its molten state, blast furnace slag can be cooled in several ways to form any of several types of Blast furnace slag products. Its chemical composition is nearer to the chemical composition of cement that because it can be used in cement concrete.

Granulated Slag

Granulated slag is rapidly cooled by large quantities of water to produce a sand-like granule that is primarily ground into a cement commonly known as GGBS (Ground Granulated Blast Furnace Slag), or Type S slag cement. It is additionally mixed with Portland cement clinker to create a homogenized Type IS cement.

The important element of blast furnace scum are CaO (30-50%), SiO2 (28-38%), Al2O3 (8-24%), and MgO (1-18%). On increasing the CaO content of the slag compressive strength is increased. The MgO and Al2O3 content show the similar trend up to respectively 10-12% and 14%, beyond which no further improvement can be obtained. This chemical composition is nearer to the chemical composition of cement that because it can be used as a binder material and also used in concrete by replacing the by weight of cement.

Tests on GGBS

Standard consistency- The motive of this experiment figure out the water contents demanded to produce a GGBS standard consistency paste.
Accoutrements - vicat Accoutrement, ―Mixing trowel conforming the requirement of IS: 10086-1982‖.
Procedure: -

Weight approximately 400mg of GGBS and mix it with a weighed quantity of water, i.e- 10% to 25% % weight of GGBS. The time of mixing should vary between 5 to 7 minutes.

Brim the vicat's mould with paste and level it with the help of trowel.

Loser the plunger smoothly till it hold the GGBS surface.

Uncork the plunger and permit it to penetrate into the paste.

Note the interpretation on the guage.

Repeat the above procedure taking fresh samples of GGBS and different quantities of water until the reading on the guage is 5 to 7 mm.

Observations and calculations:

Weight of GGBS taken = 400 g

Quantity of water added to cement = 60 ml or g

Standard Consistency =(Quantity of water 5-7 mm penetration / weight of cement) * 100 = (60/400)100 =15%

Initial percentage of water added to GGBS – 15%

—Earliest and final setting time‖

Aim: To calculate the earliest and final sating time.

Accoutrements - vicat_s Accoutrements, Mixing trowel meeting the requirement of —IS: 10086-1982‖.

Procedure:

Groom a GGBS paste by mixing the GGBS owing to 0.875 time of water demanded for making a —standard consistent paste‖.

—Threshold a stop-watch at the instance ai which water is added to the GGBS‖.

The properly mixed cement mortar is filled in the mould completely, the mould is resting on a plate which is non porous and smooth plate making a level with the top of the model.

Observations and calculations:

—Weight of GGBS taken = 400 g‖

Quantity of water added to GGBS= 0.875*Quantity of water required for standard consistency.

= 0.875*60 = 52.5g

Result:

—Initial setting time: 115 minutes‖

—Final setting time: 11.5 hours‖

FinenessAim: Determine the fineness of GGBS by dry sieving.

Accoutrements: Ninety µm IS Sieve , Balance capable of deliberation of ten g to the closet ten mg , A pure bristle brush, ideally with 25 to 40 mm.

Procedure:

GGBS sample of about 100 gm was taken and represented by w 1.

Put the sample on —I.S sieve no. 9‖

Air set lump in the sample was remove with the help of fingers.

Sieving was done by the both the hands and sieves with usually rise without sipping the GGBS and keeping GGBS will spread on the screen carried out circular motion of sieve of the period for 15 min.

The residual left on the sieve was limpid and weight of residual is represented as w2

Result: —the percentage of residual GGBS sample by dry sieve 3.63 % it has less than 10% by weight.‖

Test on Aggregates

Specific gravity of coarse aggregate

Aim: The motive of this experiment is to figure out the specific gravity of coarse aggregate passing 4.74 mm IS sieve by pycnometer.

Material & equipment:

Pycnometer of about 900ml capacity, with a conical brass cap and screwed at it top,Deaired, distilled water, Glass rod

Procedure:

- Pycnometer is cleaned and dried properly. Figure out the pyconometer mass (M1).
- Oven-dried coarse aggregate of weight 200 to 400 gm and keep it in the pycnometer, calculate the mass of the pycnometer plus soil (M2)
- Fill the pycnometer to half of its height with distilled water and blend it thoroughly with glass rod. Add more water and stir it. Replace the screw top and fill the pycnometer flush with hole in the conical cap. Dry the pycnometer from outside, and find the mass (M3).
- Empty the pycnometer , clean it and fill it distilled water to the hole of the conical cap and find the mass (M4).
- **Calculations:**

The specific gravity (G) is calculated by

"G = (M2-M1) / (M2-M1)-(M3-M4)" = (919-652) / (919-652) – (1641 – 1473)

G=2.67

Calculations:

G= (881-652) / (881-652) – (1614 – 1474)

G= 2.58

Results:

"Specific gravity of fine aggregate = 2.58"

"Specific gravity of coarse aggregate = 2.6"

"Sieve analysis"-

- The particle size distribution of coarse aggregate and fine aggregate can be figure out by using the sieve analysis. This can be achieved by sieving the aggregate as per IS: 2386 (PART 1) – 1963. In this experiment we have a tendency to "use different sieves as standardized by the IS code and then pass aggregate through them and so collect different sized particles left over different sieves."
- A set of IS sieve of size _- 80mm,63mm, 50mm,40mm,31.5mm,25mm,20mm, 16mm,12.5mm,10mm,6.3mm,4.75mm,3.35mm,2.36mm,1.18mm,600µm,300 µm,150 µm and 75 µm.
- Balance or scale with an accuracy to measure 0.1 present of the weight of the test sample.s

Sieve analysis for coarse aggregate-

Analysis of particle using sieve is done for determining the size of particles in coarse aggregate

Aim: To determine the particle size distribution

Apparatus used:

A brood of IS sieve of size – 40mm, 20mm, 16mm, 10mm, 4.5mm, 2.36mm.

Preceding

- **"**Dried the test sample up to a constant weight at a temperature of 110 +5 degree centigrade and weighted"
- Sieve the sample.
- Weight the sample of the material retained on each sieve after completion of sieving.
- "Cumulative weight passing through each sieve is calculated as a percentage of total sample weight"

Observation;

Total weight of coarse aggregate = 2000 gm

Preceding to adjudicate the distribution of particle size of aggregate:

- "The test sample is dried to a constant weight at a temperature of 110 + 5 degree centigrade and weighted.
- The sample is sieved by using a set of IS sieves.
- On completion of sieving, the material on each sieve is weighted.
- Cumulative weight passing through each sieve is calculated as percentage of total weight.
- Fineness modulus is obtained by adding cumulative % of aggregates retained on each sieve and dividing the sum by 100."

Water absorption coarse aggregate-

This experiment gives aid to adjudicate the absorption of coarse aggregate as per "IS: 2386 (Part 3)-1963". For this check a sample should not less than 2000g ought to be used. The apparatus used for this test are -

"Wire basket – perforated, electroplated or plastic coated with wire hangers for suspending it from the balance, Water –tight container for suspending the basket, Dry soft absorbent cloth – 75 cm x 45cm (2 nos), shallow tray of minimum 650 sq.cm area, air-tight container of a capacity similar to the basket and oven."

Procedure:

- The sample should be thoroughly washed to remove finer particle and dust, drained and then placed in the wire and immersed in water at a temperature between 22 to 32 °C.
- After immersion, the entrapped air should be removed by lifting the basket and allowing it to drop 25 time in 20 second .the basket and sample should remain immersed for a amount of more than twenty four hours afterwards .
- The basket and aggregate should than be removed from the water, allow to drain for a few minutes, after which the aggregate should be gently emptied from the basket on to one of the dry cloth when they would remove no further moisture. The should be spread on the second cloths and exposed to the atmosphere away from direct sun light till it appear to be completely surface dry. They should be weighted (weight A).

- The aggregate should then place in an oven at a temperature of 100 to 110 °C for 24 hrs. It should than be removed from the oven, cooled and weighted. (Weight B).

Formula used in water absorption = [(A – B)/B] X100%

Two such test should be done and mean result should be repoted.

For performing this experiment the amount of sample should not be less than 2000gm.

Calculation:

A=3200gm

B=3182 gm

Water absorption = [(3200-3182)/3182] X100

=0.53

Result = 0.53

Fineness modulus of coarse aggregate-

Procedure:

"Fineness modulus is obtained by adding cumulative proportion of fine aggregates retained on every sieve and dividing the sum by hundred."

Calculation

Fineness modulus= sum of cumulative % Wt retained (table 7) /100

= 385.3/100

= 3.85

Result: = 3.85

ConclusionBased on the results of this study, the following conclusions are drawna) Due to industrialization, large quantities of granite sludge and GGBS are produced and vandalism is produced. To reduce the cost of construction of these wastes which threaten the environment, the structure can be effectively incorporated in the concrete to make the structure more sustainable.

b) Increased percentage of granite sludge and GGBS waste reduces compression strength of concrete.

c) It is seen that the density is directly proportional to the force, as the increase of the density increases, the strength increases, as the density decreases, the strength also decreases.

d) To calculate the earliest and final sating time is- ―Initial setting time: 115 minutes‖ and ―Final setting time: 11.5 hours‖

e) The fineness of GGBS by dry sieving is ―the percentage of residual GGBS sample by dry sieve 3.63 % it has less than 10% by weight.‖

f) The motive of this experiment is to figure out the specific gravity of coarse aggregate passing 4.74 mm IS sieve by pycnometer. ―Specific gravity of fine aggregate = 2.58‖ and ―Specific gravity of coarse aggregate = 2.6‖

g) Water absorption coarse aggregate is 0.53.

h) Fineness modulus of coarse aggregate is 3.85.

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FINANCIAL INCLUSION AND DEVELOPMENT IN ORDER TO DEVELOP SUITABLE MARKETING TRATEGIES IN INDIA

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A B S T R A C T

According to Global Findx (2014 statistics), two billion people in the world do not use formal financial services Besides, seventy five percent are poor people Bank, out of which forty percent are from the poorest homes in developing countries. Women in developing countries are less than twenty percent of men deposits account and seventeen percent less likely to borrow from formal financial institution the costs of account, distance travel, infrastructure facilities, and the opening of the account are often seen in some reasons. Government of India has created an ambitious strategy for financial inclusion as part of its development plan with the support of the technology-enabled branchless banking has been successful in expanding the drive about 60 percent of Indian population in terms of banking. However, some evidence suggests that most bank accounts are not being used or not access, especially not by the poor, are the goals of financial inclusion. Like this, the researcher is interested in examining the causes of such low use formal financial services are also willing to measure researcher financial the ability of the persons with the given respondents. Most Indian homes lack access to basic formal financial services. It leaves large part of India's high personal savings have been invested in physical assets and a large part of its borrowing went into the informal credit market. Formal saving generally cheaper and more easily available accounts are expected to be more and more savings accounts utilize more savings. Thus, the researcher is to know whether or not interested in the cost of formal savings transaction costs these costs help explain the less use of financial services. With the identification of the reasons for the use of formal financial services, financial capability and cost of transaction of financial services; Interested by researcher suggest marketing strategies for financial products to increase financial inclusion in India.

Keywords- *Financial inclusion in india, overveiw, its importance, marketing strategies etc.*

Introduction

As defined by the United Nations, financial inclusion is a financial sector that provides access to savings and payment services to all the bankable people and firms and loans for all. It is not necessary for the inclusive finance that every person is eligible to use every services, but should be able to choose them if desired. 'Money transfer and insurance to poor and low income families and their micro enterprises.' Dr. C. The Committee on Financial Inclusion under the chairmanship of Rangarajan has defined financial inclusion asthe process of ensuring access to financial services and timely and adequate credit where weaker sections such as weaker groups and the need for low-income groups at an affordable cost.

However, Dr. Raghuram ji Under the chairmanship of Rajan, the committee on financial reforms, widely defined financial inclusion as a financial universal access to a wide range of financial services at a

a reasonable price. These include not only banking products, but other financial services like insurance and equity products. Financial inclusion is a basic requirement of the Government of India. The goal of financial inclusion in India is to draw financial services adequately to open their own growth potential, unless there is no service population. In addition, target efforts towards greater widespread development by accessing funding especially to the poor.

Financial inclusion in India has become a cliche although people are still untouched by unprecedented initiatives. There is apathy towards the implementation of financial inclusion for the sole reason that nobody is aware of the ideal path. It is fundamental to know that the objectives behind the population are adequate to be economically taboo. There are 203 million households in India, out of which 147 million are in rural areas. In this vast piece of population, only three types of financial items, direct credit offices, required sprawling records or a settled store, and entry to safety. Only 48 percent of India's population is enrolled in these basic financial services, 59 percent in Sri Lanka and 63 percent in Korea. The poorer meeting spends the highest level of salary on nutrition for about 60 to 90 percent. Any reduction in earnings or additional expenditure is an immediate result on family welfare.

Poverty is more than the absence of cash only. This includes lack of access to resources and means through which poor can increase their life. To avoid the formal structure has been reputed as one of the obstacles in the world without progressively destruction. In many developing countries, the financial institution does not have a large share of family units. This avoidance does not really mean that poor people need dynamic financial life: if told, in reality, the delicacy of their situation has led to the improvement of advanced casual financial instruments.

The use of only contingent means means that the poor are bound by their ability, reimburse the responsibilities, and maintain the trust in the risk of reliably. At macroeconomic level, this financial inevitability on the poor can reduce monetary growth and fuel imbalance. Finding creative models to provide financial services to the poor has now changed into an earnest examination. Therefore, this study is expected to facilitate marketing strategies for financial products to highlight and enhance specific aspects of financial inclusion.

Importance of Financial Inclusion in India

In India, policy makers are basically focusing on the financial inclusion of rural and semi-rural areas for the needs of three most important pressures:

a) To build a platform for habit to save money: Emasus of low wages is basically living under a consistent shadow of financial weight in view of non-arrangement of investment funds.
b) To provide formal loan assistance: Generally unaffiliated persons need to rely on casual channels of credit in the form of helplessly as family, companions and moneylenders. Access to sufficient and simple credit to formally manage an account channels can lead to a sense of public entrepreneurship to grow and flourish in India.
c) To prevent interruptions and leaks in public subsidies and welfare programs: A generous measure of schematic cash for the poor people does not actually contact them. Although this property gives the air through adequate arrangements of the government organization, it is widely accepted for release and can not receive the requisite meetings. Accordingly, the government is pushing for the exchange of direct money for the distribution of its money, but is financing the goods and is paying the money.

Literature review

Franklin Allen, Real Demerk-Family, Liora Clapper and Maria Soled Martinez Periya (2016) defined financial inclusion as 'use of formal accounts-can bring many benefits to individuals'. The authors examine individual and nation characteristics related to financial inclusion. Among the systems which are powerful are prohibited: poor, pastoral, women or young people Manufacturers find that financial inclusion is associated with less account costs, more prominent proximity to financial middle people, more frozen legal rights, and more politically stable situations. As it may be, the creators recommend the achievement of strategies to include advance, it is believed that it depends on the quality of the people.

Regarding measuring financial inclusions around the world from the Global Deluxe Database 2014, the Real Demirigu-Véron, Leora F. Clapper, Dorothea Singer and Peter van Odyssen (2015) presented important comments. The database showed that 62 percent of the world's adults account with a bank or some type of financial institution or with mobile money providers. Apart from this, information shows that Colossel Open Doors remain to increase financial inclusion among women and poor people. As indicated by the database, governments and private parties can consider increasing the wages to be an important and the government goes into accounts with money. There are also large scopes for promoting greater access to accounts, which allow those who already have the most to benefit fully from financial inclusion.

Diego Anzoategui, Asli Demirgüç-Kunt and María Soledad Martínez Pería (2014), examined the effect of the dispatch on financial inclusion. The study examined the effect of the settlement of families on the use of investment funds and credit instruments from the formal financial foundation. The findings of the

study have shown that even though remittances have a positive impact on financial inclusion by encouraging the use of deposit accounts, but they do not have a significant and strong impact on demand and utilization of loans from formal institutions.

Asli Demirukk-Kara, Liora Clapper and Douglas Randall (2014) discovered the use and demand of formal financial services among self-identified Muslim adults. The findings of the review revealed that after formalizing the Muslims as a whole more personal and national-level properties than non-Muslims, there is a formal record or extra space in a formal financial organization. However, there is no indication from the investigation that investigation is more inappropriate than Muslim non-Muslims for formal or incidental reports.

Jayati Ghosh (2013), reviewed the literature based on microfinance in Andhra Pradesh in India and examined the microfinance crisis. It has been estimated in the review that microfinance can not be seen as a recession of the silver to improve and microfinance institutions with profit-making systems are risky. Apart from this, the study has suggested the need for regulatory measures and other strategies for the viable financial inclusion of the poor.

Working Paper by Adele Atkinson and Flore-Anne Messi (2013), titled 'Promote Financial Inclusion through Financial Education', showed that low levels of financial inclusion are linked to low levels of financial literacy. Based on the review of the approach, the challenges and solutions faced in the study were highlighted, and the possible ways were discussed.

C. Paramasivan and V. Ganeshkumar (2013) has presented an overview of financial inclusion in India. According to the study, proper mechanisms with resources will promote inclusive growth. Studies have shown that financial inclusion, which is an innovative concept, will promote the banking habits of rural people in India.

Terry Friedline (2012), examined the role of parents in saving financial benefits and opportunities for financial inclusion. The findings of the study showed that savings for parents of their children are important in low-to-middle and high-income household types. It has been suggested in the study that the purpose of inclusion of children in savings can help in reducing the transfer of financial benefits.

Marcus Taylor (2012) studied the problems which underline / exclude and underline the duplication of formal / informal finance. The study had major contradictions within the means of commercial microfinance discourses and practices. Apart from this, its correlated perception of inadequacy of

financial inclusion and smooth consumption of smooth in the study was demonstrated. '

Mandira Sarma (2012), has attempted to fill the comprehensive measurement literature gap which can be used to measure the extent of financial inclusion in economies by using the index of financial inclusion (IFI). According to the author, the proposed index satisfies the mathematical properties and it is easy to calculate and is comparable to the countries over time.

Michael U. Klein and Colin Mayer (2011) examined mobile banking and financial inclusion from a regulatory perspective. In this letter, the competing policy and inter-subject issues were discussed. The findings of the study showed that mobile banking provides important lessons for the purpose of financial regulation, which usually develops alongside developed economies.

Marketing Strategies to Enhance Financial Inclusion

To succeed in the mission of financial inclusion, a strategy is needed. To face the challenges related to financial inclusion, one needs to engage themselves in planning and implementing strategic orientation and marketing strategies. Today, innovation is the key to creating an opportunity and achieving the goal of financial inclusion. Based on the findings of primary and secondary data analysis and study, the researcher is following marketing strategies to increase financial inclusion in India.

Understanding Market

In fact, changes in demographic and lifestyle in the country are introducing new opportunities for financial inclusion. Strategic perspective of efficient analysis is essential for understanding socio-economic classification and changes in demographic profile of individuals.

Finding Niches

Prices, services, facilities and techniques are some that need to be searched and used in the right direction to meet the target of financial inclusion by banks. Today, these niches are becoming more and more expedient. Today, technology can achieve large-scale adaptation that can benefit the economies of top marketing and scale. Apart from this, banks and other financial service providers have to design products and distribution mechanisms which are more viable and are in line with the financial requirements of the Unbank in rural areas.

Portable Banking Services

Banks should think about developing and promoting portable banking services in different areas of India, which can be limited to cash deposits and services on a weekly basis. In such a case, the bank does not need to invest in large infrastructure to meet the needs of such areas. In addition, customers will be able to save transportation and other contingencies because they will be getting services at their doors.

Product Planning

Financial inclusion involves the use of important financial services such as bank account, insurance, etc. It is important to understand the perception of these formal financial services and the perceptions of those areas in which the person is dissatisfied with formal financial services and non-formal / traditional financial services. It also involves analyzing the situation in which the person uses financial services and if there is a situation which banks / government does not have information about. It will definitely help experts not only add value to formal financial services but also reinforge the value package for individuals with the aim of financial inclusion.

Segmentation

Segmentation is one of the basic elements of marketing strategy. It is advisable for experts that value-added marketing strategy should be used on the basis of segmental analysis and similar information should be used to develop novel formal financial services.

Mass Customization

Partition strategies will give experts the option to standardize specific formal financial services and separate them from non-formal / traditional financial services. With the help of technology, researchers are suggesting individuals to design a marketing mix in accordance with the needs of individuals for formal financial services.

Targeting Strategy

Banks should see Millennial / Generation Y and Generation Z as their main goals for formal financial services. They are those who are 30 or less and can become long term operators of formal financial services throughout the life.

Value Addition

Banks should be allowed to use their key resources like knowledge and relationship to reconfigure their roles and relationships in the process of creation of value for financial inclusion. In addition, experts should maintain value building in the form of continuous process for knowledge of formal financial services and better fit among new customers involved.

Customer Relationship Management

Financial institutions should make the right mix of technology, people and processes with the aim of customer loyalty for formal financial services. This will help financial institutions to use the services of people repeatedly and encourage their confidence in processes.

Experience Creation

Banks should take initiative to create anesthetic experience by creating the right environment which will encourage individuals to participate in various activities to understand the many formal financial services available to them.

Customer Value Management

Not all people are equal and they do not need the same level of financial services. The development of the management information system can help financial institutions understand the proposals for new proposals and formal financial services proposals.

Ease of Opening an Account and Facility to Hold Ad-hoc Bank Account

In the current study, it has been noted that it takes at least 5 days to open new accounts. This delay can cause any negative impact on the account holder's mind. It has been suggested to accelerate the process and bring it down to one or two days. It will be necessary to collect necessary documents from the potential account holder within the shortest possible time. This is one of the methods to reduce the time limit, opening of new accounts on the basis of ad-hoc in the absence of some documents, and facilitating the account holder to submit remaining documents in extended period. Customers should be allowed to operate their accounts during this time with a specific time limit. They should also be made aware that their account will not be operated after the time limit of compliance.

Incentive Program

Financial institutions should offer incentives for socio-economically backward people when they open a bank account. These incentives should be directly deposited in their bank accounts and they should not be allowed to withdraw this amount till the account holder uses the account for certain transactions.

Bank Account Utility

Providing some benefits like various subsidies, the Government should route them with nationalized or commercial banks with this condition that the beneficiary's bank account should be operated for at least the last 8-10 transactions for other purposes. needed. Such bank accounts should not be operated only to get subsidy and to keep these accounts inactive till the next subsidy. In a way, this strategy will also compel account holders to deal with other reasons.

Debit Cards

Soon after opening the account, the bank should arrange for a debit card to the account holders with a confidential PIN. Account holders will be able to operate accounts without losing time. It is recommended that no fee for such a debit card be charged to the customer. In contrast, these customers should be given some incentives per transaction. This will motivate a large number of new customers to take advantage of such schemes. It will also facilitate cashless transactions and reduce the risk of carrying cash.

Statement of Account

The periodic details of the account should be sent to the account holders without demand from them. Such statements can be sent through the mobile network. This will help the account holder keep the updates of the transaction, and this will result in a God-deal of confidence in the customers about the banks.

E-deposits

Account holders should be encouraged for electronic deposit through mobile banking, bank app or net banking. This will help reduce the bank's visits to account holders and reduce indirect transaction costs.

E-payments

Electronic payments should be encouraged by financial institutions with proper education among account holders. It will help individuals build trust in formal financial services.

Inexpensive Investment Plans

As the socio-economic backward class income is low and there is a habit of overspending, they fail to save anything bigger. However, financial institutions should come up with the schemes where the person can start investing with a great return (15 to 20 percent per annum) for a short period (15 to 20 years) per month (Rs 100 to 500) Are.

Long Term Loan Facility

Banks can provide long term long-term facilities for eligible candidates without interest. A plan should be developed in such a way that these students can repay their loans in a flexible way to get employment.

No-Fee Program

Banks should be encouraged to open an account with schemes like the skip-in-charge program, courtesy payment, etc. These schemes will definitely help the socioeconomically backward class to open and use bank accounts.

Periodic Campaigns

It has also been suggested that the bank should appoint some personnel to go to different places and arrange campaigns from time to time to open accounts of new members. Whenever more than two persons are found eligible to be account holders in a family, then the bank should allow all the members of the same family to open accounts on a single set of documents. It will save family members' efforts to compile multiple copies of the same document.

Counseling Services

The bank should try to provide free consulting services as a part of the promotion. This will create opportunities for banks to tap potential market. Needy customer

Personal Selling and Cross Selling

Banks can promote insurance and other products related to investment within a new customer's network using personal sales skills. Increase the money advice services for all individuals, with a variety of focus on families with different demographic characteristics.

Financial Education

With various banking assistance, government institutions should increase the continuity of financial education in all the teaching environments in different rural areas targeting the targets of all age groups and who teach them and teach them.

Product Literature

Financial service literature should be simple and well illustrated. In addition to attracting the public, it should be published in the local language.

Financial Capability Interventions

Financial capacity intervention in rural areas of India has been evaluated in such a way that we can make a benchmark and compare interference and can identify its functions well. It should be designed to increase opportunities and share the education of interventions, which can help people create financial flexibility.

Findings of the studyRespondents of 20 to 30 age group were up to 16 percent; While about 44 percent of respondents were falling in the age group 41 and above. A group of 20 to 30 years of age is a group of youth who has many aspirations in life and they are capable of saving some amount for future purposes.
87 percent of respondents were male while 13 percent were women. Men in the family are the key elements for earning income in village areas, and women see home and allied activities.
About 94 percent of the respondents were married and the responsibility was after marriage. Only 6 percent were unmarried respondents.75 percent of the total respondents were employed in some organizations and were earning through this medium. Self-employed up to 7 percent and the same number of respondents were also unemployed. There were no practical income sources of 5 per respondents. About 3 per respondents were only looking after the work of the house, which had no income. Approximately 2.4 percent of respondents were in the category of retired persons.

As with regard to educational qualification of respondents, 56 percent had completed their higher secondary education or below this level. 23 percent did not receive formal education with literacy; While 20 per university degree was achieved.

Researchers wanted to understand the family structure of respondents in relation to the number of male and female members living in families. Statistics show that in most of the houses, there were 4 male / female members. It also means that the houses where the respondents lived in were almost one type of nuclear family.

It was noted from the collected data that all respondents had savings accounts in different types of banks. 53 percent of respondents had their savings accounts with nationalized banks, while 42.6 per respondents had their savings accounts in rural / regional rural banks. Only some respondents had their savings bank accounts with private / foreign type banks.

The researcher was interested in knowing the frequency of operating his savings accounts. It is believed that while conducting any account in the bank, a person usually visits banks for the purpose of transactions. Therefore it was decided to ascertain how many times the respondents visited the bank premises in a period of 3 months. Data showed that 40% of the total respondents had visited their respective banks at least 3 times in a 3 month period for some transactions. 18 percent found that visiting their banks four times in a three-month period. 16 percent of respondents had visited their banks six times in the said period. During the 3-month period, approximately 14 percent of respondents visited banks almost twice.The researcher thought of finding any relation between the types of accounts created by these respondents and the types of banks. On analyzing the data, it was specifically noted that there was no relation to the type of bank and the purpose for which the account was opened by these respondents. In other words, the objective was fulfilled despite the type of bank.

The researcher tried to ascertain that the number of visits of these respondents had some relation with the banks they were choosing to deal with. It was noted that the type of banks has no relation with the number of visits that the respondents had to do to open the account. Whether it is nationalized bank, or rural / rural regional bank or even private one, there was no relation to the number of visits.

Cash withdrawal is one of the t frequent activities while operating a savings bank account in any bank. In rural areas, people like to go to the bank individually and take cash according to their needs. It was found that, despite the type of bank, the respondents used to withdraw cash from the ATM using the card, but the number of respondents doing so was found very little. For this purpose 755 out of 453 respondents were found. 210 respondents were using bank clearance slip to withdraw cash from their accounts. For this activity, the account holder must present himself / herself in the bank with the related passbook. Payment on the withdrawal slip is done only on these basis. 1 were6 respondents were found using cash to withdraw cash from their accounts. In this way, a large number of respondents preferred the mode of payment / withdrawal slip to withdraw money from banks. Again, the type of bank in this regard did not

matter too much.

It was attempted to note that the respondents had a habit of lodging their day-to-day expenses on food and other items. Statistics showed that almost 71 percent of respondents did not have such a habit. Of course, 29 per cent of them were not paying attention to these expenses on a regular basis.

During the current study, efforts were made to understand the different types of personality related to the use of financial discipline, learning habits and information received from various sources. Approximately 41 percent of the total respondents firmly agreed that when they come into financial matters, they consider themselves to be the most disciplined person. Approximately 24 percent believe that they were highly disciplined 24 percent of the total respondents admitted that they were not so disciplined in financial matters and the remaining 8 percent were completely non-disciplined personality.

Conclusion

The present study has been directed to achieve four key objectives. Given the fact that formal financial services have been outlined in India, the researchers were eager to examine the various reasons for that. It has been specifically noted that the number of people living in rural areas is weak in their socio-economic background. Despite the fact that the latest technology is being used for the wider spread of financial services across the county, urban areas seem to have more privileges of its benefits. In the expansion of financial services across the nation, major players will have to focus primarily on those profit margins which are more than urban background. Most of the rural areas of the country are neglected by these financial institutions relatively profitablely because of such areas. As a result of this trend, the deprived part of the socio-economic background in rural areas is either untouched or is being served without any seriousness.

Although India is progressing towards establishing infrastructure since its independence, rural areas still have the benefit of such infrastructure. Building infrastructure is primarily the work of government, local bodies and financial institutions in the country. Unfortunately due to lack of concentration in rural areas, the infrastructure problem is still facing a serious problem. The rural population is not able to construct such infrastructure that will solve their financial problems. These are the major reasons for which a large part of the poor population in rural areas is found to be financially excluded. There is a dire need to bring them to the lowest level of financial inclusion. They also need to help them to understand and understand the importance of financial inclusion in their lives. It is largely possible to bring them in regular steam of

financial inclusion and the results will be most encouraging for the national economy.

In this regard, it was found necessary to measure the financial capabilities of the people living in rural areas. The major income source for such areas is from agricultural produce. However, most people like to migrate to the nearest cities to earn their livelihood. This reduces the ability of households to use financial resources. Apart from this, financial products offered by various institutions have their own limitations. Most of them are ready to target the urban population. People living in rural areas do not find such products useful to them because they do not match their needs. The complexity involved in financial products keeps these individuals away from using them freely. It is necessary to develop suitable financial products that match the needs and desires of the rural population.

It is true that some of the costs have to be raised to take advantage of financial products. If more people are financially involved then they are bound to certain costs. Many times it has been seen that some people open bank accounts for government subsidy and wherever applicable, for subsidies. After obtaining such benefits and crossing the transaction, such accounts are terminated, their purpose ends. In fact, there is every chance for them to use these accounts to plan their financial needs. It is therefore necessary that they should be given the importance of staying in the financial stream which can affect their lives and can teach them to survive in difficult times. The concerned financial institutions and the government can formulate a policy to reduce the cost of availing financial services in the disadvantaged areas. In the end, it should be seen that the mere cost of availing financial services should not be an obstacle to the use of services.

It is true that most people are not aware of the importance of managing their day-today finances. Only the low income balance can not be the reason for being financially excluded. A proper training can make wonders if it is taken seriously. However, such training should be provided to the disadvantaged people by local bodies because they know more about the problems of such persons. Other financial institutions can also support their localbodies wherever possible. Persons who have been celebrated to succeed on financial inclusion can be used as role models to motivate local counterparts.

It has been noted through primary and secondary data that the persons who have not yet been brought in financial inclusion have different perspectives. They give more importance to their present existence than their future. This is because their earnings are comparatively very low and they try to find ways and methods to meet their current needs. Circumstances do not allow them to think about their future. They need to reassure that their future can be better if they think about planning their finances properly. To see their future, they need to change their attitude. Their changing attitude can help them think optimistic,

which can bring them to the primary stage of financial inclusion.

During the last seventy years of independence, India has made tremendous progress in many areas. Commerce and Industry are making rapid progress in the urban parts of the nation. However, unemployment in rural areas is still a big problem in front of the government. As a result, there are several low-growth socio-economic groups that are still away from financial inclusion. The current study has attempted to ascertain the causes and challenges which are still deprived of financial services. Their inclusion in the national financial stream is particularly important for the equal social justice and economic viability of the nation.

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