

# Enhancement of Work Efficiency of Employes in An Organization By Applying Human Engineering & Sound Waves Session

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**Abstract** –The majority of organizations are competing to survive in this volatile and fierce market environment. Motivation and performance of the employees with HUMAN ENGINEERING are essential tools for the success of any organization in the long run. On the one hand, measuring performance is critical to organizations. Management of the employees and behavior study as it highlights the evolution and achievement of the organization. On the other hand, there is a positive relationship between employee management and organizational effectiveness, reflected in numerous studies. This dissertation work aims to analyze the drivers of employee brain enhancement & human comfort by applying HUMAN ENGINEERING & sounds vibration session to high levels of organizational performance by the help of brain wave analysis of brain & HUMAN ENGINEERING techniques. The literature shows that factors such as empowerment and recognition increase employee brain potential and help to improve efficiency in work place. If the empowerment and recognition of employees is increased, their efficiency to work will also improve, as well as their accomplishments and the organizational performance. Nevertheless, employee dissatisfactions caused by monotonous jobs and pressure from clients, might weaken the organizational performance. Therefore, jobs absenteeism rates may increase and employees might leave the organization to joint competitors that offer better work conditions and higher incentives. Not all individuals are the same, so each one should be motivated using different strategies. For example, one employee may be motivated by higher commission, while another might be motivated by job satisfaction or a better work environment.

**Keywords:** Brain Wave Analysis ; Sounds & Vibration ;HUMAN ENGINEERING ; Working Efficiency of Employes ; Productivity

## I. INTRODUCTION

All organizations want to be successful, even in current environment which is highly competitive. Therefore, companies irrespective of market strive to retain the best employees, acknowledging their important role and influence on organizational effectiveness. In order to overcome these challenges, companies should create a strong and positive relationship with its employees and direct them towards task fulfillment. In order to achieve their goals and objectives, organizations develop strategies to compete in highly Competitive markets and to increase their performance. Nevertheless, just a few organizations consider the human capital as being their main asset, capable of leading them to success or if not managed properly, to decline. If the employees are not satisfied with their jobs and not motivated to fulfill their tasks and achieve their goals, the organization cannot attain success.

The main two themes to increase efficiency in any industry or workplace are following:

- 1) To improve the workplace environment by applying HUMAN ENGINEERING techniques for employee comfort.
- 2) By applying Vibration & Sound Waves Sessions for enhancement potential of employees for betterment of work & Surroundings.

### 1.1 What is HUMAN ENGINEERING?

Human engineering, also called ergonomics or human engineering, science dealing with the application of information on physical and psychological characteristics to the design of devices and systems for human use.

The term human engineering is used to designate equally a body of knowledge, a process, and a profession. As a body of knowledge, human engineering is a collection of data and principles about human characteristics, capabilities, and limitations in relation to machines, jobs, and environments. As a process, it refers to the design of machines, machine systems, work methods, and environments to take into account the safety, comfort, and productiveness of human users and operators. As a profession, human-factors engineering includes a range of scientists and engineers from several disciplines that are concerned with individuals and small groups at work. The term "ergonomics" is derived from two Greek words: "ergon," meaning work, and "nomos," meaning natural laws. Ergonomists study human capabilities in relationship to work demands. "Ergonomics is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data

and methods to design in order to optimize human well-being and overall system performance. The terms 'ergonomics' and 'human factors' can be used interchangeably, although 'ergonomics' is often used in relation to the physical aspects of the environment, such as workstations and control panels, while 'human factors' is often used in relation to wider system in which people work. On this site we generally use the term that fits most closely with the research or the industry that we are discussing.

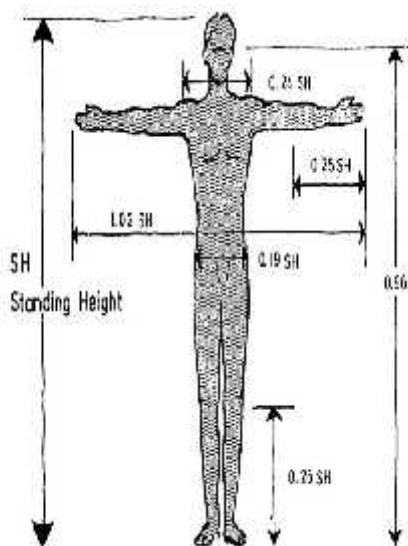


Figure1 Body Structure Analysis

## II. LITERATURE SURVEY

Szczepan Paszkiel et. al.(2020) "The Impact of Different Sounds on Stress Level in the Context of EEG, ardiac Measures and Subjective Stress Level: A Pilot Study " in this Everyone experiences stress at certain times in their lives. This feeling can motivate, however, if it persists for a prolonged period, it leads to negative changes in the human body. Stress is characterized, among other things, by increased blood pressure, increased pulse and decreased alpha-frequency brainwave activity. An overview of the literature indicates that music therapy can be an effective and inexpensive method of improving these factors. The objective of this study was to analyze the impact of various types of music on stress level in subjects. The conducted experiment involved nine females, aged 22. All participants were healthy and did not have any neurological or psychiatric disorders. The test included four types of audio stimuli: silence (control sample), rap, relaxing music and music triggering an autonomous sensory meridian response (ASMR) phenomenon. The impact of individual sound types was assessed using data obtained from four sources: a fourteen-channel electroencephalograph, a blood pressure monitor, a pulsometer and participant's subjective stress perception. The conclusions from the conducted study indicate that trap music negatively affects the reduction of stress level compared to the control group ( $p < 0.05$ ), whereas relaxing music and

ASMR calms subjects much faster than silence ( $p < 0.05$ ).

Zhixing Tian et. al. (2020) " Study on acoustic analysis of Cleveland Dam waterfall sound" Sound therapy has been used as a feasible method of psychotherapy in psychology for many years and has many mature research results. Natural sounds such as rain, sea waves, wind, waterfalls, etc. are also widely regarded as healthy sounds that relieve stress and relax the mind and body. This provides a good way for people who are living in a fast paced life and who have been troubled by urban noise for a longtime to relieve stress and maintain health. In fact, different acoustic characteristics of sound will bring different psychological effects. Cleveland Dam waterfall sound is a healthy artificial waterfall sound. This paper uses spectrum to analyze its acoustic spectrum characteristics, which is related to the structure of the dam and the resonance of water sound with the surrounding environment. Analyze his effect through brain wave measurement experiment. Because the sound energy of Cleveland Dam waterfall induces many waves and suppresses waves, it is proved to be a healthy sound with a sense of comfort and relaxation relaxation.

Zhixing Tian et. al. (2020)"Study on the Acoustic Characteristics of Sunwapta Falls " The auditory system, as a human alert system, has an important connection with human emotions, and both psychologically and physically affected by the sound heard. Therefore, people's health is closely related to the health of their sound environment. If exposed to big city noise for a long time, this may damage our health . But in the natural environment, most white noise and pink noise have the effect of relieving stress and relaxing the body and mind, which is beneficial to health. The SunwaptaFall sound studied in this article is also one of the healthy sounds. Use spectrum analysis to get its acoustic characteristics which is similar to white noise and has three special formants. Then, in order to study its psychoacoustic characteristics, brainwave measurement experiment. As a result, Sunwapta Fallsound stimulated more alpha and beta brainwaves. This also proves that it can really reduce stress and contribute to health.

## III. PROPOSED METHOD

The methodology used by our company is different and unique we provide a customized solution for very product we make provide a customized soundtrack for increasing the potential and efficiency of the brain through Initially we see brainwave frequencies in initial level and give different session according to requirement and after the session we are again take brainwave frequencies, also show key feature what really change. After this we take review all employee and their bosses that in available in annexure.

The brain has billions of neurons, and each individual neuron connects (on average) to thousands of others. Communication happens between them through small electrical currents that travel along the neurons and throughout enormous

networks of brain circuits. When all these neurons are activated they produce electrical pulses – visualize a wave rippling through the crowd at a sports arena – this synchronized electrical activity results in a “brainwave”.

When many neurons interact in this way at the same time, this activity is strong enough to be detected even outside the brain. By placing electrodes on the scalp, this activity can be amplified, analyzed, and visualized. This is electroencephalography, or EEG – a fancy word that just means electric brain graph. (Encephalon, the brain, is derived from the ancient Greek “enképhalos,” meaning within the head.)

One way that EEG ‘brainwaves’ convey information is in their rate of repetition. Some oscillations, measured on the scalp, occur at more than 30 cycles per second (and up to 100 cycles per second!) These cycles, also called frequencies, are measured as Hz, or hertz, after the scientist who proved the existence of electromagnetic waves.

When looked at this way, brainwaves come in five flavours, each of which corresponds to a Greek letter. As we’ll see, these different brainwaves correspond to different states of thought or experience. While there are many other ways to analyze brainwaves, many practitioners of a field called neurofeedback rely on dividing brain oscillations into these five categories.

Some of these brain oscillations are more easily detectable on specific parts of the scalp, corresponding to the parts of the brain just below. The brain has many specialized regions which correspond to different processes, thoughts, and sensations. Particular oscillations often reflect distinct regions and networks in the brain communicating with each other.

Our brain is act as a influencer by any means if we are on conscious state and we do things with people or without people in our surrounding we always get influenced by the sound or we can say vibration in our surrounding or sound of own. So here we use the process of sound again to balance or enhance the brain potential and reliving or reducing the mental ailments of the particular person in a customize way.

Why customization is need?

As we all are unique and different, Everyone has a different capability to excel or doing things Everyone has a different behavior and personality. So, if we are different in many manners so how a standard or generic solution will help the person for the issues. A tailor-made thing always help person for the enhancement

For making the customize solution of the participant, here we do the brain wave analysis of the participant which help us to understand their alpha, beta, gamma, delta, and theta wave distribution of the participant. As every wave has their respective frequency and standards. We draft the brain wave of the participant using MEG machine.



Figure 2 MEG machine

After drafting the brain wave of the participant, we start assessing the brain waves by comparing it with standards. After getting the difference between the brain waves of the participant we start analyzing the difference and start comes to an end for the result and start the sound wave session for the enhancement of work efficiency of employees.

The 5 main types of brainwave frequencies

Different patterns of brainwaves can be recognized by their amplitudes and frequencies. Brainwaves can then be categorized based on their level of activity or frequency. It’s important to remember, though, that brainwaves are not the source or the cause of brain states, or of our experiences of our own minds – they’re just some of the detectable reflections of the complex processes in the brain that produce our experience of being, thinking, and perceiving.

**Slow activity** refers to a lower frequency and high amplitude (the distance between two peaks of a wave). These oscillations are often much larger in amplitude (wave depth). Think: low, the deep beat of a drum.

**Fast activity** refers to a higher frequency and often smaller amplitude. Think: high pitched flute.

Below are five often-described brainwaves, from fastest activity levels to slowest.



Figure:3 Gamma Brainwaves

Frequency: 32 – 100 Hz

Associated state: Heightened perception, learning, problem-solving tasks

Gamma brainwaves are the fastest measurable EEG brainwaves, and have been equated to ‘heightened perception’, or a ‘peak mental state’ when there is simultaneous processing of information from different parts of the brain. Gamma brainwaves have been observed to be

much stronger and more regularly observed in very long-term meditators including Buddhist Monks.



Figure:4 Beta Brainwaves

Frequency: 13-32 Hz

State: Alert, normal alert consciousness, active thinking

For example: Active conversation, Making decisions, Solving a problem, Focusing on a task, Learning a new concept

Beta brainwaves are easiest to detect when we're busy thinking actively.



Figure 5 Alpha Brainwaves

Frequency: 8-13 Hz

State: Physically and mentally relaxed

Alpha brainwaves are some of the most easily observed and were the first to be discovered. They become detectable when the eyes are closed and the mind is relaxed. They can also often be found during activities such as: Yoga, Just before falling asleep, Being creative and artistic



Figure 6 Theta Brainwaves

Frequency: 4-8 Hz, State: Creativity, insight, dreams, reduced consciousness

According to Professor Jim Lagopoulos of Sydney University, "previous studies have shown that theta waves indicate deep relaxation and occur

more frequently in highly experienced meditation practitioners. The source is probably frontal parts of the brain, which are associated with monitoring of other mental processes."

Most frequently, theta brainwaves are strongly detectable when we're dreaming in our sleep (think, the movie *Inception*), but they can also be seen during :

- Deep meditation
- Daydreaming

When we're doing a task that is so automatic that the mind can disengage from it e.g. brushing teeth, showering. Research has also shown a positive association of theta waves with memory, creativity and psychological well-being. (5) (6).



Figure 7 Delta Brainwaves

*Delta Brainwaves*

Frequency: 0.5-4 Hz, State: Sleep, dreaming

These are the slowest of all brainwaves, and are strongest when we are enjoying restorative sleep in a dreamless state. This is also the state where healing and rejuvenation are stimulated, which is why it's so crucial to get enough sleep each night.

*How to train your brainwaves*

Is it possible to change how much we experience these different brainwaves, and the brain states and thought experiences associated with them? In short, yes.

## II. 2 Conditioning and Neurofeedback

For decades, practitioners have engaged in training programs which are intended to reinforce the brain states which produce increases in certain brain oscillations, and decreases in others. The most common example of this, called neurofeedback, can utilize EEG or other brain sensing modalities. Neurofeedback practitioners and clinicians find that immediate, direct feedback on brain states, whether in the form of sound, light, or even a video game, can produce changes in underlying behaviors and brain states that are reflected in brainwaves. This feedback seems to accelerate the learning process, by making brain states more apparent to the recipient.

Another important discovery in the recent history of neuroscience is the significant differences in brainwave characteristics of highly experienced meditators. Expert meditators not only have different resting-state brainwaves from non-meditators – they also seem able to control their brainwaves through voluntary thought control with greater ease than others. So how do we start to improve our ability to control our brainwaves? These brainwave-changing skills can be learned. Meditation deepens your ability to focus and control your attention.

improve his control over, balancing in thought and become visionary also.

Beta Brain wave : intellectual – Interpretation – Learning - Grasping

#### IV. RESULT

Here we do analysis of guy name Aran. Here is according to proposed model analysis of brain wave based on alpha, beta, delta, Gama and theta. Here is show pre analysis of all brain wave and then analysis of problem and according that make solution, treat aran and then again analysis of brain wave and result is show below. The characteristics of Brain Waves are as follows :Alpha : Control over Brain – Thought Balancing – Positivity – Visionary .

##### Employee 1 :-



Figure: 8 Alpha Brainwave Analysis Before Session



Figure 8 and 9 is alpha brain wave which is show pre and post analysis of aran. It is indicate before of treatment having issue after therapy it balance. Before session if you note that the average is 25, which means the participant has a less control over brain.

After the session if you note down that the enhancement in Alpha brain wave , the average is found out is 45 , which means the participant



Figure: 10 Beta Brainwave Analysis Before Session



Figure 10 and 11 is Beta brain wave which is show pre and post analysis of aran. It is indicate before of treatment having issue after therapy it balance. Before session if you see that the average of beta brain wave is ranging between 20-40, which means low intellectual, interpretation and learning ability. After the session the enhancement in beta waves is noted now the range is 30-50. Which means enhancement in intellectual, interpretation , learning and grasping in the participant.

Delta Brain Wave : Satisfaction- Sleeping - Selfesteem

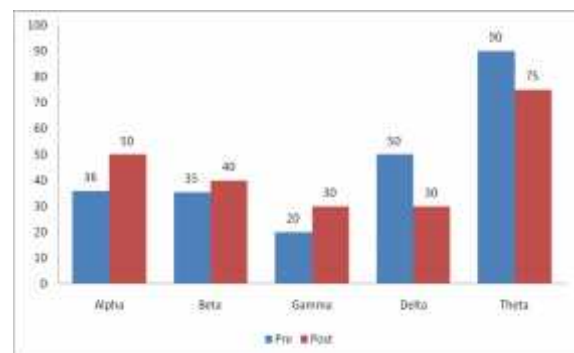


Figure:12 Aram Performance Index Before and after

## V. CONCLUSION

### V. Conclusion

Here we proposed unique session that is optimized behavior and efficiency of guy in their working schedule. As we show previous result section we do brainwave frequencies analysis based on different type of wave alpha, beta, gamma, delta and theta. After the analysis of employee behavior through wave we are design customized sound track for every employee of company to increase efficiency. Here we enhanced alpha, beta and gamma and reduce theta to optimized their working efficiency to give better growth of company.

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