

A STUDY ON CAUSES AND EFFECTS OF CONFLICTS IN INDIAN CONSTRUCTION PROJECTS

KARTHIKEYAN.R¹ & MANIKANDAN.T²,

¹ Dept of Civil and Structural Engineering, Annamalai University, Tamilnadu

² Dept of Civil and Structural Engineering, Annamalai University, Tamilnadu

Abstract - *The conflicts in Indian construction projects seem inevitable and are increasing in the construction industry due to its uncertainty, complexity nature, and involvement of different categories of project participants especially in India. Due to interdisciplinary construction environment in India, which is inevitably results in clashes of interest, the uses of conflict and recovery from conflict must be subject to real interest. This study focuses on the identification and evaluation of factors of causes and effects of conflicts, in India.*

The research methodology is adopted based on questionnaire survey focusing on Indian construction projects. The findings come up with several conflict issues related to project time, cost, quality, safety, scope and personnel. The results can be useful for construction practitioners by taking alternate approaches for reducing the bad consequences of construction conflicts. The survey responses were statistically analyzed and statistical means were used to rank the significant factors causing conflicts in construction projects in India.

The most significant causes and effects of conflicting factors were identified by the overall ranking; priority of goal/objective, change of site condition, personality conflicts, manpower resources, people interruptions, input or instruction from leader, architect or engineers dissatisfies the work progress of the main contractor, communication barriers and lack of continuous improvement. The values of Pearson's correlation coefficients were used to show, that there is relatively good agreement between 3 groups of project in the ranking of the causes and effects of conflicts.

Key Words: Conflict Issues, Project Relationship, Project Management, Communication, Claims & Disputes.

1.INTRODUCTION

Construction project is an important element of any country's mass housing, commercial, infrastructure and industrial growth. As part of the process of standardization and improving efficiency in the construction sector, harmonized bidding conditions and regular bidding documents for domestic construction contracts have been developed and distributed to all Government agencies and public sector organizations as guidelines. There is necessity for proper dispute resolution mechanism in the construction division. A considerable amount of money is locked up due to

disputes between contractors and clients, leading to cost and time overruns. Wide-ranging dispute resolution mechanism is necessities to address all these concerns. At present, the Arbitration and Conciliation Act, 1996 (India) is the foundation for all dispute resolutions. In sectors like National Highways, provisions are made in the contract document for a Dispute Review Expert (DRE) and Dispute Review Boards (DRB).

1.1 REASONS FOR DISPUTE ARIES IN CONSTRUCTION

Construction contracts provide rise to disputes of unusual difficulty and complexity even by evaluation with other types of litigation. The performance of many construction contracts run over much longer periods than most other forms of commercial contract, with potential scope for disagreement and financial disagreement arising constantly during the construction period, and with large sums of money and cash flow pressures concerned on both sides.

There is plenty chances of disputes or difference of opinion from the very inception of entering into the contract and commencing the work because consistently both the parties have to meet with reciprocal obligations on either side one after the other and a single case of default is satisfactory to upset the balancing pendulum and the whole development, programming enhance targeted schedule of completion of work. The employer wants to reduce the expenses in order to keep up the economic viability of the project within its restrictions, tries to bring down the expenses whereas the contractors universally called 'builders' who invests large amounts by way of establishment cost in the form of machinery, materials, tools and plants as also onsite and offsite staff and at times own testing laboratories and research wings, planning and drawing wings, when confronted with unexpected situations where variations from the scope of the contract or undue delays by the owner which were not within the consideration of the parties at the tendering stage, unless remedied immediately, would upset the planning and programming and financial viability, enter into prolonged correspondence leading to dissimilarity of opinion and disputes which ensure in settlement.

1.2 CONFLICT

The word 'conflict' is infrequently used in the construction industry (at least in communications between parties). The word 'conflict' and the idea of conflict is critique on dispute and the resolution of dispute [Cheung et al, 2006; Fen et al, 1997; Gardener and Simmons, 1995; Gebken, 2006; Kassab et al, 2006; Kumaraswamy et al, 2004; Semple et al, 1994].

1.2.1 Types of Conflicts

Conflicts arise in three levels; level one may be viewed as intrapersonal conflict that is the conflict that takes place inside the individual, interpersonal conflict the conflict experienced between individuals in the same group or unit and intra-group conflict, the conflict between groups in the same organisation, team or command. The interactive and intra-group clashes can supplementary be characterized into three types: the association, task and procedure conflicts [Jehn, 1997; Simmons and Peterson, 2000; Jackson et al. 2008].

Relationship or emotional conflict is a discernment of interpersonal incompatibility and typically includes tension, annoyance, and animosity among group members (Simmons and Peterson, 2000). Document the negative effects of relationship conflict on group and organization satisfaction and commitment. Relationship conflict pessimistically affects group decision quality in three ways. First, it limits information processing ability of the group because the group members spend most of their time and energy focusing on each other rather than on the group problems. Second, it limits group members' cognitive functioning by raising their stress and anxiety levels and third, it encourages antagonistic or sinister attributions for other group members' behaviour, which can create a self-fulfilling prediction of mutual hostility and conflict escalation. Task or cognitive conflict is a perception of disagreements among group members about the content of their decisions and involves differences in viewpoints, ideas, and opinions. According to Jehn (1997), task conflict can improve decision – making outcomes and group productivity by increasing decision quality through incorporating devil's advocacy roles and positive criticism. Groups use members' capabilities and prior knowledge better when the conflict is task-focused, rather than when conflict is not present or relationship-focused. Jehn [1997] further contend that reasonable levels of task conflict are constructive, since they inspire discussion of ideas that help groups perform better. Groups with an absence of task conflict may miss new ways to enhance their performance, while very high levels of task conflict may interfere with task completion.

Conflict is rarely seen as constructive; however, in certain contexts (such as competition in sports), moderate levels of conflict can be seen as being mutually beneficial, facilitating understanding, tolerance, learning, and effectiveness. It can be differentiated between content conflict, where individuals disagree about how to deal with a

certain issue, and relational conflict, where individuals disagree about one another, noting that the content conflict can be beneficial, increasing motivation and stimulating discussion, whereas the relational conflicts decreases performance, loyalty, satisfaction, and commitment, and causes individuals to be irritable, negative and suspicious.^[10] Irving Janis proposed that conflict is beneficial in groups and committees to avoid the error of group thoughts.

According to Simons and Peterson (2000) a number of researchers have found that task conflict can lead to increased satisfaction with the group decision and a desire of members to stay in the group, and also have shown a cross relationship between the two forms of conflict. Researchers have established that efforts to encourage potentially beneficial task conflicts run a substantial risk of triggering disadvantageous relationship conflict. Simmon and Peterson suggest two possible explanations; first they contend that, task conflict leads to relationship conflict through a process of misattribution. Group members constantly interpret the behaviour of other group members – they infer intentions, appraise whether the source of the behaviour they see is internal or external, and assess the completeness and accuracy of the arguments made by others. When this attribution process points toward personal affection or hidden agendas, then task conflict triggers relationship conflict. The second justification is the behaviour of group members. In the process of task conflict, some group members may use expressively harsh language, intimidation tactics, or ad homonym arguments. From such behaviour and conduct other members can feel bruised, humiliated, offended, disrespected or even brutalized thus causing relationship conflicts. While on the other hand it is possible that relationship conflict could trigger task conflict. This may happen when one group member attempts to make life difficult to another group member by sabotaging any manipulate that the other might have and by so doing a task conflict is manufactured.

Jackson et al (2008) define process conflict as an awareness of controversies about aspects of how task achievement will proceed. It pertains to issues of duty and resource allocation such as; who should do what or how much one should get. This may happen when for instance group members oppose about whose responsibility is to carry out and complete a specific duty. Jackson et al in their study of process conflict identified three sub-categories of process conflict which are; scheduling and timing referring to issues of attendance punctuality and time spent on a particular work. involvement and workload; referring to issues of fairness in workload distribution, commitment and follow up of assigned works, conflict over credit recognition and conflict about members not showing up at all. Work method and approach; referring to issues such as conflicts over ideas or work method. Process conflict may activate

latent conflicts or may detract from the benefits of healthy task conflict.

1.3 FUNCTIONAL AND DYSFUNCTIONAL CONFLICT PHENOMENON

The phenomenon of conflict is considered along two different perspectives. According to Vaaland and Hakansson (2003), the first perspective regards conflict as a disease in organizations with primarily disruptive, dissociating, and dysfunctional consequences. In this perspective, the study of conflict has aimed to resolve it and to minimize its deleterious effects because of fear that too little coherence can develop into destructive conflict and a diffusion of focus.

According to Loosemore (2000) conflicts can enhance creativity and innovation. History tells that conflicts like the two world wars stimulated inventions which led to development of radar, jet-propelled aircraft, the United Nations, the World Bank, the international Monetary Fund just to mention a few. The cold war conflict led to development of nuclear power and space race which provided communication satellites and cell phones widely used today (Loosemore, 2000:2-3). Vaaland and Håkansson (2003) argue that, “several scholars within industrial network approach and conflict theory argue that development and creativity are stimulated by imbalance and problems. This is backed by the old Japanese proverb that the moment two bubbles are united, they both varnish”.



Fig 1.1 Relationships between Degree of Collaboration And Degree of Conflicts

Indeed as proclaimed by Vaaland (2004), without conflicts, progress and creativity disappear. Gadde and Håkansson in Vaaland and Hakansson (2002), illustrate how conflict may be functional and dysfunctional by a figure with two axes, the first axis indicate the degree of collaboration between two parties, and the second indicate the degree of conflict in connection with business relationships as shown in figure 4.2. The figure reflects that, by viewing collaboration and conflict as two dimensions, it is possible to identify four combinations.

This situation is explained by Vaaland and Håkansson (2003) basing on the studies of industrial business relationship as an indication of a typical well developed buyer – seller relationship, expressing an efficient process that is accompanied with technological complexity, strong activity interdependencies, large number of internal and external third parties directly and indirectly involved, and time pressure. This exemplify a typical situation for a complex construction project that demands specialized knowledge and skills in the design and construction process and involve various participants who come together on temporary basis to compose a building.

The main argument that conflicts can be functional is based on the view that the origin for improvement can be found in conflict as long as it is accompanied by cooperation. According to Vaaland (2004), conflict is characterized as functional when it adds necessary tension and motivation to the relationship that extends opportunities and speed up innovation. The question is how in a project a hostile relationship can be transformed into a well developed relationship in other words, as Vaaland advocate, how can “steam” be released without removing the functional conflict? The conflict and relationship improvement model as discussed below explains how “steam” can be released.

1.4 INFLUENCE OF CONFLICTS IN CONSTRUCTION PROJECTS

Conflict brings breakdown of relationships between project participants and results to project delays, claims and disputes which are the main shortcomings in completion of the project within objectives and goal.

Construction conflicts affects the interests of many stakeholders in connection with big investments, they reduce profits and are therefore very expensive and unprofitable (Awakul & Ogunlana, 2002). The construction industry is dynamic in nature due to the uncertainties in technology; budget and development process, claims and litigation are on dramatic throughout the construction industry. if disputes are not resolved promptly, then tend to drag on and escalate and can cause project delays, lead to claims, require litigation proceedings for resolution and ultimately destroy business relationships.

If the conflict issues studied specifically, it will give better understanding of the conflicts in particular. This is because project participants should have a clear picture of a conflict when faced with any issues (Thomas 1994). Further, if specific conflict issues related to time , cost , quality and safety in construction are explored , the conflict may able to reduce in better ways. Because the underlying issues that usually have conflicts in construction are mainly due to time, cost, quality and safety when public owners and contractors considered as a main objectives (Kumarasamy 1994).

In view of contract situations in construction projects, it becomes important to be addressed. If conflict issues are not addressed, it will result in high level of conflict. Conflict situations depend on objectives, plans, methods, goals and personalities that may lead into disputes and court of law (Walker 1996).

Such intensifying situation would involve people, additional time and higher costs (Loosemore et al. 2000; Harmon 2003).

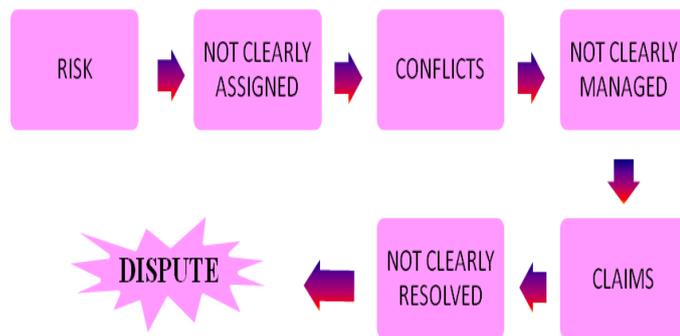


Fig 1.2 Risk, Conflict, Claim and Dispute Continuity

1.6 PROPOSED THESIS

The construction industries often focused as a project based industry that is assigned by the unique characteristics of each project and the involvement of the various parties within the project life cycle. Due to the diversity of the industry and the involvement of various parties, conflicts and disputes do take place. Many construction projects are of long-duration and high values and foreseeing and planning for every eventuality may be impossible. Engineers and managers are expected to solve problems surfacing during execution stage. Objective of the thesis work is to find the key conflicting factors which influence in Indian construction industry for the effective conflicting management in the Indian construction industry.

1.7 SUMMARY

Conflicts has been identified (Collins 1995) as ‘serious disagreement and argument about something important’ and also as ‘a serious difference between two or more beliefs, ideas or interests’. Since conflict is ‘inevitable in human relationship’ (Rhys Jones 1994). It is essential for a successful project to be completed in scheduled time and within estimated cost and of specified quality. For this purpose project should be well planned, properly designed and above all agreeable construction. Among several factors which influence success of an construction project, one of them is art of dealing with construction projects. It gives rise to the problems including increasing project cost, project delays, reduce productivity, loss of profit, and damage in business

relationship. In this thesis an effort has made to find out the key conflicting factors which influence in the Indian construction industry and its causes for the effective conflict management in India.

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2. SCOPE AND OBJECTIVE

2.1 OBJECTIVE

The purpose of this study is to identify the conflicts which arise in the Indian construction industry to prevent it from the causes and damages which arise due to the conflicts in the construction projects. To determine the attitudinal difference among respondents and causes leading to conflicts encountered on the construction projects and also to identify the causes leading to the conflicts encountered on the construction projects as perceived by the respondents. It can be achieved by reviewing the existing literature available on conflicts to obtain an clear idea and concept of conflict issues arising all over the world and to obtain solution through conflict management techniques.

2.2 SCOPE

To generate the questionnaires and to carry out pilot studies to collect data’s from experts in different construction projects and by using collected data analyzing with the available statistical methods.

3. RESEARCH METHODOLOGY

This research looks at “what are the conflicting factors which influence on the Indian construction industry. This chapter outlines the research methodology will be used to carry out the research. The chapter will describe the research methodology, the research method, data analysis method and research ethics in detail which will be used to ensure the research is reliable and valid.

Quantitative research is generally understood as explore people’s perception and opinions. According to the study question “what are the key factors influence the conflicts in construction”, the objective is to study is to discover construction conflicts” opinions on “the factors influence of construction conflicts”.

3.1 QUANTITATIVE RESEARCH

The objective of quantitative research often intends to conjecture and refute some issues such as theories and findings in previous studies by gathering factual data. Quantitative research typically answers the questions such as “what” and “how”. The scale of measurement approach is the key issues which need to be considered while forming a quantitative research. The required data normally are gathered from survey through questionnaire. The collected factual data is measured by statistical techniques. Often, the quantitative data are numerical data. The theories of findings in previous studies are compared with quantified results. It is easy to miss the important data without closely studying of the literature and it is important to collect and analyse the data fairly.

3.2 STUDY METHODOLOGY

The research methodology is adopted based on available literature review and expert opinions in construction industry by questionnaire survey method. The findings come up with several conflict issues related to project objectives such as time, cost, quality and safety etc.

The object of the present research is to study the causes and effects of conflicts in construction projects. An extensive literature review has been carried out, to identify the factors influencing the causes and effects of conflicts in construction projects. A questionnaire was developed considering the factors influencing the causes and effects of conflicts in construction projects in India. Before distributing the questionnaire, a pilot study was conducted. The basic purpose of the pilot study was to verify the completeness of the questionnaire in capturing the factors relevant for India. The questionnaire was distributed among construction professionals, and the data was collected. The data collected was analysed, using statistical methods, such as the descriptive statistical analysis, relative importance index analysis, Spearman rank order correlation test and factor analysis. After the factor reduction, an equation for estimating the causes and effects of conflicts in construction projects was developed using structural equation modeling method.

3.2.1 Concerning Object: (To Identify The Factors Influencing The Causes And Effects Of Conflicts In Construction Projects)

The literature about the conflict was reviewed (Fenn et al 1997, Gebken 2006, Al-Tabtabai and Thomas 2004, Leung et al 2005, Al-Tabtabai and Thomas 2004, Awakul and Ogunlana 2002, Acharya et al 2006, Sinha and Wayal 2007, Jaffar et al 2011, Sigitas and Tomas 2014, Shabir and Tauha 2014, Kumarasamy 1997) to identify the factors influencing the causes and effects of conflicts in construction projects. In addition, there are other local factors that have been added, as recommended by local experts.

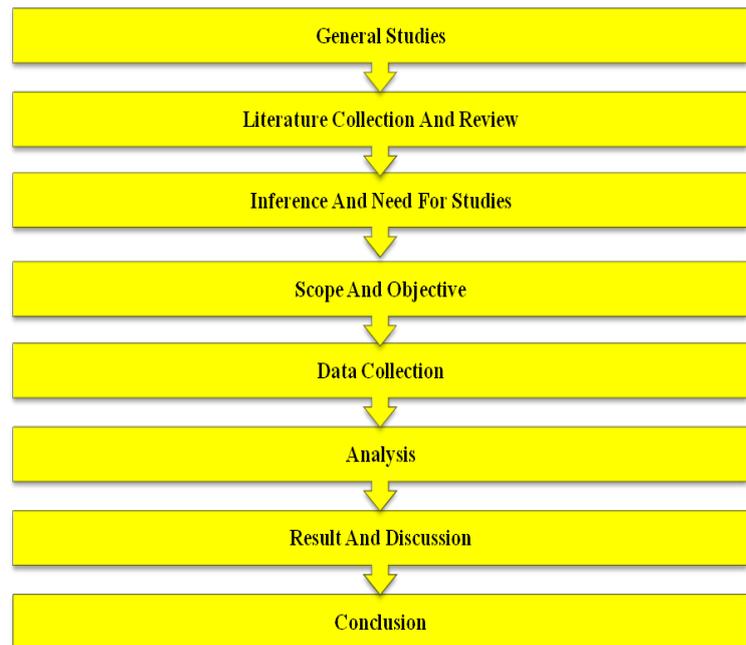


Fig 3.1 Methodology

4. DATA DESIGN

The questionnaire preparation began with a review of the relevant materials from journals and conference papers. A questionnaire was developed to assess the perception of clients, consultants, and contractors on the relative importance of factors influencing the delay of construction projects in India. The questionnaire was divided into two parts. The first part consisted of general information about the respondent. The second part of the questionnaire focused on the delay factors, causing delay and effects of construction projects in India.

4.1 DATA MEASUREMENT

In order to be able to select the appropriate method of analysis, the level of measurement must be understood. For each type of measurement, there is/are an appropriate method/s that can be applied, and not others. In this research, ordinal scales were used. The ordinal scale very low, low, moderate, high and very high a ranking or a rating scale that normally uses integers in the ascending or descending order. The numbers assigned as important (1, 2, 3, 4, 5) do not indicate that the interval between scales are equal, nor do they indicate absolute quantities. They are merely numerical labels. Based on the Likert’s scale, we have the following Table 3.0 (Iyer and Jha 2005).

Table 4.1 Ordinal Scale Used for Data Measurement

Item	very low	Low	Moderate	High	Very high
Scale	1	2	3	4	5

4.1.1 Pilot Study

The objective of the pilot study is to verify the completeness of the questionnaire. Before distributing the questionnaire, a pilot study was conducted on a limited scale. All the respondents agreed that the questionnaire was sufficient to capture the causes and effects of conflicts in construction projects. Based on this, the questionnaire was finalized.

4.1.2 Sample Size And Sampling Technique

The sampling method used in this study was convenience and snowball sampling. This sampling comes under the class of non-probability sampling techniques. The sample elements are identified by friends and through referral networks. This method of sampling is preferred, when it is difficult to get response from sample population selected at random (Sekaran 2000).

Commonly, the calculated sample size is increased by 30%-40% to compensate for no response; therefore, the total numbers of questionnaires were randomly distributed in Indian construction firms.

The survey was self administered, and the questionnaire was distributed to 150 construction professionals from various constructions in India. Before handling over the questionnaires all the questions were explained to the respondents, so that they could fill the questionnaire easily and properly. The respondents were collected and analyzed. Out of 150 copies of the questionnaire distributed to the respondents 76 were retrieved and analyzed.

4.1.3 Descriptive Statistics Method

The questionnaire was distributed to 150 construction professionals, out of which 75 responses were received and thus, the response rate 50% was achieved. The respondents details of the samples, like gender, designation, working experience, types of organization, project annual turnover and types of projects are explained using descriptive statistics.

4.1.4 Statistical Methods Of Analysis

The statistical methods of analysis employed in this study other than descriptive statistics, spearman rank order correlation test and regression.

83 factors influencing the conflicts in construction projects are selected. These factors are grouped under five heads, namely task interdependency, differentiations, communication obstacles, tensions, personality traits. Each factor is given a lable. Task interdependency is represented by I, Differentiation by II, Communication obstacles by III,

Tensions by IV, and Personality traits by V. Out of eighty six factors considered, 21 factors are task related, 11 are differentiation related, 9 factors are communication related, 33 are tension related, 10 factors are personality traits related and 30 factors related to effects were added. The factors which are considered in the questionnaire are summarized and presented in Table 5.2 & 5.3.

Table 4.2 List of Factors Identified, Grouped Under Five Heads

Group	Label of each factor	Factors
Task interdependency	I1	The project team members heavily rely upon each other for assistance, information or compliance to perform respective
	I2	The project team has responsibilities
	I3	The project team members impose unrealistic time demands to perform respective tasks
	I4	Insufficient efforts to keep partnering going
	I5	Input or instruction from leader
	I6	Management procedures and administration
	I7	Scheduling and sequencing of work
	I8	Cost estimates
	I9	Change of site condition
	I10	Priority of goal/objective
	I11	Relationship problem
	I12	Inadequate site and/soil investigation report
	I13	Personality and inter-personal problems
	I14	Lack of continuous improvement
	I15	People interruptions
	I16	Delayed possession of site
	I17	Delayed possession works
	I18	Acceleration of works
	I19	Suspension of works
	I20	Delays caused by unforeseeable obstructions
	I21	Misaligned ambition
Differentiation	II1	The project team members have different view points
	II2	The project team members have difference in common goal
	II3	Client fails to pay for various claims
	II4	Difference in change order evaluation
	II5	The project team members are lack of agreement on the common goal.
	II6	The project team members only focus on particular contribution, not client's goals and expectations
	II7	Argument on the measurement and valuation of contracted work
	II8	The project team members feel difficult in prioritizing of work
	II9	Uncovering of works for examination
	II10	Lack of continuous improvement
	II11	Additional needs (to verify compliance with specification , in excess of those anticipated at tender stage)
Communication	III1	Only less units in the project teams know about each other's job
	III2	Communication breakdown
	III3	Communication barriers
	III4	Uneven commitment
	III5	Misunderstanding of partnering concept
	III6	The project team members are lack of

n obstacles		common experience
	III7	Discreditable relationship
	III8	Lack of information
Tension s	III9	Discreditable relationship
	IV1	Inconsistent demands from client, architects or engineers
	IV2	Design errors
	IV3	Manpower resources
	IV4	Mistrusting each other
	IV5	Architect and engineer dissatisfies the work progress of the main contractor
	IV6	Excessive quantity variation
	IV7	Double meaning in specifications
	IV8	Construction method change due to engineer's comments(on contract)
	IV9	Clients takes over the site and denies access to the main contractor
	IV10	Main contractor fails to proceed in a competent manner
	IV11	The project team members face a high degree of uncertainty on the project.
	IV12	The task of some project team members were overloaded
	IV13	Employer's breach of contract
	IV14	Disposal of fossils
	IV15	Inclement weather
	IV16	Instruction issued to resolve discrepancy
	IV17	Hoisting of storm signal no 8 or above
	IV18	Rectification of damage caused by expected risks
	IV19	error in setting out due to incorrect data shown on drawings
	IV20	Investigation due to alleged defects
		Disruption to regular progress due to:
	IV21	Late instruction
	IV22	Variations
	IV23	Opening for inspection
	IV24	Delay caused by any person or organization employed by the employer
	IV25	Late delivery of materials by employer
	IV26	Main contractor ceases the work of the site
	IV27	Argument on the prolongations costs claimed by the main contractor
	IV28	Prolongation cost claimed by the sub-contractor
	IV29	Argument on the accelerated costs
	IV30	Delay work due to utility service organization
IV31	Sub-contractor work delayed due to main contractor	
IV32	Past conflict not end or settle	
Person ality traits	V1	Some of the project team members are unable to manage the mixed motives of each other
	V2	Conflicting commitments(two projects or more at a time)
	V3	Some of the project team members have high authoritarianism
	V4	People interruptions
	V5	Personality conflicts(ego between team members)
	V6	Some of the project team members have dogmatic attitudes
	V7	Some of the project team members have low self-esteem
	V8	Errors or substantial changes in the bills of quantities
	V9	Interest on claims due to their late valuation
	V10	Technical opinion and performance trade off's

Group	Label Of Each Factor	Factors
Effect	E1	Cost overrun
	E2	Time overrun
	E3	Negative social impact
	E4	Idling resources
	E5	Disputes
	E6	Arbitration
	E7	Delaying by the client to return the loans
	E8	Poor quality of work due to hurry
	E9	Bankruptcy(can't pay back bank's loans a like situation)
	E10	Litigation
	E11	Create stress on contractors
	E12	Acceleration losses
	E13	Total abandonment(withdrawal of project)
	E14	Increased costs(time, money)
	E15	Wasted resources
	E16	Decreased productivity
	E17	Lowered morale(losing confidence)
	E18	Poor decision making
	E19	Withdrawal and miscommunication
	E20	Complaints and blaming
	E21	Backstabbing and gossip(roomers and bad name to project over public)
	E22	Attitudes of distrust and hospitality
	E23	Erosion to personal relationship
	E24	Harm to others not directly involved in the project
	E25	Damaged emotional and psychological wellbeing
	E26	Dissatisfaction and stress
	E27	Insubordination
	E28	Lack of direction
	E29	Lack of new ideas
	E30	Quality of work

5. DATA ANALYSIS

A survey by means of a questionnaire was undertaken for data collection from all over India. The questionnaire survey was conducted to quantitatively confirm the list of factors obtained from the interviews, and identify the most important factors influencing the causes and effects of conflicts in construction projects. The descriptive survey method was adopted for data collection. The questionnaire was prepared based on the resource constrain factors influencing causes and effects of conflicts in construction projects. The demographic profile of the respondents and the survey responses are discussed in this chapter.

5.1 QUESTIONNAIRE DESIGN

The questionnaire preparation began with a review of the relevant materials from journals and conference papers. 85 factors causing the conflicts in construction project were identified and 30 factors identified as effects from the literature survey. Out of eighty five factors, 1) twenty one factors were task interdependency i.e., common aim depend upon their task their mind set up and planning to do the particular task may vary like peoples interruptions, delayed possessions etc. 2) Eleven factors were differentiation i.e., difference among members participants idea may vary depend upon their work load, 3) nine were communication obstacles i.e., communication barriers, communication breakdown etc.,4) thirty three factors were due to tensions i.e., mistrusting, double meaning in specification, manpower resources, 5)ten factors were personality traits like personality conflicts ego etc.,

The questionnaire used in this survey is presented in appendix 1.

A questionnaire survey method was adopted with a list of the target respondents on hand, the distribution of survey is directed to the potential respondents in person. The questionnaire survey was conducted with owners', consultants', and contractors' from various construction industries. Prompt action was taken to ask for respondents' clarification of responses, after scrutinizing the returned responses for any missing and abnormal data entries.

The questionnaire was distributed to 150 construction professionals, out of which 75 responses were received and thus, the respondent's rate of 50% was achieved.

5.2 DATA ANALYSIS

The collected data were analyzed by the demographic characteristics of the respondents are given below.

5.2.1 Respondents Gender

Among the respondents, 92% (69 out of 75) are males and 8% (6 out of 75) are females. The females – male ration is shown in the Figure 6.1.

5.2.2 Respondents Educational Qualification

Among the respondents, 14.7% were diploma candidates, 64% respondents completed their BE, 14.7 were ME candidates and 6.7% only belongs to other category. Since 93.3% peoples were from civil engineering qualification hence the can be said as reliable.

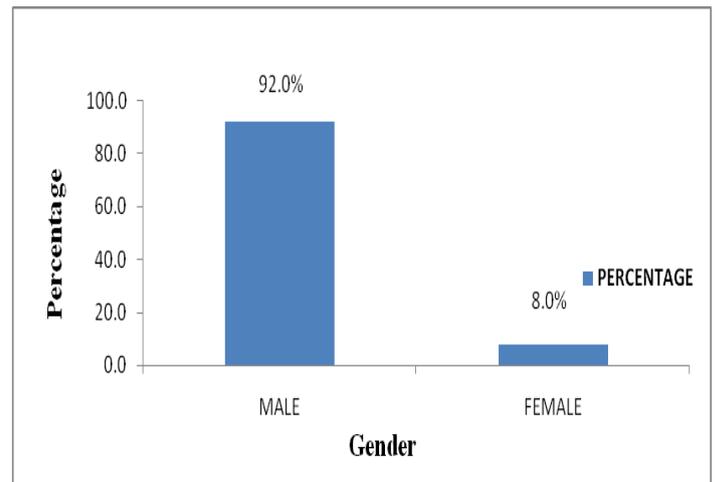


Fig 5.1 Respondents Gender

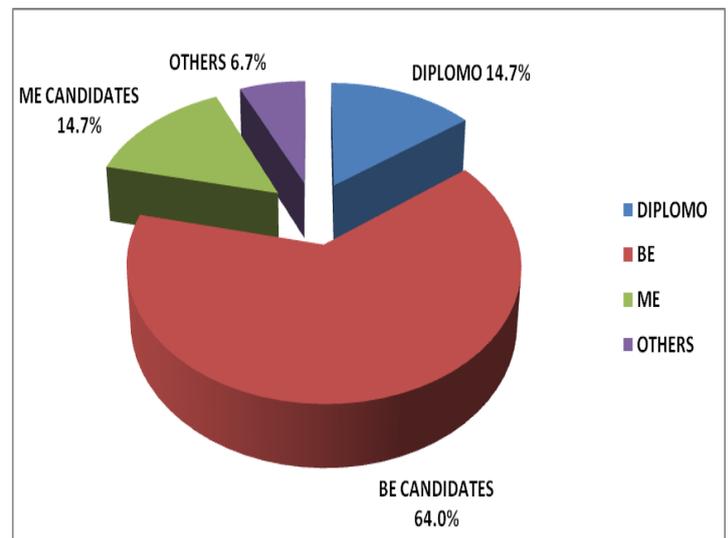


Fig 5.2 Respondents Qualification

5.2.3 Respondent's Working Experience

Among the respondents, 36% have < 5years of experience, 52% have 6-10 years of experience, 5.3% have 11-15 years of experience, 5.3% have 16-20 years of experience, 1.3% have > 25 years of experience respectively. The respondents working experience are shown in the table from the above it is found that 64% of the respondents have more than five years of experience (considering persons with more than five years of experience in the same field as well experienced); hence, it can be said that the data collected is more reliable.

5.2.4 Project Size

The responses received from the construction professionals are classified, based on the size of the project where the professionals or working or involved. The size of the project is as follows:

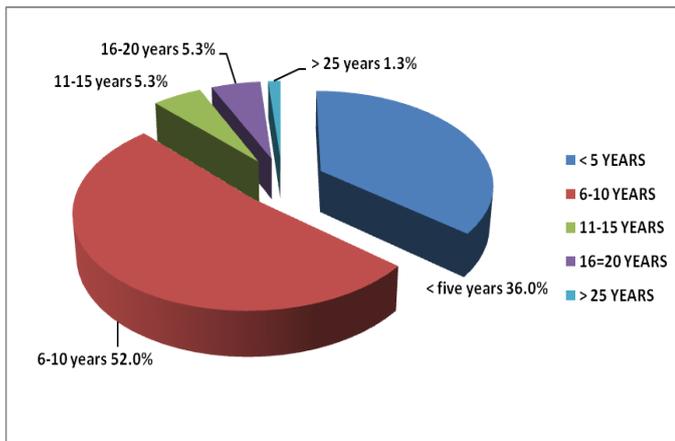


Fig 5.3 Respondents Experience

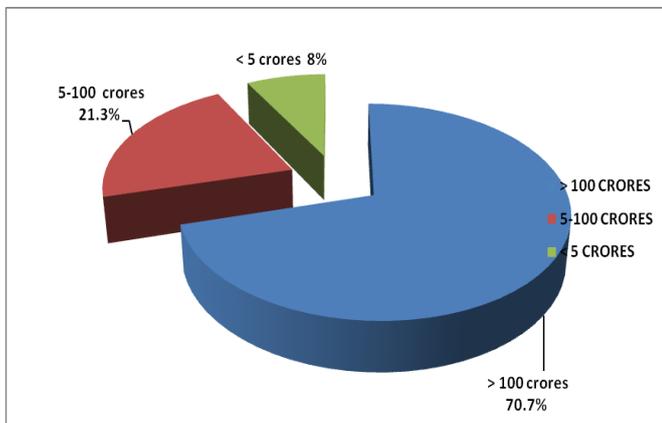


Fig 5.4 Respondents Working Project Size

5.2.5 Types of Project Details

The responses received from the construction professionals are further classified based on the type of projects carried out by the organizations. The type of projects carried out by the organization are 10.7% industrial, 53.3% are residential and 36% are infrastructure projects.

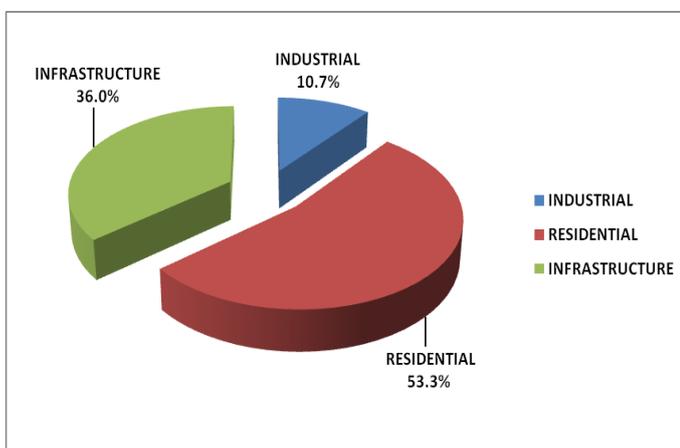


Fig 5.5 Respondents Type Of Project

5.3 SURVEY RESPONSE

The questionnaire comprised of totally eighty five questions. Each question corresponds to one causes of conflict factor, influencing the conflict in five category namely task interdependency (21 factors), differentiation (11 factors), communication obstacles (9 factors), tensions (33 factors), personality traits (10 factors). The responses to the level of impact of these five group of causes factors on the conflicts in construction projects from 75 respondents.

Table 5.1 Task Interdependency Related Factors

FACTORS	Very low	Low	Moderate	High	Very high	high to very high
I10	0.00	10.67	14.67	56.00	18.67	74.67
I9	2.67	9.33	25.33	33.33	29.33	62.66
I15	2.67	14.67	21.33	33.33	28.00	61.33
I5	4.00	5.33	15.00	50.67	13.33	64.00
I14	1.33	14.67	28.00	42.67	13.33	56.00
I8	18.66	18.67	21.33	50.67	9.33	60.00
I6	1.33	14.67	46.67	28.00	9.33	37.33
I4	2.67	12.00	48.00	29.33	8.00	37.33
I3	2.67	17.33	42.67	25.33	12.00	31.33
I2	1.33	14.67	52.00	20.00	12.00	32.00
I11	8.00	14.67	32.00	34.67	10.67	45.34
I7	1.33	25.33	30.67	34.67	8.00	45.34
I13	2.67	16.00	54.67	18.67	8.00	26.67

Table 5.1 shows the rating given by the construction professionals for the task interdependency factors. It is found that more than 25% and range 14% to 36% of the professionals have rated these factors between high and very high, which indicates that these task interdependency related factors have an influence on the causes and effects of conflicts in construction projects and therefore, all these factors were considered for further analysis.

Table 5.2 Differentiation Related Factors

FACTORS	Very low	Low	Moderate	High	Very high	high to very high
II2	1.33	17.33	52.00	22.67	6.67	29.34
II5	4.00	24.00	40.00	21.33	10.67	32.00
II4	2.67	26.67	38.67	25.33	6.67	32.00
II10	9.33	24.00	25.33	34.67	6.67	41.34
II3	6.67	26.67	29.33	30.67	6.67	37.34
II9	6.67	18.67	45.33	26.67	2.67	29.34
II11	2.67	14.67	64.00	17.33	1.33	18.66
II8	5.33	26.67	37.33	28.00	2.67	30.67
II1	12.00	20.00	37.33	22.67	8.00	30.67
II6	5.33	38.67	24.00	22.67	9.33	32.00
II7	16.00	17.33	33.33	29.33	4.00	33.33

Table 5.2 shows the rating given by the construction professionals for the differentiation factors. It is found that more than 16% and range 6% to 26% of the professionals have rated these factors between high and very high, which indicates this differentiation related causes factors have an influence on the causes and effects of conflicts in

construction projects, they are to be given importance during the process of construction project.

Table 5.3 Communication Obstacle Related Factors

FACTORS	Very low	Low	Moderate	High	Very high	high - very high
III3	5.33	12.00	28.00	33.33	21.33	54.66
III2	8.00	17.33	22.67	34.67	17.33	52.00
III4	5.33	13.33	41.33	28.00	12.00	40.00
III8	6.67	22.67	22.67	34.67	13.33	48.00
III1	9.33	21.33	29.33	29.33	10.67	40.00
III7	1.33	24.00	48.00	22.67	4.00	26.67

Table 5.3 shows the rating given by the construction professionals for the communication obstacle factors. It is found that more than 22% and range 14% to 31% of the professionals have rated these factors between high and very high, which indicates that these communication related factors have an influence on the causes and effects of conflicts in construction projects and therefore, all these factors were considered for further analysis.

Table 5.4 Tension Related Factors

FACTORS	Very low	Low	Moderate	High	Very high	high - very high
IV3	4.00	10.67	13.33	52.00	20.00	72.00
IV5	0.00	20.00	18.67	42.67	18.67	61.34
IV23	1.33	10.67	44.00	36.00	12.00	48.00
IV26	1.33	12.00	40.00	38.67	7.00	45.67
IV4	1.33	18.67	36.00	36.00	12.00	48.00
IV1	2.67	16.00	38.67	30.67	12.00	42.67
IV22	1.33	16.00	41.33	33.33	7.00	40.33
IV24	1.33	20.00	38.67	26.67	13.33	40.00
IV2	4.00	20.00	26.67	41.33	8.00	49.33
IV21	10.67	13.33	22.67	45.33	8.00	53.33
IV32	6.67	17.65	21.33	49.33	2.67	52.00
IV7	8.00	21.33	21.33	40.00	9.33	49.33
IV6	6.67	9.33	42.35	29.33	6.67	36.00
IV33	5.33	10.67	53.33	21.33	9.33	30.66
IV27	8.00	20.00	30.67	36.00	5.33	41.33
IV8	6.67	13.33	50.67	22.67	6.67	29.34
IV20	6.67	18.67	48.00	18.67	8.00	26.67

Table 5.4 shows the rating given by the construction professionals for the tension related factors. It is found that more than 23% and range 9% to 36% of the professionals have rated these factors between high and very high, which indicates this tensions related causes factors have an influence on the causes and effects of conflicts in construction projects, they are to be given importance during the process of construction project.

Table 5.5 Personality Traits Related Factors

FACTORS	Very low	Low	Moderate	High	Very high	Moderate - very high
V5	1.33	8.00	28.00	38.67	24.00	90.67
V4	1.33	12.00	24.00	48.00	14.67	86.67
V6	4.00	18.67	38.67	30.67	8.00	77.34
V3	1.33	30.67	37.33	24.00	6.67	68.00

Table 5.5 shows the rating given by the construction professionals for the personality trait factors. It is found that more than 18% and range 14% to 22% of the professionals have rated these factors between high and very high, which indicates that these personality trait factors have an influence on the causes and effects of conflicts in construction projects and therefore, all these factors were considered for further analysis.

Table 5.6 Effects Related Factors

FACTORS	Very low	Low	Moderate	High	Very high	high - very high
E5	1.33	16.00	22.67	29.33	30.67	60.00
E6	4.00	12.00	20.00	37.33	26.67	64.00
E2	2.67	10.67	24.00	46.67	16.00	62.67
E30	8.00	8.00	16.00	49.33	18.67	68.00
E15	1.33	13.33	25.33	44.00	16.00	60.00
E29	2.67	13.33	21.33	48.00	14.67	62.67
E4	1.33	10.67	26.67	53.33	8.00	61.33
E16	4.00	12.00	37.33	21.33	25.33	46.66
E8	1.33	12.00	25.33	56.00	5.33	61.33
E3	0.00	13.33	44.00	36.00	6.67	42.67
E18	2.67	12.00	45.33	33.33	6.67	40.00
E1	9.33	16.00	25.33	38.67	10.67	49.34
E26	0.00	20.00	44.00	29.33	6.67	36.00
E14	4.00	17.33	34.67	40.00	4.00	44.00
E10	6.67	24.00	22.67	36.00	10.67	46.67
E7	8.00	12.00	46.67	26.67	6.67	33.34
E24	4.00	22.67	41.33	26.67	5.33	32.00
E11	4.00	25.33	40.00	25.33	5.33	30.66
E28	8.00	30.67	17.33	40.00	4.00	44.00
E21	4.00	28.00	41.33	17.33	9.33	26.66

Table 5.6 shows the rating given by the construction professionals for the effect related factors. It is found that more than 16% and range 6% to 26% of the professionals have rated these factors between high and very high, which indicates this differentiation related effect factors have an influence on the conflicts in construction projects, they are to be given importance during the process of construction project.

The questionnaire comprises of questions related to factors causes and effects of conflicts. These questions are classified and grouped into factors. The backgrounds of respondents were discussed in detail in this chapter. The data collected is given as input for the statistical analysis, and the significance of the factors responsible for the causes and effects of conflicts is identified; it is discussed in the next chapter.

6. FACTORS INFLUENCING THE CAUSES AND EFFECTS OF CONFLICTS IN CONSTRUCTION PROJECTS

This chapter describes the factors that influence the causes and effects of conflicts on Indian construction industry in account to the type of project handled. This chapter focuses on the causes and effects of conflicts in construction projects.

6.1 FACTORS INFLUENCING THE CAUSES AND EFFECTS OF CONFLICTS IN CONSTRUCTION PROJECTS

From the literature review, eighty five factors were identified as the ones influencing the conflicts in construction projects. Out of the eighty five factors only twenty five task interdependency related factors. In the present study, only the task interdependency factors influencing the conflicts in construction projects are considered. The level of impact of each factor on the conflicts in construction projects is categorized; using the five point Likert’s scale ranging from 1 to 5, corresponding to very low, low, moderate, high and very high. The construction professionals were asked to rate the each of the factors on its level of impact.

The questionnaire was distributed to various construction project professionals such as residential’, industrial’ and infrastructure’. The questionnaire was distributed to 150 construction professionals, out of which 75 have responded. Out of 75 responses collected, 40 were residential’, 8 from industrial’ and 27 from infrastructure’ projects.

6.1.1 Descriptive Statistics

In the present study, MEAN method was used to determine the relative importance of various factors influencing the causes and effects of conflicts in construction projects. The same method was adopted in this study within various groups (i.e. industrial, residential and infrastructure. The five point scale ranging from 1 (very low) to 5 (very high) was adopted, and transformed to the mean for each factor.

The primary data collected form the second part of the questionnaire was analyzed from the perspective of the type of projects residential, industrial and infrastructure. Each individual factor’s mean perceived by all respondents was computed for the overall analysis. The relative importance index, mean, was computed fro each factor to identify the most significance causes. The causes were ranked based on the mean values. From the ranking assigned to each factor, the important factors of the causes and effects of conflicts in Indian construction industry were identified.

In the following sections, the type of project perspectives of the residential, industrial and infrastructure

about the relative importance of the task interdependency factors influencing the conflicts in construction projects is presented.

6.1.2 Factors Influencing Causes and Effects of Conflicts Overall Perspective Causes

From the overall point of view, all the overall factors are listed from the importance index analysis in Table 6.1 The top most influential factors were taken as critical ones causing the conflicts in construction as shown in Fig 6.1..

Table 6.1 Mean and Ranking of Critical Factors of Conflicts Causes – Overall Perspective

SI NO	FACTOR ID	FACTOR	MEAN	RANK
1	I10	Priority of goal/objective	3.83	1
2	I9	Change of site condition	3.77	2
3	V5	Personality conflicts(ego)	3.76	3
4	IV3	Manpower resources	3.73	4
5	I15	People interruptions	3.69	5
6	I5	Input or instruction from leader	3.64	6
7	V4	Outside people interruptions	3.63	7
8	IV5	Architect and engineer dissatisfies the work progress of the main contractor	3.60	8
9	III3	Communication barriers	3.53	9
10	I14	Lack of continuous improvement	3.52	10
11	I8	Cost estimates	3.51	11
12	IV23	Opening for inspection	3.43	12
13	IV26	Late delivery of materials of materials by employer	3.40	13
14	III2	Communication breakdown	3.36	14
15	IV4	Mistrusting each other	3.35	15
16	IV1	Inconsistent demands from clients, architects or engineers	3.33	16
17	IV22	Variations	3.31	17
18	IV24	Delay caused by any organization or person	3.31	18
19	I6	Management procedures and administration	3.29	19
20	IV2	Design errors	3.29	20
21	I4	Insufficient efforts to keep partnering going	3.28	21
22	III4	Uneven commitment	3.28	22
23	I2	The project team has responsibilities	3.27	23
24	I3	The project team members impose unrealistic time demands to perform respective tasks	3.27	24
25	IV21	Late instructions	3.27	25
26	I11	Relationship problem	3.25	26
27	III8	Lack of information	3.25	27

28	I7	Scheduling and sequencing of work	3.23	28
29	IV32	Sub-contractor delayed due to main contractor	3.21	29
30	IV7	Double meaning in specification	3.21	30
31	IV6	Excessive quantity variations	3.20	31
32	V6	Some of the project members have dogmatic attitudes	3.20	32
33	IV33	Past conflict not end or settle	3.19	33
34	II2	The project team members have difference in common goal	3.16	34
35	I13	Personality and inter-personal problems	3.13	35
36	II5	The project team members are lack of agreement on common goal	3.11	36
37	IV27	Main contractor ceases the work of the site	3.11	37
38	III1	Only less units in the project teams know about each other's job	3.11	38
39	IV8	Construction method change due to engineer's comments	3.09	39
40	II4	Difference in change order evaluation	3.07	40
41	II10	Lack of continuous improvement	3.05	41
42	III7	Discreditable relationship	3.04	42
43	V3	Some of the project team members have high authoritarianism	3.04	43
44	II3	Clients fail for pay for various claims	3.04	44
45	IV20	Investigation due to alleged defects	3.03	45
46	II11	Additional needs (in excess of those anticipated at tender stage)	3.00	46
47	II9	Uncovering of works for examination	3.00	47
48	III9	Discreditable relationship	2.97	48
49	II8	The project team members feel difficult in prioritizing of work	2.96	49
50	II1	The project team members have different view points	2.95	50
51	V8	Errors of substantial changes in the bills of quantities	2.92	51
52	IV10	Main contractor fails to proceed in a competent manner	2.92	52
53	II6	The project team members are lack of agreement on common goal	2.92	53
54	III5	Misunderstanding of partnering concepts	2.92	54
55	I18	Acceleration of works	2.91	55
56	I1	The project team members heavily rely upon each other for assistance, information or compliance to perform respective	2.89	56
57	I12	Inadequate site /soil investigation report	2.89	57
58	IV25	Employed by the employer	2.88	58
59	I20	Delays causes by unforeseeable obstructions	2.88	59

60	V2	Conflicting commitments (more projects at a time)	2.88	60
61	II7	Argument on the measurement and valuation on the contracted work	2.88	61
62	I16	Delayed possessions of site	2.87	62
63	IV31	Delayed work due to utility service organizations	2.84	63
64	IV19	Error in setting out due to incorrect data shown in drawings	2.83	64
65	I17	Delayed possession works	2.83	65
66	IV12	The task of some project team members were overloaded	2.79	66
67	IV13	Employer's breach of contract	2.76	67
68	IV28	Argument on the prolongations costs claimed by main contractor	2.76	68
69	V7	Some of the project team members have low self esteem	2.72	69
70	V10	Technical opinion and performance trade off's	2.71	70
71	III6	The project team embers have lack of common experience	2.71	71
72	IV9	Clients takes over the site and denies access to main contractor	2.68	72
73	I19	Suspension of works	2.65	73
74	IV18	Rectification of damage caused by expected risks	2.64	74
75	V9	Interest on claims due to their late valuation	2.63	75
76	IV11	The project team members face a high degree of uncertainty on the project	2.61	76
77	IV30	Argument on the accelerated costs	2.59	77
78	IV29	Prolongation cost claimed by the sub-contractor	2.56	78
79	V1	Some of the project team members are unable to manage the mixed motives of each other	2.51	79
80	IV15	Inclement weather	2.49	80
81	I21	Misaligned ambition	2.49	81
82	IV14	Disposal of fossils	2.47	82
83	IV16	Instructions issued to resolve discrepancy	2.39	83
84	IV17	Hoisting of storm signal no 8 or above	2.32	84

The overall main factors are ranked based on the respondents response priority of goal/objective plays an very important causes of conflicts (MEAN =3.83), followed by the change of site conditions (MEAN =3.77), personality conflicts (MEAN =3.76), manpower resources (MEAN =3.73), peoples interruption (MEAN =3.69), input or instruction from leader (MEAN =3.64), outside peoples interruption (MEAN =3.63), architect or engineer dissatisfies the work of the main contractor (MEAN =3.60), communication barriers (MEAN =3.53), lack of continuous improvement (MEAN =3.52) were identifies as the top causes of conflicts in Indian construction industry in overall perspectives.

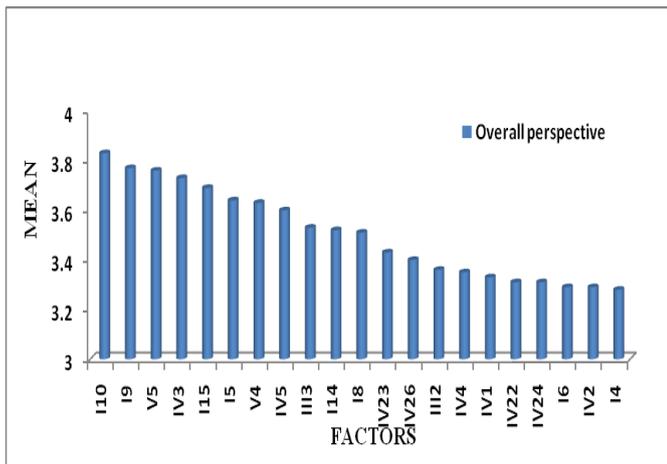


Fig 6.1 Critical Factors Causing Conflicts - Overall Perspectives

24	E23	Erosion to personal relationship	2.91	24
25	E25	Damaged emotional and psychological wellbeing	2.89	25
26	E20	Complaints and blaming	2.81	26
27	E13	Total abandonment	2.77	27
28	E12	Acceleration losses	2.76	28
29	E17	Lowered morale(losing confidence)	2.69	29
30	E27	Insubordination	2.47	30

Effects

From the overall project point of view, all the overall factors are listed from the mean ranking in Table 6.1 These critical factors have more effects on the construction projects. The top most influential factors were takes as critical effects of conflicts in construction as shown in Fig 6.1.

Table 6.2 Mean and Ranking of Critical Factors of Conflicts Effects - Overall Perspective

SI NO	FACTOR ID	FACTOR	MEAN	RANK
1	E5	Disputes	3.72	1
2	E6	Arbitration	3.71	2
3	E2	Time overrun	3.63	3
4	E30	Quality of work	3.63	4
5	E15	Wasted resources	3.60	5
6	E29	Lack of new idea	3.59	6
7	E4	Idling resources	3.56	7
8	E16	Decreased productivity	3.52	8
9	E8	Poor quality of work due to hurry	3.52	9
10	E3	Negative social impact	3.36	10
11	E18	Poor decision making	3.29	11
12	E1	Cost overrun	3.25	12
13	E26	Dissatisfaction and stress	3.23	13
14	E14	Increased costs (time, money)	3.23	14
15	E10	Litigation	3.20	15
16	E7	Delaying by the client to return the loan	3.12	16
17	E24	Harm to others not directly involved in the project	3.07	17
18	E11	Create stress on contractors	3.03	18
19	E28	Lack of direction	3.01	19
20	E21	Backstopping and gossip (roomers and bad name to project over public)	3.00	20
21	E19	Withdrawal and miscommunication	2.97	21
22	E9	Bankruptcy	2.95	22
23	E22	Attitudes of mistrust and hospitality	2.92	23

The main factors are ranked based on their mean values in which disputes ranked as the first factor on effects of conflicts (MEAN=3.72), arbitration ranked as the second factor (MEAN =3.71), followed by the factors time overrun(MEAN =3.63), quality of work(MEAN =3.63), wasted resources (MEAN =3.60), lack of new ideas (MEAN =3.59), idling resources (MEAN =3.56), decreased productivity (MEAN =3.52), poor quality of work due to hurry (MEAN =3.52), negative social impact (MEAN =3.36). From the overall perspective the most critical effects of conflicting factors are identified as shown in Fig 6.2

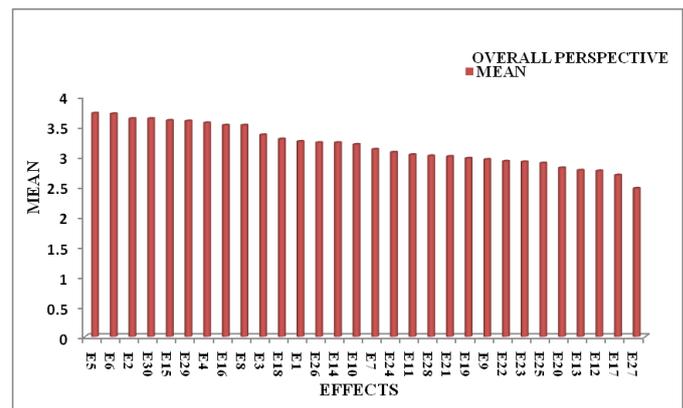


Fig 6.2 Critical Factors of Conflicts Effect - Overall Perspective

The groups of conflicts causes were analyzed based on the overall results. The group mean was calculated as the average of the conflicts causes factors in the group. In the “task interdependency”, the group mean is the average of the important factors of its constituting causes as follows: priority of goal/objective (MEAN =3.83), change of site condition (MEAN =3.69), input or instruction from leader (MEAN =3.64), cost estimates (MEAN =3.51), management procedures and administration (MEAN =3.31), insufficient efforts to keep partnering going (MEAN =3.28) resulting in average of MEAN =3.19 which is the group importance mean. The ranked groups of conflicts causes and their corresponding mean values are shown in Table 6.2.

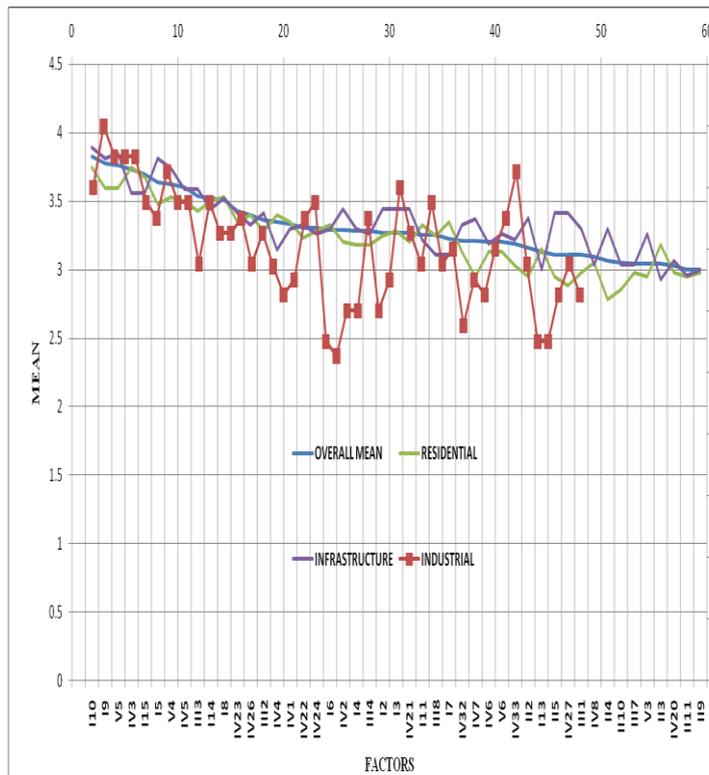


Fig 6.3 Comparison Of Mean Between All Respondents

Table 6.3 presented summarizes the mean and ranking of the categories influencing the conflicts, as perceived by all the respondents.

SI NO	GROUP OF CAUSES	MEAN	RANK
1	Task interdependency	3.19	1
2	Communication obstacles	3.13	2
3	Differentiation	3.01	3
4	Personality traits	3.00	4
5	Tensions	2.99	5

Table 6.4 Results of Mean And Ranking in the Group

Si No	Group	Residential	Industrial	Infrastructure	Overall
		Mean	Mean	Mean	Rank
1	Task interdependency	3.18	3.15	3.23	1
2	Communication obstacles	2.91	3.21	3.1	3
3	Differentiation	3.06	3.48	3.13	2
4	Personality traits	2.97	3.02	3.01	5

5	Tensions	2.96	2.94	3.09	4
6	Effects	3.13	3.23	3.25	-

RANK VALIDATION

The Pearson's rank correlation coefficient is used to measure the degree of agreement or disagreement, associated with the importance of ranking. Table 6.5 illustrates the result that there is relatively good agreement between each group in ranking the conflicts causes and effects with the highest degree of agreement of Pearson's coefficient and significance level calculations. A conclusion can be inferred from these results, that there is very agreement between the project participants in ranking the causes and effects of conflicts, despite the mean. Although some slightly contrary opinions exist between residential' and infrastructure', the highest degree of agreement exists. The results show that there is relatively good agreement between the different project types in ranking the causes and effects of conflicts with the highest degree of agreement. Due to the relative agreement between each group of parties in ranking the causes and effects, the results of this study are dependable.

Table 6.5 Pearson's Rank Correlation Coefficient of the Ranking of Causes Group and Effects

		Effect	Task interdependency	Communication obstacles	Differentiation	Personality traits	Tensions
Effect	Correlation coefficient	1.000	.997	.982	.946	.998	.965
	Sig. (1-tailed)	-	.000	.000	.000	.000	.000
	N	75	75	75	75	75	75
Task interdependency	Correlation coefficient	.997	1.000	.978	.943	.995	.965
	Sig. (1-tailed)	.000	-	.000	.000	.000	.000
	N	75	75	75	75	75	75
Communication obstacles	Correlation coefficient	.982	.978	1.000	.956	.983	.943
	Sig. (1-tailed)	.000	.000	-	.000	.000	.000
	N	75	75	75	75	75	75
Differentiation	Correlation coefficient	.946	.943	.956	1.000	.946	.949
	Sig. (1-tailed)	.000	.000	.000	-	.000	.000
	N	75	75	75	75	75	75
Personality trait	Correlation coefficient	.998	.995	.983	.946	1.000	.963
	Sig. (1-tailed)	.000	.000	.000	.000	-	.000
	N	75	75	75	75	75	75
Tensions	Correlation coefficient	.965	.965	.943	.949	.963	1.000
	Sig. (1-tailed)	.000	.000	.000	.000	.000	-
	N	75	75	75	75	75	75

7. THEORETICAL MODEL FOR CAUSES AND EFFECTS OF CONFLICTS

Multiple linear regressions have been appointed to test the hypothesis. The model was found out the relation between the effects and causes of conflicts in construction projects. To predict the relationship between the variables involved in the mediation, Regression is the widely used statistical technique. The results for the linear regression for construction conflicts, are summarized below in Table 7.1.

Table 7.1 Multiple Linear Regression

	Unstandardized Coefficients		T	Sig
	B	Std. Error		
(Constant)	0.003	0.021	0.14	0.45
Task interdependency	B₁ 0.34	0.052	6.63	0.00
Communication obstacles	B₂ -.011	0.031	-0.37	0.71
Differentiation	B₃ 0.019	0.023	0.82	0.35
Personality traits	B₄ 0.65	0.061	10.74	0.00
Tensions	B₅ -0.002	0.024	-0.087	0.93

Effects = Group of Causes

$$Y = B_1X_1 + B_2X_2 + B_3X_3 + \dots \pm B_nX_n \pm CC$$

$$\text{EFFECTS} = 0.34\text{Task interdependency} - 0.011\text{Communication obstacles} + 0.019\text{Differentiation} + 0.65\text{Personality traits} - 0.002\text{Tensions} + 0.003$$

The first hypothesis tests the relationship between “task interdependency factors” and “effect of conflicts” of construction projects. It is observed that task interdependency related factors of conflicts positively cause conflicts in the construction projects. Further the value of the relationship is 0.34, and is significant at 95% level of confidence. It is reported that one unit change in “Task interdependency related factors” can cause 34% increase in “conflict” in the construction projects. The p value for “Task interdependency” is 0.05, which indicates a positive relationship between the dependent and predictor variables. Hence, hypothesis 1 is accepted. It despite that priority of goal/objective, change of site condition, people interruption, input or instruction from leader, lack of continuous improvement, cost estimates, management procedures and administration, insufficient efforts to keep partnering going, the project teams responsibilities, The project team members impose unrealistic time demands to perform respective tasks. Explains that the significant variance in the conflicts of construction projects.

The second hypothesis indicates the relationship between “communication obstacles” and “Effects of conflicts” in the project completion. The regression model was tested, and the results were found to be significant (p=0.71). The value of the relationship is -0.011, representing that communication obstacles related factors explain no variance in conflicts, is sampled firm in India which reveals the rejection of hypothesis.

The third hypothesis tests the relationship between “Differentiation factors” and “Effects of conflicts” in construction projects. The relationship turns out to be significantly positive (p=0.42) for sample firms included in this thesis. The value of the relationship stands at 0.019, representing moderate strength for effect of the predictor variable on dependent variable. The regression weight denotes that Differentiation factors account for 1.9% variation in causing conflicts in construction projects. It is reported that one unit change in “Differentiation” can cause 1.9 increase in “conflicts” in the completion of construction projects.

The multiple linear regression revealed that factors related to the personality traits are found to have positive significant effects on the causes of conflicts in construction projects in India. The beta coefficient for this relationship is 0.65, and it is significant at 95% level of confidence. It is reported that one unit change in personality trait related factors can cause 65% increase in causes and effects of conflicts, in the completion of the construction projects, which indicates that hypothesis 4 has been accepted. The findings report that manpower resources, architect and engineer dissatisfies the work progress of the main contractor, opening for inspection, late delivery of materials by the employer, mistrusting each other, inconsistent demands from clients, architect or engineers, variations, delays caused by any organization or person, design errors, late instructions are the major causes of conflicts in the construction industry.

The fifth hypothesis of the study measures the tension related factors on the conflicts in construction projects. The multiple linear regression models reveals the coefficient at -0.02, representing that tension related factors explain no variance in the causes and effects of conflicts, is sampled firm in India which reveals the rejection of hypothesis.

8. RESULT AND DISCUSSION

In this study, 92% of males and 8% of females participated in the questionnaire survey. The target groups in this study are different project type respondents such as residential, industrial and infrastructure projects. Of the participants in the survey, 10.7% were Industrial participants, 53.3% were Residential participants and 36% were Infrastructure project participants. 36% of the respondents had less than 5 years of experience, 52% of the respondents had 6 to 10

years of experience, 5.3% of the respondents had 11 to 15 years of experience, 5.3% of 16 to 20 years of experience respectively. 1.3% of the respondents had an experience more than 25 years. 70.7% of the companies where the respondents worked, had an project size more than 100 crores INR, 21.3% had worked in the projects of size 5 to 100 crores INR, and only 8% of the respondents were from the project of size less than 5 crores INR. So the respondent's characteristics have influenced the conflicts in the construction projects.

The professionals have rated these factors between high and very high, which indicates that all the factors influence on the causes and effects of conflicts in construction projects and therefore, all these factors were considered for further analysis.

"Manpower resources" causes was identified as the prime reason of the **causes** of conflicts with MEAN-3.75 from the **residential** project's perspective, where as industrial projects rated it as second, infrastructure project's rated it as the ninth most important factor and overall it is rated fourth factor which cause conflicts.

"Wasted resources" was identified as the prime **effect** due to conflicts from the **residential** project perspective with MEAN-3.75, whereas industrial project rated it as sixth, and infrastructure project rated it as the tenth most important factor for effect of conflicts.

"priority of goal/objective" was identified as the prime reason for the **causes** of conflicts from the **residential** project perspective, whereas industrial project respondent rated it as eighth, infrastructure project respondents rated it as the first most important factor and overall it is rated as the first for causes of conflicts.

"arbitration" was identified as the key reason as rated by the **residential** project participants for the major **effects** of conflicts, whereas industrial project side rated it as second, whereas infrastructure project respondents rated it as sixth factor for the effects of conflicts.

The main factors are **"change of site conditions"** (MEAN=4.5), is ranked as the first factor to **cause** conflict in **industrial** project perspective. The main **effects** ranked are **"disputes"** with MEAN (4.5) in the first position, followed by the **"arbitration"** in the second position with mean (MEAN=4.38), **"litigation"** (MEAN=4) etc.,

The main factors ranked are **"priority of goal/objective"** in first position, and MEAN=3.89, which indicates the high importance on **causes** of conflict once the goal is not achieved in projects it can lead to several conflict issues, the project objective must be achieved for the smooth functioning of the construction projects in **infrastructure** project perspectives..

The main factors of the **infrastructure** project respondents perspective is **"time overrun"** ranked as first factor (MEAN=3.85), the second factor is idling of resources (MEAN=3.81), followed by **"the poor quality of work due to hurry"** etc.,

The **overall** main factors are ranked based on the respondents response **"priority of goal/objective"** plays a very important **causes** of conflicts (MEAN=3.83), followed by the **"change of site conditions"** (MEAN=3.77), **"personality conflicts"** (MEAN=3.76), **"manpower resources"** (MEAN=3.73) etc.,

The **overall** factors are ranked based on their mean values in which **"disputes"** ranked as the first factor on **effects** of conflicts (MEAN=3.72), **"arbitration"** ranked as the second factor, followed by the factors **"time overrun"**, **"quality of work"**, **"wasted resources"** etc.,

The other major influencing factors are **"people's interruption"**, **"personality conflicts"**, **"and change of site condition"**, **"double meaning in specification"**, **"cost estimates"**, **"architect and engineers dissatisfies the work progress of the main contractor"** is the eighth important **causes** of conflicts from the **residential** projects' view. It was identified as the fifth and ninth causes of conflicts by **industrial and infrastructure** projects respectively. The causes lead to conflicts in the project productivity and growth. The management must take necessary steps to reduce these conflict situations for the good results.

The **task interdependency** factors were major reported **causes** of conflicts of project delay and loss of productivity etc.. It is ranked as **first in overall** perspective and it is ranked as **first in residential perspective, third in industrial perspective and first in infrastructure.**

Next to task interdependency **communication obstacle** factors were ranked in the second place. The some of the main causes on task interdependency were priority of goal/objective (MEAN=3.83), change of site conditions (MEAN=3.77), personality conflicts (MEAN=3.76), manpower resources (MEAN=3.73), peoples interruption (MEAN=3.69), input or instruction from leader (MEAN=3.64), outside peoples interruption (MEAN=3.63), architect or engineer dissatisfies the work of the main contractor (MEAN=3.60), communication barriers (MEAN=3.53), lack of continuous improvement (MEAN=3.52) were identifies as the top causes of conflicts in Indian construction industry in overall perspectives.

The overall effects are ranked based on their mean values in which disputes ranked as the first factor on effects of conflicts (MEAN=3.72), arbitration ranked as the second factor (MEAN=3.71), followed by the factors time overrun (MEAN=3.63), quality of work (MEAN=3.63), wasted resources (MEAN=3.60), lack of new ideas (MEAN=3.59),

idling resources (MEAN=3.56), decreased productivity (MEAN=3.52), poor quality of work due to hurry (MEAN=3.52), negative social impact (MEAN=3.36).

9. CONCLUSION

The important conclusions drawn from the perception analysis with respect to identifying and evaluation of causes and effect factors of conflicts in construction projects, are presented.

From the statistical results, the top fifteen factors are taken as the main factors. From the above results, it is concluded, that the main factors for causes conflicts are priority of goal/objective, change of site condition, personality conflicts, manpower resources, peoples interruptions, input or instruction from leader, outside people interruptions, architect and engineers dissatisfies the work progress of the main contractor, communication barriers, lack of continuous improvement, cost estimates, opening for inspection, late delivery of materials by employer, communication breakdown and mistrusting each other.

The main effects of conflicts are disputes, arbitration, time overrun, quality of work, wasted resources, lack of new idea, idling of resources, decreased productivity, poor quality of work due to hurry, negative social impact, poor decision making, cost overrun, dissatisfaction and stress, increased costs and litigation.

The main groups of factors like task interdependency ranked as 1, communication obstacles ranked as 2, were as differentiation as 3, followed by personality traits ranked as 4 and tensions as 5 have contributed to the causes of conflicts. So these rankings should be taken into consideration planning, scheduling process and construction practices to reduce the causes behind these conflicts and its effects. The results given can be implemented in any construction projects to minimize the construction conflicts and its effects.

This study provides a good guidance for managerial intervention and also some guidelines and actionable information that managers can utilize to manage their projects.

SCOPE FOR FUTURE RESEARCH

In this paper a conceptual model of conflict management is given. Eighty four reasons for conflicts and thirty reasons for its effects are identified. Based on the secondary research top-15 reasons for conflicts causes and top-15 reasons for conflicts effects are given. Further empirical studies can be conducted based on the items from the literature review to find the reasons for causes of conflicts and effects based on primary data.

However, it is recommended that project managers should ensure that conflict of any kind is not allowed to navigate to claims and consequently to dispute and lawsuits furthermore conflict management should be introduced as part of project managers training within and outside the projects. Project management regulatory body should be established to monitor and regulate activities of project management in Indian construction industry as this will enhance project management practice training and retraining of project managers.

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