DESIGN MANAGEMENT IN CONSTRUCTION PROJECTS

BY **ARIE RAZA**

ABSTRACTS: ***Customers are the sole reason of designing, building and delivering a product or service. The design manager's role are to realise the clients vision and idea to meet and satisfy clients needs and requirement by technically economically feasible project with regarding current regulations , and consequences to the society and environment, and to help clients to specify and clarify their wishes and intentions.***

KEYWORDS: *CLIENT, DESIGN MANAGEMENT, PROJECT MANAGEMENT, TEAMWORK, LEADERSHIP, INFORMATION TECHNOLOGY. QUALITY.*

DEFINITION:

the word **DESIGN** according to Webster's New World Dictionary
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vt. :1 to make preliminary sketches of; sketch a pattern or outline for; plan
2 to plan and carry out, esp. by artistic arrangement or in a skilful way 3 to form (plans, etc.) in the mind; contrive ,
4 to plan to do; purpose; intend, 5 to intend or set apart for some purpose,
vi. 1 to make designs, 2 to make original plans, sketches, patterns, etc.; work as a designer
n. 1 a plan; scheme; project , 2 purpose; intention; aim, 3 a thing planned for or outcom aimed at,
4 a working out by plan, or development according to a plan
5[*pl.*] a secret, usually dishonest or selfish scheme: often with *on* or *upon* [to have *designs* on another's property],
6 a plan or sketch to work from; patter [a *design* for a house],
7 the art of making designs or patterns, 8 the arrangement of parts, details, form, colour, etc. so as to produce a complete and artistic unit; artistic or skill invention, 9 a finished artistic work or decoration
SYN. INTEND, PLAN

INTRODUCTION & BACKGROUND :

Construction process is usually broken down into subprocesses because the nature of the individual subprocess varies significantly, and in practice it is common to assign particular project personal or groups responsibility for individual subprocesses.
Project management serves to manage constructions process or rather to manage and co-ordinate the subprocesses .
Their are different models to illustrate these subprocesses and phases:
preliminary studding , design subprocess, construction, and administrating.(Jan Bröchner 95).

Paul D. Grander and John E.L. Simmons (Analysis of conflict and changes in construction projects 1992) divide the construction process into:
Inception subprocess , briefing subprocess, design subprocess , construction subprocesses.
Design subprocess is a important phase in the construction process, in this subprocess the shape ,type and quality of the product considers .

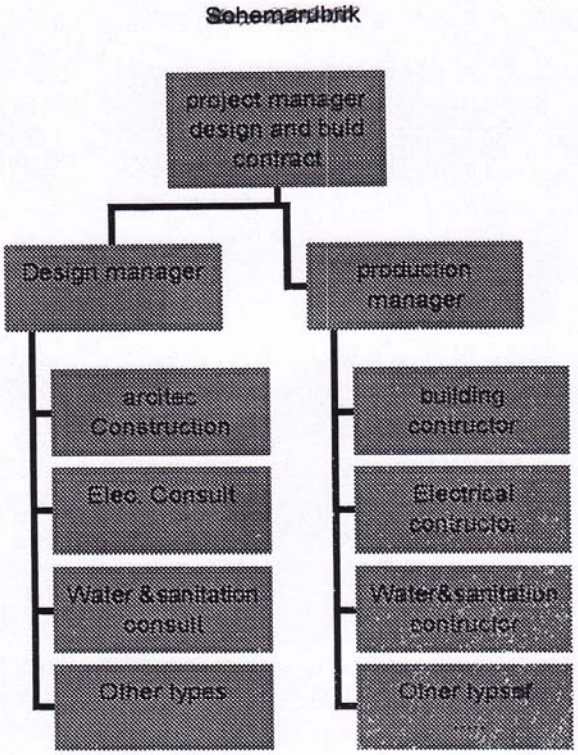
OBJECTIVES:

The objectives of this paper is to illustrate the design management in the constructions process and design manager role with case studding project "Swedish Science Center" which is not clear yet if the project starts because of financing problems.

PROJECT ORGANISATION:

The temporally multi -organisation established for the limited and finite purpose of bringing the project into being from inception to completion, and which consist of parts of several separate and diverse organisations and whose members will eventually disappear , going back to their own organisations or to some new project (Cherns and Bryant, 1984).

The organisation should be tailored to the requirement of the specific project, and " *a good organisational solutions allow smooth integration of the project work into the company organisation, as well as high level of responsibility and independence of the project team" . (H Knoepfel 1992).*
There are many different Models of project organisation these models attempted to show relationship between persons and /or groups involves in the construction project.
As example (Design & Build contract)



DESIGN MANAGEMENT

The subprosses Design consist of four interacted phases , artistic, information management, deliberation, and problem solution (Bröchner 95).There are many parts engaged in the design process , these are specialists and the design work is a high qualified work .The client has a primary role and the relation between the design group and the client or his representative is iterative and almost continuous during the design time (Bröchner 95).

The parts involves in design work are usually , Architect consult, construction consult, electrical , ventilation, water & sanitation and others consults depending upon the type of the project.

The work of these consults have to be managed and co-ordinated to avoid design errors and contradictions. The work begins with some sketches ,then preliminary design drawings with specifications and later the detail drawing of construction ,etc. ....boundary lines between the assignment of these parts are not always clear, and to avoid conflict and wasting efforts doing same task twice, require clarifying borderlines carefully.

In house building projects traditionally the architect has the role of design manager, but in infrastructure projects ,construction engineers are almost proper for the job, and projects like some industries with huge and complicated installations, the mechanical engineers or other engineers may be suitable to be design managers.

Design is a team work ,and the design managers work are high qualified job ,
"Design Managers should have a long experience , good skills , characteristics of leadership , and have a team with high skilled members " (Göran Tröff ,FFNS SWEDEN).

"*Customers identified and redefined as a sole reason for designing , building and delivering* a product *service " .(L R Ireland 1992)* . The project manager and the design manager role in managing the clients expectation and requirements directly relates to the success of the project.
It is of a grate essence for both the Design and project manager to have a good knowledge about the Client and the Clients representative , clients organisation .
There are tow types of Client , those who have no construction expertise, and those with in-house expertise available'.

Walker (1988) define Cline system to include organisations which satisfy one or more of the following criteria (i) has the authority to approve expenditure on the project ;(ii) has the authority to approve the form the project has to take and / or its timing (iii) will be the owner of the project (iv) will be major tenant or user; (v) will administer or manage the project upon completion. . LR Ireland extend the idea of Customer to include some organisations (or persons) that the project manager should try to fulfil their expectation and Some of these custmers are relevant for designers to take them into account, although they are or may not be a part in the contract. These are users of the product , partner in the project which have expectation of participating , team members expecting professional leadership , society , and environment .
Naturally these expectations should be realistic ,and they should be economically, and technically feasible with regarding current regulations and consequent to the society and environment.

Although the relation between the design group and the Client linked through project manager but it is very essential to have a direct communication with the client .

One of the most difficulty which face both the design manager and project manager is to deal with representative of the client who has no authority to make decisions and mast go back to the steering committee, or has difficulty to stand for the decision he or she has been made.
(Göran Träff Swedish Science Center , FFNS)

"If organisations are working on a joint project and have different priorities for performance , the potential for problems and conflict is high". (C Gary, S Dworatschek, H Knoepfel and E Larson 1990).

"Co-ordination problems are exacerbated on joint project when firms from different counters use different project management structure" . (C Gary, S Dworatschek, H Knoepfel and E Larson 1990).

There are different organisations involved in the project and in the design subprocess and these organisations have different culture , priorities and economical interest , the design manager(and as well as the project manager in more extended scale) have to deal with these differentiations and have to try to integrate them in his (her) team to reach the goal of the group which is normally is the interest of all the parts (organisations) to perform the project in the best form and at the contracted time.

Since project is a task that is limited in time and effort ,the design manager has not enough time to deal with the conflicts in long term solutions ,and has no authority to make changes in other organisations rather than his/her organisation . Construction firms usually prefer to replace personal to overcome conflicts .
But these organisations have to analyse carefully the cause of conflicts and to take proper action to prevent them in the next project or in future and to study how to be more efficient team (double lope learning)

Construction contracts have routines and principles to deal with conflicts but these are general and not contain details to avoid conflicts.

The economical crises and bad state of building sector in SWEDEN demands that the constructions firms note to wait for the client but to seek clients and to generate projects and try to find sponsors, as the case of Swedish Since Center which FFNS found the idea of building a Science Center for the Swedish firms and Industry to give them opportunity to innovate new technology and products , and to make Swedish youth more interested in technology and since.

In the project of Swedish Science Center Project manager , Design manager (Architect) and the Construction consult are FFNS Which make a good ground for contribution and better co-ordination but at the same time some other parts was not really satisfied and there was same irritation about to much influence on the project from FFNS side.

There are some principles and routines for the project manager and design manager to take them into consideration so as to avoid conflicts and to attain higher efficiency and productivity.
As mentioned before the design subprocess as well as construction project is a teamwork, and good project managers and design managers are team leaders.

Whilst this paper is not directed at detailed study of leadership styles and characteristics in detail but some of these qualifications have significant affect on effectiveness of the organisation system of the project

It is of concern to managers to maintain good relation ships and harmonious working atmosphere.
an atmosphere of openness and trust ,and participation.
Organisational culture has a significant influence on how, and indeed whether , the team operate effectively.
different types of organisational culture exist , not all are conductive to teamwork and teams may develop subculture . The leaders should be aware of these cultures . and design managers should try toavoid confrontation.
The group leaders have to look at the team problems from different angels and be open to all data.
Groupledars have to be aware of members morals and motivations, and take proper actions to improve them.

Other skill areas for the team leader in general in which strength should be developed are
Planning, Organising, Coaching Persuading , Negotiating and **Communication,** which is the most essential for the leaders . Most of conflicts originate from bad communication and misunderstanding .

" Conflict and Changes can have considerable impact on the success or otherwise of construction projects"
(Paul D. Gardiner and John E.L. Simmons 1992)
There are tow types of change in Construction project , Design changes and Scope changes . A scope change is a fundamental change to the intent of the project . A design change dose not alter the scope of the project.
Project design has the most occurrences of conflict and changes .

Concurrent engineering and changes demands better and faster communicating systems .
The right information at a right time to the right person is what information technology in construction concerned about . IT dose play essential role in the design work and design management. IT makes the correct information available to the all parts of the construction project and allows easy and economic storage processing , display and transfer of data.

Design managers have to arrange meetings regularly to communicate directly , to provide opportunity to the all parts to participate in making decisions , to get clarification to challenge accuracy of the information to get feedback, to solve conflicts and to achieve co-ordination of efforts .

Quality management system provides a method of working which aids the client and the design manager to check the validity of each operation or activity against identified requirement .
There is an increasing tendency to view quality as customer satisfaction rather than a technically superior product or service (L R Ireland 1992).

CONCLUSION

The subprocess of design is an essential process in construction in which the form and type of the product are considered, to satisfy clients needs and expectation and in this stage the decisionis are made about how to satisfy the functional requirements . These considerations have effects to the society and environment

There no doubt that there are much to be written about the design subprocess in construction projects, and there are more issues and factors to be taken to account in studding design management.
Whilst to much conclusions can note be drawn on the bases of studding the project of Swedish Science Center which all the design work are note started and until know it is note clear that the parts will succeed to finance the project ,nevertheless the persons who contributed in giving information do have long experience from other projects.

The new tendency to view qualities customer satisfaction rather than a technically superior product or service is quite interesting.

Finally this paper based on personal experience , interviews, and following

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Individual literature analyze

Psychological analyzes in material production in construction

By **Arie Raza**

ABSTRACTS: Many articles have been written about loss of productivity and improvement in production ***rates. Authors give different attentions to root causes of the problem . Many of these factors may interact to cause a loss of productivity. In addition , the factors cited as causing a loss of productivity do not always do so .When such factors occur ,their impact varies from project to project, from activity to activity and from crew to crew. Many articles are also written about using new technology and methods to facilitate different types of Activities . These articles needs to look to these issues from overall perspective. Psychological analysis does play a significant role in studying these issues.***

The action response model seems to be a good method to study the loss of productivity .

***KEYWORDS* : Productivity, Attitude, Motivation , Action-response model, Innovation, Just in time**

INTRODUCTION & BACKGROUND :

Productivity and quality in the construction industry has not improved as much as in other industries . There are many factors that influence productivity in the construction industry. Same factors that create variations in production rates for certain activities are extremely difficult to control and other factors that can be fairly easily identified , modified and can lead to significant improvements in production rates of activities.

Many articles have been written describing some of these factors and other articles describe resolution techniques and facilities to increase productivity.

OBJECTIVES

The objectives of this paper is to consider which articles of a total eleven articles using psychological discussion in analyzing productivity in construction industry .These articles are given in the end of this paper and they are course literature of production processes in construction

ANALYZING THE ARTICLES

The articles give attention to different factors and technical solutions and facilities to prevent and minimize the loss of productivity and to improve productivity in the construction industry. They are relevant to the issue, but improvement of productivity can not be related only to some of these , in fact many of them play important rule and these effects to be considered at the same time or by interacting. There is no doubt that psychological factors are among the relevant factors of root causes of loss of productivity and improvement of it .

The article (Effects of Delay times on Productions rates in Construction) by **John Christian and Daniel Hachey**

This article do not gives special attention to psychological aspects, but a very few lines of it might be related indirectly to psychological aspects when they mentioned: "In concreting activities it was found that the most significant reduction in the production rate was due to

delay in delivery of concrete to the site. This type of delay was often attributed to unexpected occurrences that appeared to be not rectifiable, and therefore was a secondary concern to a very busy management

The article (Quantitative Effects of construction changes on labor productivity) By **H. Randolph Thomas and carmen L. Napolitan** gives a very little indirect attention when They Talk about "Changes affect Labor productivity" that the work done out of sequence, and the crew doing the work needs to stop their present assignment , and plan for the new work. The phenomena called loss of moment or loss of rhythm Under" Data collection procedures" pointed that data collection efforts was organized around the completion of eight forms .Under form no. 1- manpower/labor pool Crew composition ;absenteeism. However they have not gone further to the causes of absenteeism ...etc., and how to tackle these problems.

Article Project planing process for capital facilities by **G. E. Gibson Jr. & H. E. Lore Jr.**

Under "Major subprocesses of preproject planing" They mentioned that when selecting a team the members must be skilled and the team should be dynamic in its membership and Draft Charter which defines the preproject-planning-team `s mission and responsibilities ..... Although the article is not extent these issues to psychological aspects and these are more related to the organizations experience, I think that well defining and clarity in members (crews) responsibility and organization is very important in the organizational ,administration as well as psychological point of view.

"Just - in - time and implementation for building material management " By **Akintola Akintoye**

The article is basically about JIT but the authors give some attention to psychological aspects and he mentioned that JIT requires Trust and Discipline by building materials suppliers , and encouragement , motivation, cooperation and coordination by construction contractors. It requires an attitude change of employees, and it is very important that all employees in both contractor and the suppliers organization the JIT material management program before its implementation .

"**Action - Response** Model And Loss of productivity in construction"
by **David W. Halligan , Laura A. Demsetz , James D. Brown and Clark B Pace**

This article essentially gives attention to psychological aspects when analyzing the root causes of loss of productivity .
The authors give attentions to complexity of analyzing the root causes of loss of productivity which is not always or necessarily the result of unanticipated conditions like adverse weather, Scheduled overtime ,material shortages ...etc. They provide a model for analyzing the complex - and - effect relationship that may lead to a loss of productivity in construction, they called it as "Action-Response Model" and they believe that productivity or lack of it is a crews response to external events and the action of others.

The authors means that the productivity in construction is usually taken to mean labor productivity , and they define it: as units of work placed or produced per man - hour , and the labor productivity is often the greatest source of variation in overall construction productivity and the productivity of other inputs can often be measured with respect to labor productivity. The inverse of labor productivity , man - hours per unit (unit rate)

is also commonly used.
Its obvious that the authors have psychological aspects behind giving attention to that definition.

They studied workers motivation and productivity in the article . Workers motivation in conjunction with or in the absence of other factors as:
Adverse weather and environmental Conditions , Scheduled overtime , Disruptions ,and additional factor. They explained how precipitation , wind , temperature , and humidity may lead to reduce performances du to both physiological and psychological factors , and the influence of temperature and humidity varies a great deal by individual and is affected by attitude and motivation . Also they refereed to studies previously done about the effect of overtime on the productivity and how productivity loss are generally attributed to fatigue and to decrease in workers motivations. Therefor, to the extent that effective managers can keep workers motivated to minimize the impact of the overtime.
Additional factors such as low morale, poor supervision , poor training and unsafe working conditions are generally related to workers motivation and they refer to other studies which have shown how the effect the management can have on crew performance and how strong effect has the Forman on the workers performance as example.

The "ACTION - RESPONSE MODEL OF PRODUCTIVITY LOSS" graphically depicts how a variety of factors may interact to cause a loss of productivity and how a crew and hence productivity is influenced by
these factors .
These figures are :
* fig 3 page 55 Basic relationship for model of productivity which shows the relation between external conditions, contractor actions and crew response and how these affect each other.

*Fig 4 on page 56 Expected Relationships for model of productivity loss shows external conditions and contractor actions in more detail.
*Fig 5. on page 57 Action - response Model of productivity Loss shows different level in detail these levels are
Initiating Events : owner action, force Majeure, environmental conditions, contractor initial actions
Crew level constraints
management- level , contractors management action, consequent of management action and Crew response which is specified as:
fatigue, low motivation , slow pace of work, absenteeism, worker turn over idle time , poor quality work.
They depict arrows between these levels to indicate "may lead to a relationship".

INTRODUCING NEW PROCESS TECHNOLOGIES INTO CONSTRUCTION COMPANY
*by **Maria Laborde and Victor Sanvido***

The objective of this article is to give the U.S. contractors a set of guidelines for the successful introduction of a new technology into their companies.
When they analyze this issue they do give some attention to psychological discussions in some cases indirectly.

The authors refer to Tatum (1989) which complete the description of the elements of innovation of the model in Tatum (1987) by elements of organizational structure and Culture that foster innovation . They refer also to the Construction Industry Institute (Haggard 1991) in using pilot project that the people organized teams should be well motivated .

In innovation process model which consist of four steps :step one(Identification) gives also attention to motivation . Step two (Evaluation) when the director of development analyzes the benefits versus of the alternative innovation technologies, he or she have to use many criteria's and one of them is " Impact on Moral, quality, and safety. In step four (Feed back) among activities which regarded as "unrealistic to think that the project manager will have a time to perform with the degree of dedication that they deserve" in point three authors made psychological explanation when they discussed the importunes of rewarding team member regardless of success or failure. Monetary rewards considered by the authors to be preferred if the project was successful. and other types of recognition should not be underestimated, and "respect among ones peers and admiration from superiors are psychologically valuable reward to any individual.

If the project was not successful ,even though ,team members must not be punished , but be given a chance to learn and help correct it on next job. In discussing Suggestions and Reward Programs they further extend the same ideas .
In conclusions they pointed two main barriers to innovation in the USA construction industry are the Fear of risk and variety of restrictive code and regulation.

CONCLUSION

Constructions industry problem is not only loss of productivity but also how to find new methods to increase the rate of productivity and to produce better quality , less time to produce and lower prices of end product.

There are many factors which influence the loss of productivity which are discussed in the articles mentioned at end of this paper and they are all relevant as general but have different influence on different types of project , Companies ,Crews, and at different times .
Definitely psychological factors is one among them. Attitudes and Motivation are of a great importunes in studding the loss of productivity as well as in adoptions of new methods and technology in innovation , Information technology ...etc.
Innovation is the second important issue for the construction industry to be able not only remain in same position with the same rate of productivity but also to make a progress compared to concurrent companies

ARTICLE STUDIED

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