

# Time Study and Motion Study of an Assembly Line Job (Manual) Done by a Worker Exploring his Stress State

DILIP KUMAR ADHWARJEE

Associate Professor

DR. B.C.Roy Engineering College

Durgapur, West Bengal University of Technology

**Abstract:** An Industrial Engineer takes time study and motion study on a manual job done by a worker without knowing his STRESS state. Sometimes there is conflicts between them. The author suggests that the time study man should explore his stress state before taking the study of a manual job like fitting in the assembly line. The author gives details of techniques to draw STRESS-GRAPH of the working person. When the worker is in a group of say 5 persons, he has to earn the incentive in the group. We need to choose the worker based on his interpersonal relationship with other members. STRESS condition consideration is an additional requirement for the time study man.

**Keywords:** Demands, Mobilize, Stress scale, psychosomatic, conflict resolution skills, professional career, threatening events.

## I. INTRODUCTION

Richard S Lazarus gives the definition, "stress is a condition or feeling experienced when a person perceives that demands exceed the personal and social resources the individual is able to mobilize."

When we receive shock or threat, our body quickly releases hormones that help us to tackle the situation. These hormones help us to run faster and harder. Heart beat and blood pressure increase. More oxygen is added to blood. Blood sugar is increased giving power to important muscles. Sweating in the body is observed, it cools these muscles thereby increasing their efficiency. If we are damaged having blood loss these hormones divert blood away from the skin to the core of our bodies causing reduction in blood loss. This improves our ability to survive life-threatening events.

There is also a negative effect. This mobilization of the body for survival also may cause anxious, Jumpy, irritation and excitation. With trembling and pounding heart, reduce our ability to work effectively with the people and the situation may go out of control.

Thus in most of the situations we should remain calm, rational, controlled and socially sensitive.

### Explanation with an example

Show how frequently you behave in each of the following ways by placing a cross(x) mark in the proper column opposite each item.

KEY : Usually = 1, Often = 2, Sometimes = 3, Occasionally = 4, Rarely = 5, Never = 6

**Warning:** Stress can cause severe health problems and, in extreme cases, can cause death. While these stress management techniques have been shown to have a positive effect on reducing stress, they are for guidance only, and readers should take the advice of suitably qualified health professionals if they have any concerns over stress-related illnesses or if stress is causing significant or persistent unhappiness. Health professionals should also be consulted before any major change in diet or levels of exercise

## II. PROCEDURE

- a) The worker is given 11 number of questions. He will show how frequently he behaves against each question by placing a cross (X) in the proper column.
- b) Now that he has filled up the questionnaire, the scores can be calculated.
- c) Then the points in the graph paper can be plotted.
- d) The points are joined by straight lines
- e) The STRESS graph of the person/worker is obtained.

Sr. No	Event	1	2	3	4	5	6
1	How often do you become tired in a very short period of time?				X		
2	Do you have trouble with aches in lower back?			X			
3	Do you have trouble with aches in the neck and/or upper back?						X
4	Do you have trouble in breathing?		X				
5	Do you have trouble with pains, or feeling of constriction?				X		
6	Do you have trouble with sweaty hands which feel damp and clammy?					X	
7	Do you have trouble with feeling nervous, fidgety or tense?				X		
8	Do you have trouble with poor appetite?	X					
9	Do you have trouble getting to sleep?						X
10	Do you have trouble staying asleep?		X				
11	Do you feel uneasy due to high blood pressure?			X			

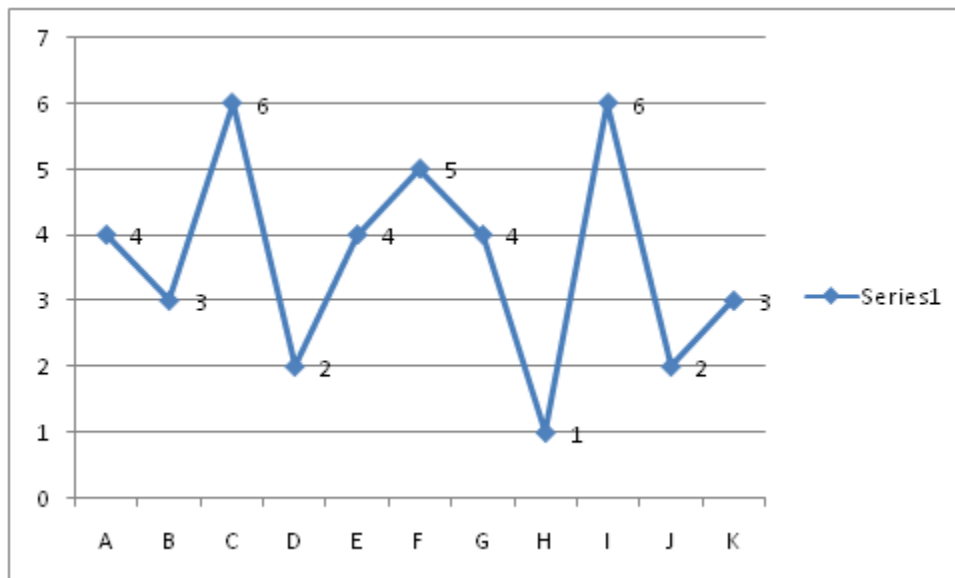
TOTAL SCORE = 40

SCORE ≥ 40 NORMAL

SCORE 30-39 ALARMING

SCORE 11-29 STRESSED

We have to select the worker having score 40 and above for the time study (an additional requirement)



**RESPONSE GRAPH (TOTAL =40) i.e NORMAL WORKER**

**The Holmes and Rahe Stress Scale**

In 1967, psychiatrists Thomas Holmes and Richard Rahe decided to study whether or not stress contributes to illness. They surveyed more than 5,000 medical patients and asked them to say whether they had experience any of a series of 43 life events in the previous two years.

Each event, called a Life Change Unit (LCU), had a different "weight" for stress. The more events the

patient added up, the higher the score. The higher the score, and the larger the weight of each event, the more likely the patient was to become ill.

**The Stress Scale**

*This scale must not be used in any way to cause harm to an individual's professional career.*

	<b>Life Event</b>	<b>Value</b>	<b>Check if this applies</b>
1	Death of spouse	100	<input type="checkbox"/>
2	Divorce	73	<input type="checkbox"/>
3	Marital separation	65	<input type="checkbox"/>
4	Jail term	63	<input type="checkbox"/>
5	Death of close family member	63	<input type="checkbox"/>
6	Personal injury or illness	53	<input type="checkbox"/>
7	Marriage	50	<input type="checkbox"/>
8	Fired at work	47	<input type="checkbox"/>
9	Marital reconciliation	45	<input type="checkbox"/>
10	Retirement	45	<input type="checkbox"/>
11	Change in health of family member	44	<input type="checkbox"/>
12	Pregnancy	40	<input type="checkbox"/>
13	Sex difficulties	39	<input type="checkbox"/>
14	Gain of new family member	39	<input type="checkbox"/>
15	Business readjustment	39	<input type="checkbox"/>
16	Change in financial state	38	<input type="checkbox"/>
17	Death of close friend	37	<input type="checkbox"/>
18	Change to a different line of work	36	<input type="checkbox"/>
19	Change in number of arguments with spouse	35	<input type="checkbox"/>
20	A large mortgage or loan	31	<input type="checkbox"/>
21	Foreclosure of mortgage or loan	30	<input type="checkbox"/>
22	Change in responsibilities at work	29	<input type="checkbox"/>
23	Son or daughter leaving home	29	<input type="checkbox"/>

	Life Event	Value	Check if this applies
24	Trouble with in-laws	29	<input type="checkbox"/>
25	Outstanding personal achievement	28	<input type="checkbox"/>
26	Spouse begins or stops work	26	<input type="checkbox"/>
27	Begin or end school/college	26	<input type="checkbox"/>
28	Change in living conditions	25	<input type="checkbox"/>
29	Revision of personal habits	24	<input type="checkbox"/>
30	Trouble with boss	23	<input type="checkbox"/>
31	Change in work hours or conditions	20	<input type="checkbox"/>
32	Change in residence	20	<input type="checkbox"/>
33	Change in school/college	20	<input type="checkbox"/>
34	Change in recreation	19	<input type="checkbox"/>
35	Change in church activities	19	<input type="checkbox"/>
36	Change in social activities	18	<input type="checkbox"/>
37	A moderate loan or mortgage	17	<input type="checkbox"/>
38	Change in sleeping habits	16	<input type="checkbox"/>
39	Change in number of family get-togethers	15	<input type="checkbox"/>
40	Change in eating habits	15	<input type="checkbox"/>
41	Vacation	13	<input type="checkbox"/>
42	Christmas	12	<input type="checkbox"/>
43	Minor violations of the law	11	<input type="checkbox"/>

**Note:** If you experienced the same event more than once, then to gain a more accurate total, add the score again for each extra occurrence of the event.

### Score Interpretation

Score	Comment
300+	You have a high or very high risk of becoming ill in the near future.
150-299	You have a moderate to high chance of becoming ill in the near future.
<150	You have only a low to moderate chance of becoming ill in the near future.

The worker having score 300 + should not be selected for time study.

The worker having score <150 should be selected for time study (Please note that this is an additional requirement with the existing system of selection of worker for time and motion study)

### III. SUGGESTIONS TO TIME STUDY MAN

The STRESS graph of the worker who is doing manual work i.e fitting in the assembly line is shown above and it is self explanatory.

The author from his experience dealing with workers can suggest the followings

The author considers the following for a worker to be chosen for time study( In addition to the existing system of choosing a worker for study)

TOTAL SCORE  $\geq 40$  is the standard for choosing time study worker.

### IV. CONCLUSION

The time study man along with HRM personnel can conduct the study and can find out the behaviour patterns of all the employees and the employee having less STRESS state can be rewarded.

This write up helps to find a conducive platform for improving relationship between workers and their supervisors in an organisation.

### V. SCOPE FOR FURTHER RESEARCH

The number of questions can be increased and the STRESS graph can be reviewed in a periodical manner and observe the improvement.

### REFERENCES

- [1] The Social Readjustment Rating Scale: Thomas H. Holmes and Richard H. Rahe, *Journal of Psychosomatic Research*, Volume 11, Issue 2, August 1967, Pages 213-218,.
- [2] Organizational Behaviour: people, process, work and HRM by Stephen Perkins and Raisa Arvinen Muondo (03 JAN 2013)
- [3] Organizational Behaviour: Performance Management in practice by Richard Pettinger (13 may 2013)
- [4] Organizational Behaviour: John Barach (23 Dec 2011)

- [5] Organizational Behaviour: Text & Cases by A.K. Chitale, R.P.Mohanty and N.R.Dubey(2013)
- [6] Organizational Behaviour: Text & Cases by Singh (2009)
- [7] Organizational Behaviour: Core Concepts by Robert P. Vecchio(2 July 1999)
- [8] Organizational Behaviour: Concepts, Controversies and Applications by Stephen P. Robbins (21 July 1995)
- [9] Organizational Behaviour: Dipak Bhattacharyya (7 May 2009)
- [10] Organizational Behaviour: by R.K.Chauhan(1999)
- [11] Industrial Engineering & Operations Management by S.K.Sharma & Savita Sharma (2009)
- [12] Industrial Engineering & Production Management by M. Mahajan(2009)
- [13] Industrial Engineering by M L KHAN (2012)