MANAGING OCCUPATIONAL STRESS OF PROFESSIONALS IN LARGE CONSTRUCTION PROJECTS IN SRI LANKA

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ABSTRACT

This research aims to take an insight at construction professional-specific occupational stress causing factors, and their impacts to the productivity. The occupational stress causing factors pertinent to construction professionals, consequences of occupational stress and occupational stress prevention strategies that could be implemented within the construction sites were studied and a questionnaire survey was carried out among construction professionals such as project managers, Engineers and Quantity surveyors to identify the significance of them. Ten stressors were identified as significant in causing occupational stress among constructional professionals. Further it was recognized the organization related factors have a significant variance of occupational stress among professionals. Thereafter 11 significant impacts for project managers, 9 significant impacts for Engineers and 11 significant impacts for Quantity surveyors were explored. Impact of occupational stress of construction professionals for low performance and productivity can be reduced and job satisfaction can be enhanced by implementing the occupational stress management strategies in construction sites.

Keywords: *Occupational Stress; Productivity, Large Construction Projects; Construction Professionals; Occupational Safety and Health*

1. INTRODUCTION

Continuous increasing in complexity of work and growing demand for higher productivity have become common features of the industry and thus, created a challenging environment towards achieving time, cost and quality targets of construction projects (Ibem *et al*., 2011; Jang *et al*., 2003). Under such circumstances, many professionals including project managers, engineers and quantity surveyors have to work under pressure (Thomas *et al*., 2005). Thus to a certain extent, stress has become a normal part of most of the professionals' work environment. Stress is a natural consequence of a change that can be either positive or negative (Strutton and Tran, 2014). Occupational stress is a pattern of responses in workplace that occurs when employees are offered with work demands which are not matched to their knowledge, skills or abilities, and which challenge their ability to cope with (Mohajan, 2012).

Generally, it is considered that occupational stress is harmful to physical and mental health of workers under various circumstances. As such, excessive stress interferes with their performance and productivity and thus efficiency of the overall project delivery (Ng *et al.*, 2005; Amankwah *et al.*, 2015). Therefore, occupational stress is a growing problem worldwide which results in significant costs for both of the employees and organizations and may experience in various behaviours (Strutton and Tran, 2014; Cotton and Hart, 2003). These behaviours includes; low motivation and morale, decrease in performance, high turnover and sick leave, accidents, low job satisfaction, low quality products and services, poor internal communication and conflicts etc. (Schabracq and Cooper, 2000). However, this problem has been overlooked at the industry level and hence professionals have to find ways of managing their stress at individual capacity to meet delivery of the projects within the time, cost and at the required quality (Leung, Ng *et al.*, 2004). Therefore, this particular research was mainly outlined and aimed to address the occupational stress causing factors and their impact, extend of the occupational stresses among professionals in large construction projects.

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2. TYPES OF STRESSES

Selye (1976), who often referred to as the "father of stress", was the first to distinguish stress as "good stress (eustress)" or positive stress and "bad stress (distress)" or negative stress. Positive stress is generally short term perceived and results motivation, better focus improve personnel coping abilities, feel exciting, improve performance etc., whereas negative stress can be short term (acute) or long terms (chronic) resulting anxiety unpleasantness, decreased performance and mental or physical problems (Leung *et al*., 2004). Among these, chronic stresses create bad health problems and thus it is required to manage its causing factors. When the stress caused as a result of occupational factor such as mismatch of the job requirement and the worker's capabilities, resources or need of the workers, is known as occupational stress (The National Institute of Occupational Safety and Health (NIOSH) cited Mohajan, 2012). Such "Stress" is not limited to any particular occupation or profession (Ng *et al*., 2005).

Statt (1994) has specially noted that construction work is the third most stressful profession after mining and police work. As cited by Oladinrin *et al*. (2014), Sutherland and Davidson (1993) found that 77% are senior managers and 23% are middle level managers among professionals who have experienced stress in the UK construction industry. Further, recent studies show that construction workers experienced much more stress at their workplace than at home, and thus created undesirable effects on their health and productivity at work (Wahab, 2010). Similarly, a negative correlation is mentioned between the occupational stress and the job satisfaction as well as organizational performance (Elovainio *et al.*, 2002; Cotton and Hart, 2003; Kazmi, 2007 cited Amankwah *et al*., 2015). While there is a reported increased in occupational accidents high absenteeism, alcoholism, and drug abuse have become major social problems due to occupational stress (Clarke and Cooper, 2004).

The common types of stressors related to the construction industry can be categorized into four main groups at the site level as work demand, work environment, job role and organizational related (Ibem *et al*., 2011). Unspecified employment requirement, extremes of formality, lack of locus of authority are organizational related stressors (Raitano and Kleiner, 2004). Additionally, Ng *et al*., (2005) mentioned inadequate room for innovation, unsatisfactory remuneration and ambiguity of job requirement as stressors. According to Cooper cited Ekundayo (2014), these causing factors have been categorized in a broader way by adding several levels including environment, individual and individual differences in addition to organizational level stressors. Uncertainties such as economic, political and technological are discussed under environmental related stressors.

3. SIGNS AND SYMPTOMS OF OCCUPATIONAL STRESS

According to literature findings, signs and symptoms of occupational stress are appeared as physical, psychological, behavioural consequences which include (Gupta, 2013; Ekundayo, 2014; Oladinrin, *et al*., 2014; Ademola (2005) and Melinda *et al*. (2010) cited Amankwah *et al*., 2015);

- Physical: cardio-bronchial pains, blood pressure, palpitations, weight loss from under-eating and sleeping at abnormal times, eating disorders, headaches, hair loss, breathlessness and hyperventilating, muscle ache, dryness of throat and mouth, sweaty palms, diarrhea, indigestion, stomach ulcers, etc.
- Psychological: feeling of useless, and hopeless, lack of concentration, tenseness, sleep disturbances, depression, distrust, anxiety, etc.
- Behavioral or emotional: impulsive behavior, eating more or less, easily distracted, speech problems, sleeping too much or too little, change in personality, irritable or aggressive, grinding of teeth, increasing smoking and drugs and alcohol, burnout, nervous habits, increased errors, absenteeism, lack of concentration, etc.

4. OCCUPATIONAL STRESS MANAGEMENT

Individuals' ability to mobilize and successfully or unsuccessfully deal with stress factors is defined as coping with stress, adjusting to stress or stress management self-mobilization (Stoica, 2010). Instead of

taking medicine to reduce stress, there are many ways of diminishing its damaging effects through better control and management (Oladinrin *et al*., 2014). Moreover, organizations can orient their employees to regular maintaining of well-being and prevention of occupational stress (Treven and Potocan, 2005). Such prevention strategies at organizational level can be taken as primary, secondary and tertiary prevention methods (Ratino and Kleiner, 2004; Jordon *et al*., 2013):

- Primary prevention is the elimination or reduction of the factors that promote distress
- Secondary methods involve moderating the response of stress itself
- Tertiary prevention strategies are the attempts to minimize or cope with excessive distress from inadequately controlled stressors and inadequately controlled or moderated stress responses.

5. OBJECTIVES OF THE STUDY

Since stress at work is a well-known factor for low construction productivity, the research focuses to examine whether the various construction professionals can adequately cope with the stresses they are confronting. Thus, the research is designed to examine occupational stress causing factors and their impact, extend of the occupational stresses among professionals in large construction projects in Sri Lanka.

6. RESEARCH DESIGN

The research was structured to several phases. It begins with an extensive literature review to identify occupational stressors specific for the construction professionals, impact of occupational stress and occupational stress prevention strategies. Literature findings were used to formulate the questionnaire and it was validated though a pilot survey, focusing on the comprehensiveness, reliability, and conciseness. Three industry experts from each professional categories were participated for the pilot survey. Those experts were selected considering the experience in large construction projects and experience in both civil engineering and building sectors.

In the second phase, the detailed questionnaire was designed by incorporating the expert feedback given to the pilot questionnaire. The questionnaire was comprised with two separate sections namely; personnel information and subject information and a cover page. Further, it was included with both open ended and closed ended questions. Personnel information section covered the profession of the respondent, experience in large construction projects, age and gender of the respondents, marital status and opinion of the respondents for the occupational stress as a health and safety problem.

Three main questions to identify significant stressors, impact of such situation and stress prevention were included for the observations of the subject information. In the first question, forty one stressors were organized into ten headings namely; (1) work load and workplace related factors WL&WP, (2) work time related factors - WT, (3) organization related factors - O, (4) work related factors W, (5) career development and status related factors - CD, (6) interpersonal relationship related factors - IR, (7) preparation and training related factors, (8) Organizational function and culture related factors - OC, (9) participants related factors - P, and (10) other problems related factors - OP. In the second question, 17 number of potential health impacts which were identified through the literature survey were listed under three groups as physical response, psychological response, and behavioral or emotional response.

Respondents were asked to rank the extent of given problem using a 5 point Likert scale to measure the severity.

7. SAMPLE SELECTION

The target survey group was considered as the professionals who are working in large construction projects. Large construction projects were defined as;

“Construction projects which are complex in nature and multitasking, contact sum more than Rupees 600 million including both Building and Civil engineering construction projects” for the study.

Hence, large construction Organizations defined as the "Organizations which are undertaking large construction projects".

However, it was impossible to survey those large populations due to limited resources. The cluster sampling method was used for the study by selecting the registered large scale construction contractors (i.e. grade C1) in Colombo area. Further, it was aimed to select the most experienced professionals. A list of C1 grade contractors in Colombo area were taken from the ICTAD (Institute of Construction Training and Development) website. In view of that, 20 firms were listed as C1 contracting firms in Colombo area. Visiting the firms, details of large construction projects which were completed in last 10 years were obtained and 25 projects were selected for the study. Most experienced persons who have engaged in those projects from each professional category were invited for the survey. Hundred and six questionnaires were delivered using two methods; direct handover and via emails. Further on average 2-3 reminders had to be sent for the professionals who were communicated through emails. Reminders were given over the phone and visited to collect the completed questionnaires for other professionals.

8. RESULTS AND DISCUSSIONS

8.1. PROFILE OF THE SURVEY SAMPLE

84 questionnaires were received claiming 79% response rate from 106 questionnaires. Nine questionnaires were rejected due to their incompleteness. Tables 1 and 2 represent the composition of the survey , and site experience and age of the selected respondents respectively. Further, 36% of the sample was female while remaining 64% was male.

Table1: Composition of the Survey Sample

Profession	Distributed Questionnaires	Received Questionnaires	Response Rate	Selected Questionnaires
Project Managers	37	26	70.27%	25
Engineers	33	29	87.87%	25
Quantity Surveyors	36	30	83.33%	25

Table 2: Site Experience and Age of the Respondents

Description	Project Managers	Engineers	Quantity Surveyors
Site Experience (years)			
< 5years	-	17	15
5-10 years	16	7	4
10 years <	8	1	6
Age (years)			
25-35 years	14	21	19
35-45 years	7	3	6
over 45 years	4	1	-

Occupational Stresses among Professionals

Results reveal that 96% of the respondents have experienced occupational stress while 4% have not experienced occupational stress during their work experience. Further, 90% of respondents have indicated that occupational stress as a health and safety problem and hence it impacts the productivity whereas 10% responded have not considered it as a health and safety problem.

8.2. SIGNIFICANT STRESS CAUSING FACTORS

T-test (at 5 percent significance level) was conducted using Statistical Package for Social Sciences (SPSS) software to identify significant stressors from given 41 stressors in the questionnaire. To test the null hypothesis the following conditions were used:

H_0: $m=m_0$ against the alternate hypothesis

H_1: $m=m_1$, where 'm' is the population mean and m_0 is the sample mean.

Test value was taken as 3, according to the given scale. Thus the stressors which have obtained critical t-value 1.990 and less than 0.05 p value are identified as significant. According to results obtained from the t-test, 11 significant stressors were established from 41 given stressors under 10 headings in the questionnaire survey (Table 3).

Table 3: Significant Stressors

Stressor	Mean Rating	Std. Dev.	t-value	Sig.	Rank
Time pressures and deadlines (WL&WP)	3.85	0.711	10.397	0.000	1
Work overload (WL&WP)	3.83	0.795	9.007	0.000	2
Lack of control over pacing of work (WL&WP)	3.48	0.760	5.471	0.000	3
Long hours of work (W)	3.55	0.949	4.991	0.000	4
Different views from superiors (W)	3.43	0.808	4.571	0.000	5
Unpredictable hours of work (WT)	3.35	1.007	2.982	0.004	6
Inadequate recess (WT)	3.33	0.977	2.954	0.004	7
Exposure to heavy traffic jam (OP)	3.32	1.092	2.537	0.013	8
Inflexible work schedules (WT)	3.24	0.998	2.083	0.041	9
Lack of resources and staff shortages (OP)	3.28	1.192	2.035	0.045	10
Use of mobile phones while working (OP)	3.28	1.225	1.999	0.050	11

8.3. IMPACT OF OCCUPATIONAL STRESS

Occupational stress causes serious impact when it is taken as a negative stress. As highlighted by Ilbem *et al*. (2011) in his study, recent studies show that construction workers experienced more negative stress at their workplace, and this had been caused undesirable effects on their health and productivity at work. Occupational stress is a critical issue for the individuals and consequently result in loss of organizational productivity (Akrani, 2011 cited Amankwah *et al*., 2015). In this research, second objective was to examine the impact of occupational stress of professionals in large construction projects.

Two tailed t-test was conducted to identify the critical impacts faced by each professional category separately. The results are shown in Tables 4, 5 and 6.

Table 4: Response of Project Managers

Productivity Impacts	Mean	Std. dev.	t-value	Sig.	Rank
Fatigue (PR)	3.20	0.763	7.856	0.000	1
Tense more often (ER)	3.40	0.913	7.668	0.000	2
Aggressiveness (BR)	2.92	0.702	6.549	0.000	3
Neck and Back pains (PR)	3.20	1.041	5.765	0.000	4
Impact on family and personnel life (BR)	2.96	0.841	5.710	0.000	5
Less job satisfaction (CR)	2.80	0.764	5.237	0.000	6
Unable to Relax (ER)	3.12	1.201	4.661	0.000	7
Reduced attention (CR)	2.40	0.500	4.000	0.001	8
Headaches (PR)	2.64	0.907	3.527	0.002	9
Depression and Anxiety (ER)	2.40	0.764	2.619	0.015	10
Sick more often (PR)	2.36	0.810	2.221	0.036	11

Table 5: Response of Engineers

Productivity Impacts	Mean	Std. dev.	t-value	Sig.	Rank
Aggressiveness (BR)	2.84	0.850	4.938	0.000	1
Less job satisfaction (CR)	3.08	1.115	4.843	0.000	2
Unable to Relax (ER)	2.76	0.926	4.106	0.000	3
Tense more often (ER)	2.76	0.970	3.919	0.001	4
Depression and Anxiety (ER)	2.80	1.080	3.703	0.001	5
Feelings of powerlessness (ER)	2.68	1.069	3.180	0.004	6
Headaches (PR)	2.36	0.700	2.571	0.017	7
Fatigue (PR)	2.52	1.085	2.397	0.025	8
Neck and Back pains (PR)	2.52	1.194	2.177	0.040	9

Table 6: Response of Quantity Surveyors

Productivity Impacts	Mean	Std. dev.	t-value	Sig.	Rank
Depression and Anxiety (ER)	3.08	0.909	5.939	0.000	1
Tense more often (ER)	2.96	0.841	5.710	0.000	2
Unable to Relax (ER)	3.00	0.913	5.477	0.000	3
Aggressiveness (BR)	2.88	1.092	4.028	0.000	4
Less job satisfaction (CR)	2.68	0.945	3.597	0.001	5
Fatigue (PR)	2.68	1.069	3.180	0.004	6
Impact on family and personnel life (BR)	2.52	0.918	2.831	0.009	7
Neck and Back pains (PR)	2.72	1.275	2.823	0.009	8
Reduced attention (CR)	2.36	0.700	2.571	0.017	9
Making mistakes frequently (CR)	2.44	0.870	2.529	0.018	10
Feelings of powerlessness (ER)	2.40	0.816	2.449	0.022	11
Headaches (PR)	2.56	1.356	2.064	0.050	12

Results obtained from the t-test explored 11, 9 and 12 significant impacts for the PMs, Engineers and QSs respectively. Eight impacts such as Fatigue, Tense more often, Aggressiveness, Neck and back pain, less job satisfaction, Unable to relax, Headache, Depression and anxiety are common for all three professionals.

Fatigue is more often due to the heavy work load. Generally they have consciously work more than eight hours during a project to meet their targets. This problem has become more serious when they handle multiple projects.

Similarly, Tense more often and Aggressiveness are often linked with heavy work load. When the job demand is high; exceeding the person capacity, the above responses have become common among construction professionals.

Back and neck pain is occurred due to longer sitting hours with wrong posture. This problem is more often originated due to mismatch of the dimension of the chairs with person's body height to have better ergonomic seating facility. On the other hand, people are not serious about seating posture in most of the time.

Due to stressful working environment, most of them have felt less satisfaction towards their job. Thus, they are not fully committed to perform their work well.

Headache and even Depression and anxiety situation are identified mostly due to unable to relax with the workload. This has been further impacted on Family and personal life of them. In the local context, people always try to hide depression situations. Therefore, they are reluctant to obtain medical advice or drugs at early stages to control the situation due to fear in exposing the situation to others.

In addition, professionals neglect to highlight their health problems at work as well as they are still ready to work even if they are not feeling well. This is very common in developing countries (Chopra, 2009).

9. CONCLUSIONS

According to the previous researches, occupational stress leads to a decline in employees' job performance as excessive stress interferes with performance. This supports the assertion that excessive stress interferes with productivity. Stress must therefore be kept under control. Occupational stress has become an ignored term in the construction industry and the impact has been rarely studied due to the inherent characteristics of the industry. Construction projects are highly committed to the achievements of time, cost and quality targets. During last 10 years large construction projects were started by turning a new page in the Sri Lankan construction industry due to the construction boom. Therefore, it was identified that this is the most appropriate time frame to start assessment of occupational stress of professionals involved in construction industry.

Majority of the respondents (96%) have responded that they are experiencing stress at workplace while others (4%) said that they are not experiencing occupational stress. However, stress has become a big issue for the performance of the individuals due to less job satisfaction. Further 89.93% of respondents have presented that they are facing occupational stress as a health and safety issue, while 10.07% of the respondents stated that they do not face occupational stress as a health and safety problem.

This research study found 11 significant occupational stressors and especially organization related factors which have difference of occupational stress among different professions. Further, significant consequences were studied for different professionals separately as the results were shown in tables.

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