Int. Journal for Housing Science, Vol.35, No.3 pp. 159-169, 2011
Published in the United States

EMOTIONAL INTELLIGENCE (EI) AND PERFORMANCE IMPROVEMENT SYSTEM (PIS) IN CONSTRUCTION INDUSTRY USING DIGITAL MONITORING SMART TEST: A Key for Effective Construction Organization

S. Abul Kalam Azad
Project Management in Development Projects,
Cushman & Wakefield, Mumbai
India

ABSTRACT

Today's construction business environment nurturing and training talent is a big hurdle for several organisations. Also due to increasing competition many construction companies has adversely affected their profit margins, customer loyalty, and ultimately shareholder return. The ultimate fact is that, most of the construction organization fails to attempt using advanced management tools which are unable to make the project participants working in the better collaborative and teaming environment. Also due to large participants than in any other industry, it is not possible to manage using traditional management tools and their concepts. Hence, we must ensure with need of multi-skills to complete these demands. In a business driven by innovation, skilled employees are any organizations competitive advantage, because they act as sole resources for ideas.

To overcome the present difficulties, the survey was conducted using a web based questionnaire and some direct approach among the construction industry professionals, which investigates and readdress the deficiency. This Investigation mainly focus on **Emotional Intelligence (EI)** with psychological approach; which shows a fundamental understanding of barriers and challenges to effective interaction among a diverse project team and necessary tool towards creating truly collaborative

0146-6518/03/159-169, 2011

project teams in construction. Also this study introduces specific initiatives to reskill, groom and develop quality talent from the trainee level.

In addition to that **Performance Improvement systems (PIS)**, in practical construction have been carried out, which the performance metrics are defined using the ***SMART test*** as a management tool (i.e., Specific, Measurable, Attainable, Relevant, and Timely) for accurate monitoring in construction projects. This work also focuses in using advanced technology with the application of value engineering like micro monitoring SmartCam in execution using internet via digital network applications. By adopting this EI & PIS in construction industry, the overall depressions like workplace stress, pressure due to deadlines & conflicting demands, non quality staffing, poor quality construction, unsafe execution, improper risk assessment can be eliminated.

Key words: Emotional Intelligence (EI), Psychological approach, Performance Improvement System (PIS), SMART Test, Value engineering.

Introduction

The construction industry is one of the most vulnerable to risks in comparison to other industries. Today due to rapid development in fast track business management as well as technology, construction professionals must have the capability to ensure unforeseen risks, which do not interfere with their contractual, financial, operational performance and organizational requirements, we must ensure with need of multi-skills to complete this demands. Hence to ensure the success of projects, it is essential for construction professionals to have effective management experts on their team, to analyze, manage, monitoring and mitigate potential risks.

In order to achieve this balance, an effective management strategy should be implemented and also often overlooked resource that can successfully counter by applying advance construction management tools. Also we need to understand better the balance between a positively challenging industry and the point at which individuals lose the ability to cope through work place stress.

Methodology

A Survey was conducted using web-based discussion and some direct approach with the various construction organizations. The outcome was excellent with 93% response as in Table 1.

As the result of the survey, construction industry shows poor performance in the following areas; they are Poor Emotional Intelligence, Poor software skills, Insufficient training, More workplace stress, Poor communication, Poor planning, Insufficient IT suits in monitoring, Lack of Feedback and Unforeseen Conditions in site, which is shown in Fig 1.

Table 1 : Number of Companies Responded

Sl.No	Types of Organisation	Targeted	Responded
1	Contractor	76	68
2	Project management Consultants / Project managers	89	81
3	Governmental organizations	7	7
4	Private investor / client / developer	29	26
5	Professional associations related to construction	56	56
6	Forensic Experts in construction	14	14
	Total		

As the result of this study, this paper gives four stages with suitable solutions in a short way, to cope up some alternative ideas for effective construction. Stage 1 is on Project rating, Stage 2 on Effective evaluation, Monitoring & Selection of Team, Stage 3 on Smart training, and Stage 4 on Digital Smart monitoring.

Stage 1: Project Rating

Whenever a project is going to start, the total project activities should be studied effectively and the entire project is divided into number of activities and sub-activities and assign weight age to them depend on the types of project (Ex. IT buildings, Commercial buildings etc.).

This study should also be given to the sub ordinates and teach them how to verify and audit the progress during pre and post-construction. This will help out for accurate monitoring of the whole project with progress calculation, where we are and how to carry out within schedule time.

Finally in the Post Construction Period, the total evaluation chart acts as a reference for the future projects with how to handle as well as do's and dont's report as shown in Table 2. This evaluation is used more effective when same types of project handle at different locations. We are now aware of things what to do, how to handle these types of projects. This forms the systematic approach construction process, when it is

repeated using previous evaluation charts. It can also do with high accuracy and speedy construction.

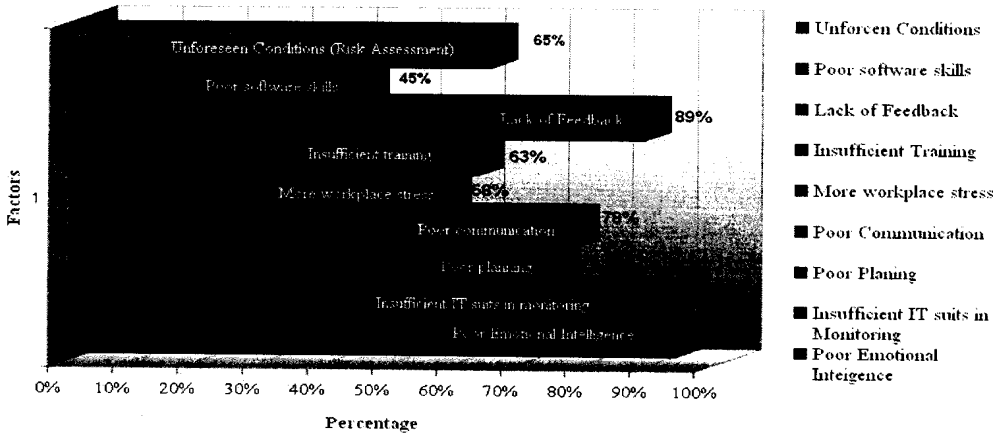


Figure 1 : Percentage shown Poor Performance in construction industry

Stage 2: Effective Evaluation, Monitoring & Selection of Team

Step A. Effective evaluation for job performance evaluation:

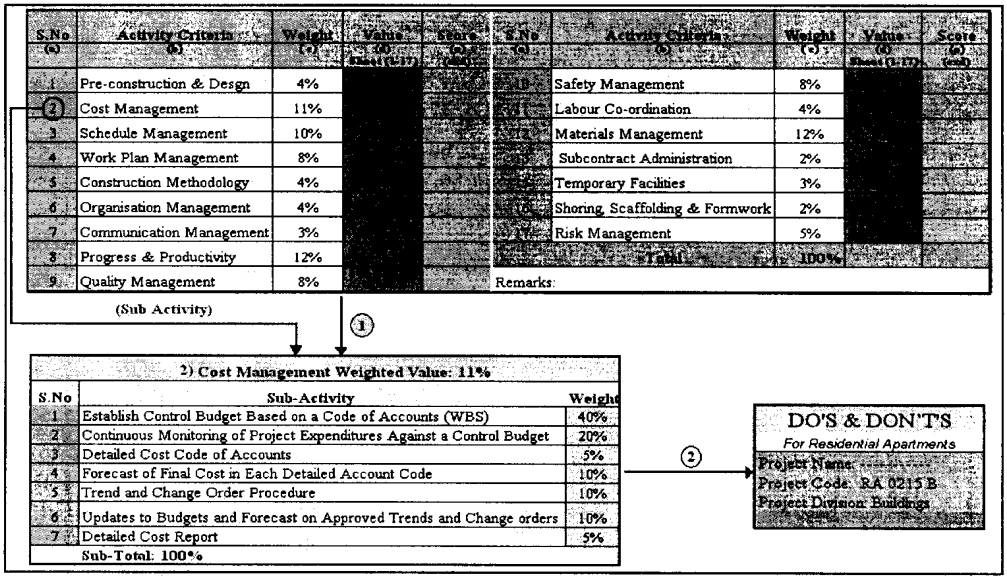
Most of the existing literature has suggested that the construction industry does not pay attention to the importance of job performance evaluation for their employees. Human resource is a core economic asset. Organizations are responsible for helping their employees work at their optimal level. Job performance evaluations become an essential organizational activity, which can sustain employee performance. Hence by focusing this area individual performance evaluation is carried out, which would help the employees to identify their strengths and weaknesses in overall management. It also describes a process for job performance evaluation as well as need for improvement in the respective departments in construction using the analytic network process as shown in Table 4.

Step B. Using EI as Smart team management:

In the construction industry, the major project participant includes the owner, Project management consultants, the architect, the contractor and the subcontractors. Traditionally, each participant's activity in the construction process has been isolated to its particular organization's goals. In recent years, one of the leading trends of project deliveries has been a movement toward a more collaborative, teaming environment.

Successful collaboration requires an effective interaction among project participants. A fundamental understanding of barriers and challenges to effective interaction among a diverse project team is necessary towards creating truly collaborative project teams in construction.

Table 2 : Example for Project Evaluation charts for effective & accurate analysis



S.No	Activity Criteria	Weight (%)	Value (a)	Score (a)*(%)	S.No	Activity Criteria	Weight (%)	Value (a)	Score (a)*(%)
1	Pre-construction & Desgn	4%			10	Safety Management	8%		
2	Cost Management	11%			11	Labour Co-ordination	4%		
3	Schedule Management	10%			12	Materials Management	12%		
4	Work Plan Management	8%			13	Subcontract Administration	2%		
5	Construction Methodology	4%			14	Temporary Facilities	3%		
6	Organisation Management	4%			15	Shoring, Scaffolding & Formwork	2%		
7	Communication Management	3%			16	Risk Management	5%		
8	Progress & Productivity	12%				Total	100%		
9	Quality Management	8%			Remarks:				

(Sub Activity)

① ② ③

2) Cost Management Weighted Value: 11%

S.No	Sub-Activity	Weight
1	Establish Control Budget Based on a Code of Accounts (WBS)	40%
2	Continuous Monitoring of Project Expenditures Against a Control Budget	20%
3	Detailed Cost Code of Accounts	5%
4	Forecast of Final Cost in Each Detailed Account Code	10%
5	Trend and Change Order Procedure	10%
6	Updates to Budgets and Forecast on Approved Trends and Change orders	10%
7	Detailed Cost Report	5%
	Sub-Total: 100%	

DO'S & DON'TS
For Residential Apartments
Project Name:
Project Code: RA 0215 B
Project Division: Buildings

That's why; Emotional intelligence reflects an individual's emotional awareness and emotional regulation, both important factors of social interaction, which shows, a set of competencies demonstrating, the ability one has to recognize his or her behaviors, moods, and impulses, and to manage them the best according to the situation. Hence, an initial understanding of the project participant's emotional intelligence would provide meaningful direction for the construction industry in regards where improvements should be focused.

Hence, this paper gives more weight for EI training which construction professionals should execute for better performance. As such, the present research study investigates 36 components of the Emotional Quotient Inventory within the construction industry and how to handle the peoples as a Smart motivator. This investigation creates an emotional intelligence yardstick by which to measure and compare future research.

Table 3 : Multismart sheet for conducting various tests to up-date the employees performance

S.No	Designation / Smart Test	LogicSmart 1	BodySmart 2	NatureSmart 3	SoundSmart 4	WordSmart 5	SelfSmart 6	PeopleSmart 7	TimeSmart 8	ImageSmart 9
1	Project Manager	☺	☺	☺	☺	☺	☺	☺	☺	☺
2	Asst.Project Manager	☺	☺		☺	☺	☺	☺	☺	☺
3	Project coordinator	☺				☺	☺	☺	☺	
4	Site supervisor		☺		☺			☺		☺
5	Quantity surveyor	☺								☺
6	Safety supervisor				☺			☺	☺	
7	Service engineer								☺	☺

Table 4 : Individual performance evaluation report

Individual Performance Evaluation Report						
Employee Name:			Employee Code:		Review Date :	
Department:					Sub-total	**Total (A+B)**
Job Performance criteria (Marks scored 1-100)					(A)	(Max 100)
Technical knowledge	**Quality Execution**	**Ability**	**Efficiency**	**Responsibility**		
18%	22%	15%	25%	20%		
82	*73*	*75*	*68*	*85*		
Management Performance criteria (Marks scored 1-100)					(B)	
Team Co-operation	**Equity**	**Attitude**	**Punctuality**	**Discipline**		
28%	25%	20%	17%	10%		
85	*75*	*72*	*80*	*78*		*77.4*
Grade criteria:	90-100 Grade S	80-90 Grade A	70-80 Grade B	60-70 Grade C		Grade: B
Reviewed by:			Title:		Employee Code:	
Remarks: ***In general performance has been improved,but is lower than the departmental average. On-Job Training will be provided for improving:First the efficiency;Second the attitude in management.***						

Step B. Smart Motivation management:

There are specific six motivation styles which a responsible staff may adopt while managing project participants in construction industry. There is no single all-purpose motivational style. It is suggests you vary the style according to the situation you are managing depend on project activity and responsibility. Table 5 shows the types of style for an employee, who is carried out using various components and identify the type of motivator.

Table 5 : Smart Test carried out to identify the type of motivator depends on activity.

Category	SmartMotivation Style	Marks scored in Smart Test											Ranks depend on priority
		1	2	3	4	5	6	7	8	9	10	11	
A	Coercer												6
B	Pace Setter												5
C	Authoritararian												1
D	Affiliator												4
E	Democrat												
F	coach												3

It is suggested that a combination of three styles are more effective for construction industry – Authoritarian, Coach and Democrat

Stage 3: Smart Training

Smart training is in such a way that it can be accurately monitored in stage wise. This is a multi-training approach with the collaboration with other industries related with construction. Usually in construction industry only very few organizations give training to their employee which is reflected in survey report. Even they provide training it is not in sequence.

As this paper explains above that our construction industry involve one of the largest participants than any other industry. Hence the training from top level to low level employee is must and it should periodically reviewed with latest and advanced approach. We mostly learn when the problem occurs and by means of experience it takes long time to know. But by the time of knowing things the technology and peoples communication grows at rapid level, leaving behind our experience out of date. However, experience is one of the most valuable things to know practical construction. There is no more way for our industry to gain knowledge. But in addition we have to know advanced happening and how to solve uncertain before it occurs. Hence for the meaningful approach and considering the future needs both experiences from top level peoples and the advanced management tools need for construction professionals. Beside that we have to train our professionals with other industry peoples related to our industry. This brings new knowledge which can adopt to our industry.

Table 6 : Six types Smart Motivation style for construction Industry

Category	Smart Motivation Style	Facing Type	Where to Use
A.	**Coercer**	He made to force to act (or) think in a certain way by use of pressure. He rewards subordinates who are willing to conform to his wishes. If the frequency is repeated for long time it will report to poor performance of work as well as poor quality.	This type of style should consider for small contractors of very short duration or when the schedule is behind the actual progress.
B.	**Pace Setter**	He tents not to manage the motivations of employees in any conscious way but rather sets the pace and expects employees will follow. He finds it harder to become interested in those employees who have not developed the same degree of commitments as himself.	These type of style should used for temporary task which is not as much involve related to industry. This should not used when we wants effective team work.
C.	**Authoritarian**	He has socialized his concern over others and in smooth manner gets people to co-operate with him. He is very task and activity oriented. His men have learned to work with him and know the limits to which he is prepared to consider their views.	This type of style can use to big contractor for long run projects. But the deadlines are fixed and track them frequently.
D.	**Affiliator**	He is less effective motivator because he feels harmony between people is more important than getting the job done. His aim is to satisfy the peoples first in all respect.	These type of style used for clients or owners, Architecture and structural consultants or to higher officials.
E.	**Democrat**	He fells that people are motivated by needs and if the needs are satisfied, then his subordinates will work under their own self-direction and self control. He feels that too much control depresses performance. He believes if you want a man to produce, you should treat him as a professional and not as a hired hand. Results he get from subordinates in short run are unimpressive. If his subordinates don't have the capacity for self-direction and self control, then their response may be poor.	These type of style used for his subordinates. In the long run, results will be poor to excellent, depend on individuals under him.
F.	**Coach**	He may work closely with his men and reward not only for performance but also for improvement in performance. He recognizes that not everybody can be a top performer, but everyone can improve some. As their performance increases, he decreases his own involvement and concentrates on stimulating subordinates to carry one at a faster pace.	These type of style used for trainees from all levels. A Coach tends to be successful both in the short and long run.

Table 7 : Example for value engineering training

S.No	Item	Basic Function	Cost (C)	Low cost alternative to accomplish basic function and Durability	Cost alternative worth (W)	Ratio (C/W)
1	M 25 CONCRETE (Cement+FA+CA)	Bond & Strength	Rs.4200	M 25 CONCRETE (Cement + 25% Fly ash) +FA+CA)	Rs.3500	1.2

Remarks : COST TO WORTH ratio is greater than 1 will usually indicate good potential for value efforts for construction industry.

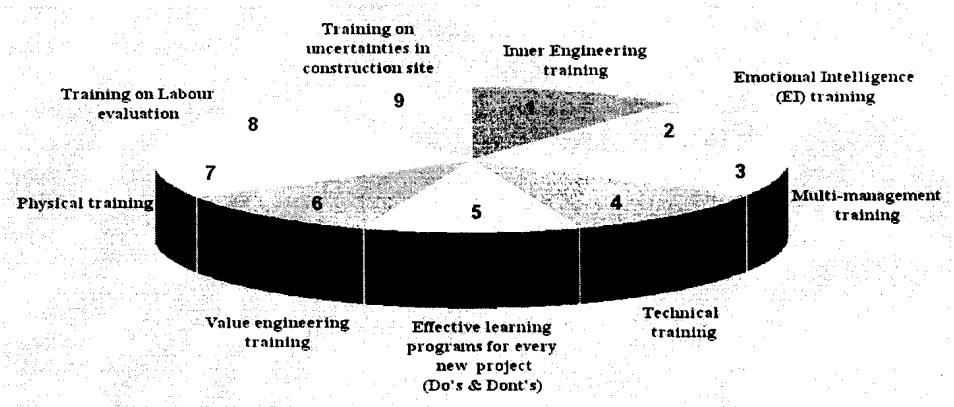


Figure 2 : Nine types of training for effective execution in construction industry

Stage 4: Digital Smart Monitoring

Digital Smart monitoring is the advanced tool with fast track monitoring, which almost fulfill the needs in construction field. When a building lasts for a long time, the structure of it must be able to sustain the erosion of weather over time. It is usually difficult for the client or the supervising architect or project manager to look after every detail in the actual construction. In simple term, quality control is at stake. Early advocates suggested the installation of CCTV systems on site; for example, the idea was good but the equipment cost, wiring inaccessible points, outdoor execution monitoring caused a lot of inconvenience.
In order to execute performance improvement as well as value engineering in site, it's better to develop a moving cameras/webcam which is fixed in safety helmets for accurate monitoring, anywhere even in obstructions. This shows through a remote eye, taken by webcam and transmitted via the internet to anywhere in the world.

The high-resolution web cam of 12 Mega pixels is installed in safety helmet and is connected to a wireless LAN access point. With a high-range transformer, the receiving access point can be as far as even 2.4 KM away. The project manager can therefore monitor the whole construction process, especially during unforeseen conditions and immediate solutions. The system is integrated into a virtual meeting system, which is a web-based many-to-many multimedia communication system.

The meeting system supports video and sound transmission (via desktop webcam), shared whiteboard as well as text messages. Finally, a standard computer can then display real time footage. In all of these cases, customers, contracting officers, project managers or other approved

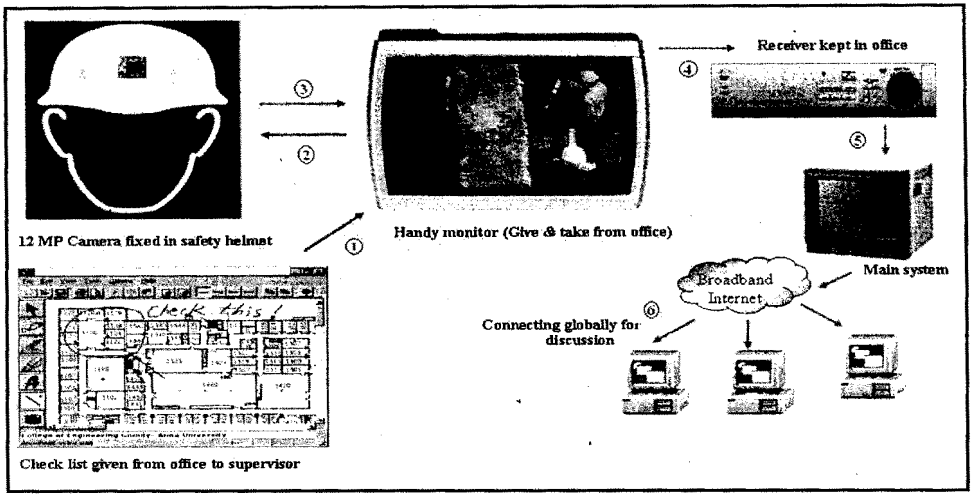


Figure 3 : Digital smart-cam technology for effective monitoring in construction industry

Team members could access current project conditions using the secure web site, instead of calling team members on site and asking questions.
It would be possible to set up a method for posting issues, modifications, clarifications and change orders on the web site so decisions could be documented quickly and construction could proceed. Video conferencing and white boarding on the internet improves the collaboration of project participants by sharing construction information in multimedia formats.

We can also have the ability to see unsafe working practices and take early action, check progress at any time, view details which may have been unclear from the drawings, help them plan deliveries, For just in-time deliveries and to give an indication of how unloading of components and materials will work, a record of activities and pictorial evidence is said to be of greater value to budges and arbitrators, so could lead to lower legal bills, effective construction operations and adjust plans for the next one accordingly.

The total cost of this monitoring range between INR 1,43,500 – INR 2,66,500, depends on the facilities. Also we can connect maximum of nine different Smartcams at different locations at a time, and monitor from a single main system. This will transfer it anywhere globally for discussion, which makes fast track in construction industry.

Conclusion

This paper just briefed the framework to the construction industry to improve performance in management in advanced level. Further research is required to identify some more exact figures affecting in systematic construction. EI and PIS using Smart approach contributes effective team management participants and advanced technology in construction industry, which arms leaders with proven, science-based tools and methodologies to capitalize on what is being left on the construction table - employees who contribute only *have-to* performance. Leaders focus the work and earn more discretionary effort from the men and women in their organization—the people who truly drive construction business success. EI & PIS is a necessary and strategic component for the next generation in construction industry. Using digital Smartcam monitoring effective construction operations can be carried out which fulfills exact supervision with better solutions.

References

1. M. D. Dunnette and L. M. Hough, eds., Vol. 2, Consulting Psychologists, Palo Alto, Calif., 271–326.
2. Cheng, E. W. L., and Li, H. _2005_. "Analytic network process applied to project selection." *J. Constr. Eng. Manage.*, 131_4_, 459–466.
3. Deadrick, D. L., and Gardner, D. G. _2004_. "Performance distributions: measuring employee performance using total quality management principles." *J. Qual. Manage.*, 4_2_, 225–241.
4. Hanna, A. S., and Brusoe, J. K. _1997_. "Study of performance evaluations in electrical construction industry." *J. Manage. Eng.*, 13_6_, 66–74.
5. Ireland, V. _2004_. "Improving staff performance." *Constr. Manage. Econom.* 22_2_, 121.
6. Katzell, R. A., and Thompson, D. E. _1990_. "Work motivation: theory and practice." *Am. Psychol.*, 45_2_, 144–153.