

# Stress Analysis of Engineering Graduates Using Six Sigma Methodology

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## ABSTRACT

*In any country engineering sector plays a vital role for overall development of tertiary and industrial sector. A challenging career as an engineer usually leads to many types of job stress. Job stress is an unpleasant emotional situation that employee experience when the work-related or non-work related requirements cannot be resolved. Job stress has been identified by most of the academic researches as the factor which had contributed to higher or lower job satisfaction and performance. Issues like health problem, role and work pressure are among the stress factors which have always been debated as most common problems. This present study attempted to test the factors influencing on quality of work life of an engineering graduate. The current situation of the engineering graduates and the problems and stresses which they have to face in their day to day life is studied using six-sigma method. This study laid focus on the factors influencing quality of work, socio-economic background of respondents, and expectation of employees in the work place.*

**Keywords:** Stress Analysis, Engineering Graduates, Six Sigma.

## INTRODUCTION

Employees are the stimulus energy that is behind in every successful organization. Quality of work life refers to the level of pleasure or displeasure with one's own career. Those who enjoyed their career are said to have a high quality of work life, while those who are unhappy or whose needs are otherwise unfilled are said to have a low quality of work life. Employees are human beings and income generating asset like fixed assets and non-fixed assets, but application of provision needs somewhat difference rather than physical assets. physical assets can't raise questions or grievances but human assets have thousands of questions and grievances, in case the organisation failed to meet their complaint and expectations. Employees are often expects various quality requirements from the work place, these can be classified into personal anticipatory, motivational in sights, job freedom, work place needs, branch operation and working conditions. Quality of working life was associated with satisfaction with wages, hours and working condition, describing the basic elements of a good quality of work life as; safe work environment, equitable wages, equality employment opportunities for advancement. At the finale it is concluded that a happy and healthy quality of work life among employees will give better turn over, make good decisions and positively contribute to the organizational success.

## LITERATURE REVIEW

### 1. Stress

Stress as a state of tension experienced by individuals facing extra ordinary demands, constraints, and personality. Stress can reach a destructive state more quickly .People who perceive a good fit between job

requirements and personal skills seem to have a higher tolerance for stress than do those who feel less competent as a result of a person job mismatch. Also, of course, basic aspects of personality are important.

### Sources of Stress

Some of the factors that commonly cause work-related stress include:

- Long hours and Heavy workload
- Changes within the organisation
- Tight deadlines and Changes to duties
- Job insecurity
- Boring work and Insufficient skills for the job
- Over-supervision and Inadequate working environment
- Lack of proper resources and Lack of equipment
- Few promotional opportunities
- Harassment and Discrimination

### 1. Stress and Health Problems

- Fatigue
- Muscular tension
- Headaches
- Heart palpitations
- Sleeping difficulties, such as insomnia
- Gastrointestinal upsets, such as diarrhoea or constipation
- Dermatological disorders

### 2. Performance Due to Stress

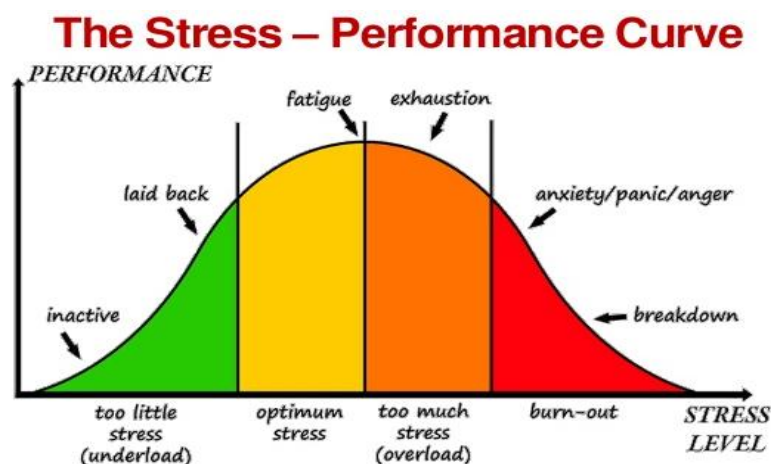


Fig.(1) Stress-Performance Curve

Stress is dysfunctional for both the individual and the organization. One form is the job burnout that shows itself as loss of interest in and the organization. One form is the job burnout that shows itself as loss of interest in and satisfaction with a job due to stressful working condition. When a person is “burned out,” he or she feels exhausted, emotionally and physically, and thus unable to deal positively with work responsibilities and opportunities.

### 3. SIX SIGMA METHODOLOGY

Six-sigma is an improvement strategy leading towards reducing defects on existing curriculum and strategies efforts in improving the curriculum growth and sustainability. It defines limiting of the number of defects to 3.4(parts per million).This kind of this methodology has two techniques which

are known as ‘DMAIC’ (Define, Measure, Analyse, Improve and Control) and ‘DFSS’ (Design for Six sigma). The main difference between these techniques are that DMAIC is defined as a process improvement strategy applied on developed and existing project or system while DFSS is leading towards designing new product or process. Besides, DFSS is a source intensive method that is very expensive when compared to DMAIC. Hence, DMAIC, a five step process is adopted in this study. The total defects of a Six Sigma refers to the total area to the right and left of  $+6\sigma$  and  $-6\sigma$ .

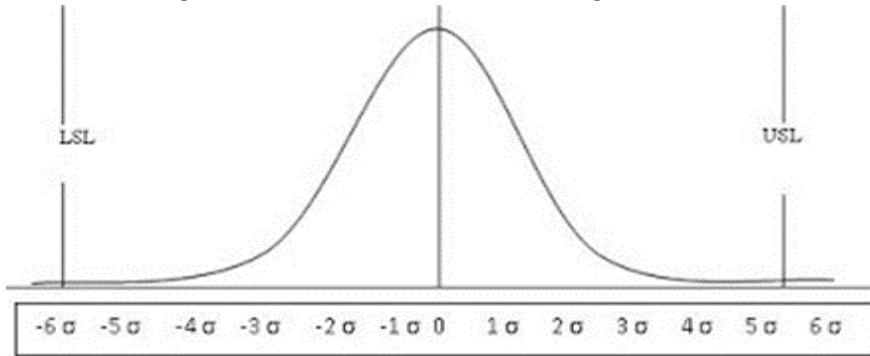


Fig. (2) Six Sigma Curve

The five step improvement phases are

- i. Define phase
- ii. Measure phase
- iii. Analyse phase
- iv. Improve phase
- v. Control phase

### I. Define Phase

The first step to understanding the process is to develop a process map for the engineering graduates and their work life and then construct a cause-effect diagram to evaluate the effect of input variables on output. The potential suppliers of this work life are companies providing jobs. The process consists of number of steps from which a company head assigns a job till the work gets completed.

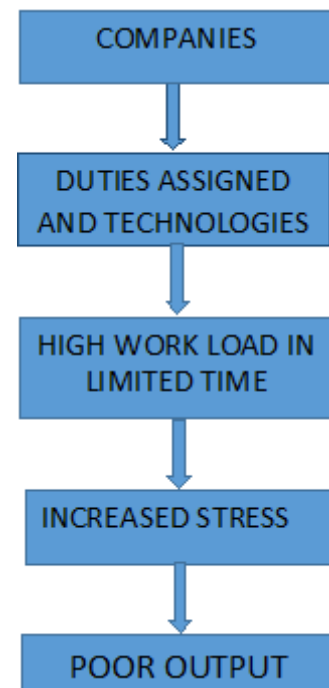


Fig.(3) Define Phase Chart

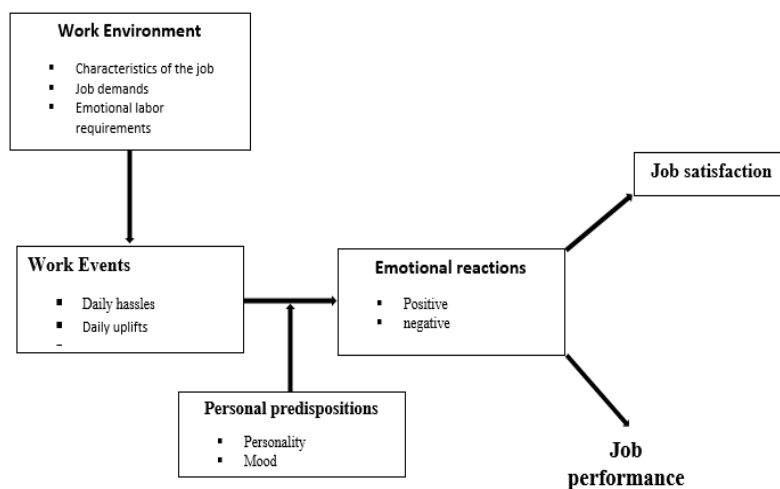


Fig.(4) Define Phase Table

## II. Measure Phase

In the measure phase, all measurements related to the work life of engineering graduates and their stress are calculated. Among different factors affecting quality of products produced on the company and stress of employees, the important ones may be work load of employees, lack of time.

### CFI. ( 4) Measure Phase Graph

## III. Analyse Phase

After developing the process map, it is important to identify the causes for low quality of product produced in the company. A cause and effect or fishbone diagram is widely used to approach in identifying the root causes and their effects. The sources of low quality of product found as stress of employees and less work time. The fishbone diagram shows the root causes from four different sources that lead to the low quality of products that produced in the company. Identification of these sources can help in making changes to improve the product quality.

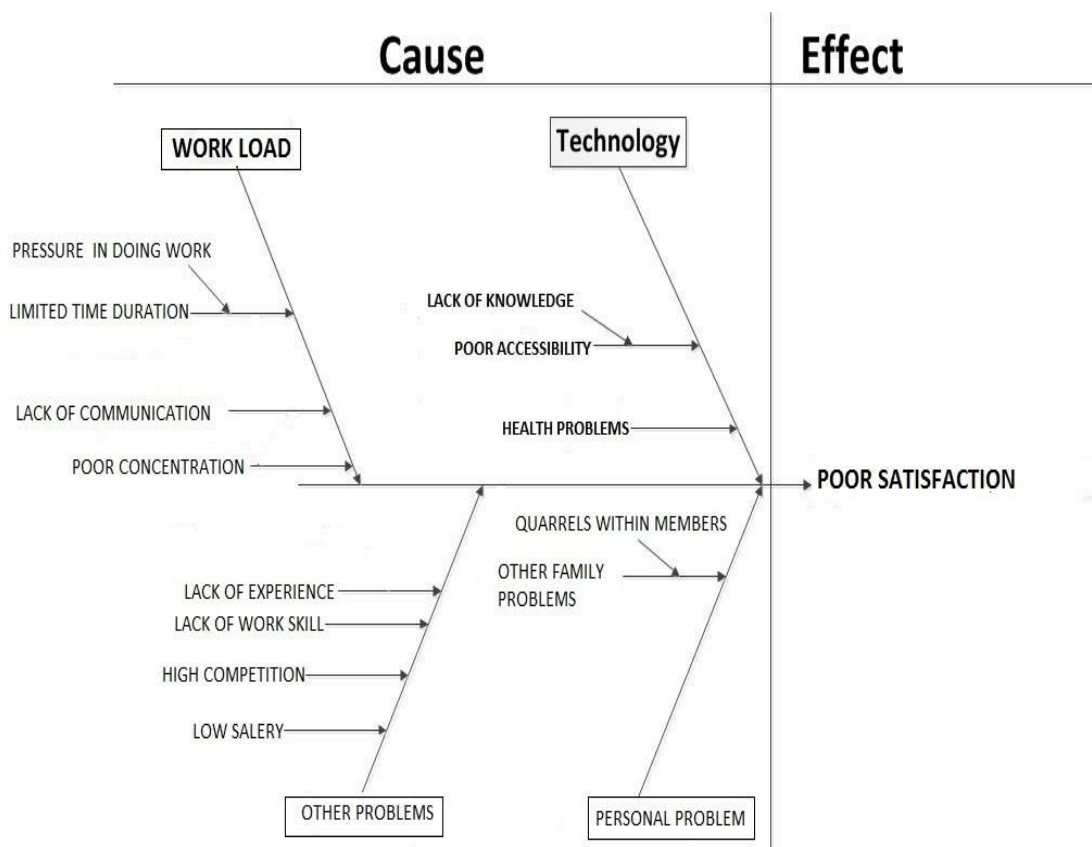


Fig.(5) Cause Effect Diagram

## IV. Improve Phase

In the improvement phase, the causes for failure or low quality must be identified with a solution that will reduce defects in the process. A failure mode and effect analysis or FMEA can be used to improve this process. . These quality tools could be very well used for the development and improvement of product quality. A step-by-step procedure is used to identify all possible causes of failure and their corresponding effects with recommended corrective actions to avoid the failure modes. Quality needs to be properly assessed with respect to employees stress, working time etc. which makes the good quality product and makes a good company.

PROCESS STEP	FRESHERS	EXPERIENCED PERSONS	COMPANY
FAILURE MODE	<ul style="list-style-type: none"> <li>LACK OF TIME</li> <li>LACK OF EXPERIENCE</li> </ul>	<ul style="list-style-type: none"> <li>WORK PRESSURE</li> </ul>	<ul style="list-style-type: none"> <li>EMPLOYEES WITH LESS INTEREST ON WORK</li> </ul>
FAILURE EFFECT	<ul style="list-style-type: none"> <li>FRESHERS WITH LOT OF STRESS</li> </ul>	<ul style="list-style-type: none"> <li>GIVE WORK TO THE FRESHERS</li> </ul>	<ul style="list-style-type: none"> <li>UNAVAILABILITY OF COMPLETE PRODUCT</li> </ul>
FAILURE CAUSE	<ul style="list-style-type: none"> <li>LACK OF INTEREST</li> <li>BAD TIME MANAGEMENT</li> </ul>	<ul style="list-style-type: none"> <li>CONCENTRATION ON LOTS OF RESEARCH WORK</li> </ul>	<ul style="list-style-type: none"> <li>LESS INTERESTED EMPLOYEES</li> </ul>
CONTROLS OR PREVENTIVE ACTION	<ul style="list-style-type: none"> <li>REDUCE WORK LOAD</li> <li>GIVE MORE TIME TO COMPLETE WORK</li> </ul>	<ul style="list-style-type: none"> <li>GIVE MORE TIME FOR RESEARCH WORK</li> </ul>	<ul style="list-style-type: none"> <li>REDUCE WORK LOAD</li> <li>GIVE MORE TIME TO COMPLETE WORK</li> </ul>
RECOMMENDED ACTION	<ul style="list-style-type: none"> <li>GIVE CLASS ABOUT WORK</li> <li>GIVE PROPER GUIDENCE</li> </ul>	<ul style="list-style-type: none"> <li>LIMIT THE NUMBER OF RESEARCH WORK ON DEPENDING ON WORK LOAD</li> </ul>	<ul style="list-style-type: none"> <li>GIVE CLASS ABOUT WORK</li> <li>LIMIT THE NUMBER OF RESEARCH WORK ON DEPENDING ON WORK LOAD</li> </ul>
RESPONSIBILITY	HUMAN RESOURCE(HR)	ADMIN MANAGER (AM)	<ul style="list-style-type: none"> <li>EMPLOYEES</li> </ul>

Fig.(6) Comparison Table

## V. Control Phase

The control phase requires institutionalization of the improvement results obtained from the Six Sigma process. The key to success in achieving quality is to standardize the improvement process and fostering a six sigma or continuous improvement process in the organizational culture. The results of the new standardizations or procedures can be further improved using different six sigma tools and procedures with a goal of reducing variation or defect in the process. Control charts are an effective way of statistically keeping a track of performance and using the data for continuous improvement in Six Sigma methodology.

## IV. CONCLUSION

We are trying to give guidance for the improvement of quality of product .Quality of product can be increased by decreasing the stress level of employees and also increasing the work time .The study we done is using six sigma method which finds the quality of product and the reason which helps for increasing the quality.

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