A Bridging Science & Spirituality: Comparative Analysis of Neutral Axis & Sthitprgyata (Steady Wisdom)

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Abstract—The ‘happiness’ appears as sole purpose of all human development activities, is the combination of comfort at physical and mental level both. Science and Spirituality are main guiding streams to provide comfort at physical and mental level respectively. But a gap is observed on the level of awareness about the concepts of each other’s areas between scholars of both streams. In order to achieve the same goal easily, it is necessary that the means of acquiring it will move forward with the help of mutual understanding and take advantage of each other’s concepts. For that, this paper deals with the study of similarity between two most important and basic concepts from science and spirituality. The concepts are ‘Neutral Axis’ from applied science and ‘Sthitprgyata’ (steady wisdom) from Spiritual field which is a very significant aspect of Gita. The neutral axis which is studied through the compression and tension developed during the external load condition in a simply supported beam and the state of Sthitprgyata described through the concepts of Raga (attachment) and Dwesh (aversion), occurred during the different circumstances in human mind, have been explained well in Patanjali Yoga Sutra and Gita. There are some very interesting factors of similarity are observed in these concepts and their establishing elements also, which may help and encourage the scholars of both streams to understand the theories and concepts of the each other.

Key words: Compression and Tension, Happiness, Neutral Axis, Raga (Attachment) and Dwesh (Aversion), Science and Spirituality, Sthitprgyata (Steady Wisdom)

I. INTRODUCTION

In the entire procedure of human development activities, the ‘happiness’ appears as sole purpose. In broader sense the word ‘Happiness’ is explained with ‘quality of life’ or ‘well-being’. The quality of life is categorized in outer qualities and inner qualities. A good life, liveability of environment is described under outer qualities and the life ability of an individual comes with the inner qualities [1]. Again, the liveability of environment comes under the physical aspect and the life ability of a person may be defined under his mental state. To achieve the target of complete happiness for a person, it is found necessary to feel comfort on physical and mental level both. The physical comfort is achieved by various luxury items, health of body and other physical tools. The day by day progress and improvements in all these physical components are fully governed by the science. On the other hand, to achieve the comfort and satisfaction at mental level, people take the help of spirituality. Many mental healths related efforts are aware of the links between mental health, spirituality and religion [2]. The availability of various means and luxuries to provide physical comfort does not necessarily assure the comfort and peace of mind. Absolute satisfaction and happiness can be attained only when the both the fields of physical and mental guidance work jointly. To apply their joint efforts, it is necessary for the faculty and scholars of both fields, to work together, by understanding the basic and important concepts of each other which ultimately results in various benefits for both. But here, a gap in the form of contradictory fillings is generally observed. For filling this gap, it is needed to build a bridge of mutual understanding between the two. As an initiative, some fields of similarities between science and spirituality should be identified for teaching the faculties and students, at their initial level of learning. This effort will help in creating a harmony between two, reduce the points of conflicts and misunderstanding, which would finally result in ideal utilisation of Science and Spirituality, for the wellbeing of the mankind.

In this regard two most important and basic concepts each from science and spirituality are identified, to study their similarity. The one concept is ‘neutral axis’ from Applied science and the other is ‘Sthitprgyata’ (steady wisdom) from Spiritual field and a very significant aspect of Gita [3], an ancient Indian book. The neutral axis which is studied through the compression and tension developed during the external load condition in a simply supported beam and the state of Sthitprgyata described through the concepts of Raga (attachment) and Dwesh (aversion), occurred during the different circumstances in human mind, have been explained well in Patanjali Yoga Sutra and Gita which are the ancient Indian classic books. There are some very interesting factors of similarity are observed in these concepts and their establishing elements also, which may help and encourage the scholars of both streams to understand the theories and concepts of the each other.

Analysis: In the field of Science, it is general practice to check the different properties of the matter and analysis the various definite changes in some specific conditions. Sciences can also be classified under ‘Basic Sciences’ and ‘Applied Sciences’ based on their purpose. Basic sciences or Pure Sciences deals with the most basic objects and forces, relationships between them and laws governing them. Applied sciences or Practical Sciences, are subject to application of scientific knowledge from basic sciences in a physical environment [4]. In Applied Science and Engineering, study of different matter is executed by considering this matter as a member of any complex system. During the analysis of these systems, it is very important to study the various forces acting on the member, their effects on the inner structure and member’s behaviour on the different levels of these effects. That is exactly what appears to be adopted in the field of spirituality.

In initial stage of life, child behaves naturally and normally under different circumstances, for example, he cries on hunger or any discomfort and becomes happy on some favourable incidents. But with the growing age he goes to school, do his job, create family, and then by acting as a student, son, husband or citizen, he becomes a member of different systems. Here the different persons,
circumstances and situations impacts on him in different patterns. Under the influence of these external factors, every person behaves in different ways. Spirituality tries to deal with all possible inner reactions of a man and his resultant behaviour with others due to his inner states. It is clarified that the general behaviour of a man or matter and then their specific behaviour under the influence of external forces or circumstances are analysed in Science and spirituality both. So here the similarity is observed at the level of analysis pattern.

In this study the effects of external forces on a simply supported beam and man have been examined through the concepts of Applied Science and Spirituality, respectively. As per Science, the force is an external agent which when acting on a body changes or try to change the existing state of the body. Similar work is also performed in spirituality where an individual’s case is examined in the context of various external forces like different situations, persons and circumstances. Any type of these external forces which when acts on a man, changes or try to change the existing mental state of that person. So here the pattern of corresponding reactions under the action of external forces is found similar.

After the application of force on a beam, related effects are transfer through its atoms and different types of forces generates different type of changes in micro structure of the beam, which then reflects the overall effect of that particular type of force. This action is explained in Science by considering the force in term of vector which is having a magnitude and a direction. For proper analysis, it is necessary to know some basic parameters like the points where the force is acting, what its direction is and what amount it is. On the basis of these parameters, a well established procedure is there to estimate the outcomes accurately. In case of human, when the results of external forces (like other’s behaviour, any incidents or circumstances) on their mind are analysed, the process become very complicated because there are no physical parameters to measure the action and reaction of human behaviour. For that it is necessary to understand the complex procedural steps of an individual’s behaviour under the influence of various external factors.

In many ancient Indian literature and theirs comments, we find different minute and to the point amendments of the mind. The different types of Vritti may take places in the mind on the basis of their causes of occurrences. These different Vritti may be classified under three important categories, which are attraction (Raga), repulsion (Dwesha) and indifference (Tatatsatha Vritti). Raga and Dwesha represent like and dislike or love and hatred or attraction and repulsion. These are the two flows in the mind of an individual, which described as the major causes of bond with the worldly (Samsaric) wheel of birth and death. All the emotions may be defined under the category of Raga-Dwesha [6]. The various influencing factors like persons, things, thoughts or circumstances which are providing happiness to an individual, develops the Raga within and the similar factors which causes pain the man, are generate Dwesha with these factors. The state of Raga and Dwesha are well described in Patanjali Yoga Sutra. As per Patanjali Yoga Sutra there are five sorrows (Kleshas). These are Avidya (ignorance), Asmita (ego), Raga, Dwesha and Abhinivesha (fear of death) [7]. By observing and analysing these Panch (five) Kleshas it is found that the first Klesha Avidya means ignorance is the main cause of ego which is the second Klesha. The next two Kleshas Raga-attachment and Dwesha- aversion are the results of ego because the feeling of I, me and mine, which based on attachment and hatred, is an expansion of egoistic perspective. These Raga and Dwesha further contributes in developing fear of death. There is a relation among the five Kleshas is seen clearly. Initially the ignorance originates the egoism, which then causes attachment. The attachment becomes the reason for misery. Attachment also develops hatred, because when a person interacts with other people who do not agree with his attachment then, the person starts hating them [8]. Wherever there is a happiness or compatibility, there is Raga; wherever there is soreness or contrariety, there is Dwesha. Man always wants to live in close contact with those things which give him happiness. He keeps away those things which give him pain [9]. In this study the Raga and Dwesha are considered for analysing through similarity comparison with concepts of mechanics and also try to find some solutions with this.

In mechanics, when the external force acts on a simply supported beam from the top, some typical type of activities of the different particles, with respect to their specific positions are observed. A very common and basic phenomenon of mechanics explained that in the upper portion of the beam compressive behaviour is observed and in the lower zone, tension is developed. A compression is a region where the particles are close together. A compression force is one that squeezes material and a tension force is one that pulls the particles of material apart. In result of these forces compressive and tensile stresses are generated in compression and tension zones respectively. The beam shortens in compression zone and elongates in tension zone. Regardless of the strength of the material, compression and tension forces always cause some amount of deformation in their respective zones. In between these zones, a specific layer is exists which termed as Neutral axis. The neutral axis or layer runs along the middle part of the beam between these compression and tension area where the stress is zero that is there is neither compression nor tension.
This concept we can also understand through Figure-1. Now by studying the effects of external force on a simply supported beam and on an individual, various points of similarities have been clearly observed. The analysis the effects the external forces in the form of typical perversion but most importantly it also provide the solution for humans to keep them away from the ill effects of any external forces or circumstances in the life.

The various circumstances, persons, behaviour of others and different situations are acts and effects on a human during his life span and considered as an external force which works on a physical body. The resultant of the external force on a simply supported beam causes compression on the upper zone, which exactly has the similarity with the attachment means raga in which the man wants that all persons and things of his liking should come near and near or more closer. On the other hand, tension is developed in lower zone of the beam have the similarity with the aversion or Dwesha developed in the form of human Vritties, in which the man wants all the things, circumstances or persons of his disliking should go away.

In condition of an acting force on a simply supported beam the compression, tension, their respective stresses and relative deformations are occurred in various parts of the beam. At the same time, an axis or a layer known as neutral axis exists at a specific location of the beam, where there is no tension, compression, stresses and deformations. The same concept is given in Gita with reference to the greater most state of the human mind that is ‘Sthitpragyata’ means steady wisdom. It is a state beyond the influence of attachment and aversion. The concept is also explained here by the similarity with Neutral axis, through Figure-2.

The significance of the principle of Sthitpragyata is that Bal Gangadhar Tilak and Vinoba have established very well in the context of Gita. A similar description has been made by Western Philosophers, through their various texts. Tilak has established the logic of the uniqueness of the state of Sthitpragyata, such as Spencer, Epicureus, Bains, Kant, Nietzsche’s Absolute Ethics, Ideal Wise Man and Superman theories (as quoted in Tilak, 126, 319-320, 325-328). Tilak strongly suggests that the wisdom of the Sthitpragyata man and his behaviour is the basis of ethics. According to Tilak, general people should take a little more concern over Sthitpragyata behaviour [10]. According to Vinoba, in the last 18 verses of the second chapter, God has summed up the essence of the 18 chapters of the Gita, in which the expiration of Sthitpragyata has been done. Sthitpragyata is the ideal idol of the Gita. This is the independent word of the Gita. Thousands of people who involve in passive resistance, based on truth (Satyagrahi) recite the symptoms of Sthitpragyata in evening prayers. As per him, it will become a matter of joy, if it can be transported to every house. Regular daily meditation and continual self-examination is essential with regular lessons [11]. The importance of Sthitpragyata and its similar concepts in the literature of different thinkers has been clearly observed. Also, a wish is seen to be emerges from the great thinkers that even ordinary humans should understand these complicated notions and apply in their own lives. The following analysis definitely will help to understand this very important and complicated concept of Sthitpragyata.

The primary introduction of the Sthitpragyata starts in the initial portion of second chapter of Gita by mentioning Dheer-Purusha (passionless man) (verse 2.13) then discussion about mutual opposite circumstances and guidance to remain firm in between (chapter 2 verses 14 and 15). In further Shlokas (verse), Aatmavta (self-essence) explain in resemblance of Sthitpragyata. In Shlokas 38 and 39 again by explaining the middle position between the opposite situations the discussion comes to the Buddha Tatva (wisdom element). In the Shlokas from 41 to 44 Nishchayatmaka Buddha (assertive wisdom) and Vyavasayatmika Buddha are explained. In Shloka 48 Samatva (equality) Buddha yoga is established and from verses 49 to 52 achievements of freeness from the bonds and an eternal connection with the God is mentioned as the result of Samatvabuddhiyoga state.

With reference to vast description of Samatvabuddhi concepts in various aspects, Arjuna himself uses the word Sthitpragyata in Shloka 54 and asks the various symptoms of a man who has got the state of Sthitpragyata. In the answer part Sthitpragyata is explained as the person who has left away all his desires and satisfied in himself by himself (2.55). In the next Shloka the formula for achieving this state is given which is most important and also it can be understand with the concepts of the mechanics which are described in this study. The formula is explained that the person who has not got restlessness (Udweg) or furiousness, in case of misery and will remain un acquisitive (Nisprih) in comfort or happiness is known as Sthirbuddhi (constant wisdom). Again the Sthirbuddhi explained as who is affectionless (2.57) and in further three Shlokas (2.58, 59, and 60) more emphasis is given on attachment and its abolition. It is clear in the above mentioned Shlokas that Sthitpragyata is the superior position of the wisdom which prevents a man from any type of deformations and disturbances in every circumstance, causes due to attachment and aversion. Sthitpragyata, attachment and
aversion are very similar in nature with the neutral axis, compression and tension respectively in case of beam. This similarity is further explained in some further Shlokas also.

In Shloka 62 the state of attachment is highlighted. As a result of the attachment, person always desire that the things of liking, persons or subjects should become closer and closer. This desire can be more easily understood, in case of the attachment of a person with another. In case of attachment one component wants to come closer to other and just like to try merge in each other and to become one system. If the two wants to merge in each other by destroying their self existence then there will be no problem, but the factor ‘I’ which was previously described as ego, is generally present in every component. With this ego of selfishness when a person (mentally) or the practical (physically) try (desire) to come closer (same as compression in beam) or wants to put up their influence forcefully on the other, definitely there I (ego) will obstruct the procedure. This obstruction is the same as describe in Shloka as Kamat krodho bhijavate (hindrance to fulfilment of desire) which will be results in anger. As a result of the anger, extreme ignorant nature arises and due to this ignorant nature delusion of memory happens further this delusion of memory causes destruction of the wisdom and knowledge power and because of this, ultimately the person falls down from his position (2.63). The same phenomenon can be seen in compression part of the beam where the particles under the influence of compressive force performing the act of attachment and try to come closer with each other, then their own physical existence (body mass) obstruct their desire to come closer, which create the more forceful strike on each other’s surfaces results in various effects like increase in abrasion and stress generations etc., which have the similarity with the anger generated due to obstruction in fulfilment of the desire. In the further act the particles forget the filling of mutual existence and unity in between, they forcibly impacts on each other and as a result finally the original structure is fully destroyed and the beam material gets crushed and the beam fails in compression.

In the tension zone the particles shows just opposite behaviour than attachment, known as aversion (Dwesha) in which they despise each other and try to keep off from each other. The same phenomenon is observed in case of human behaviour, where a person tries to shove away the things, persons or circumstances of his disliking, during the state of tension. On the other hand, when the persons, things or circumstances of one’s liking goes away forcefully, without his consent, then this situation also generate the feeling of tension. In the beam the tensile force and its resultant stresses, tends to break the bond between the two particles, similarly in case of human behaviour the tension and related stresses break the concentration, mental peace and inner strength of the individual as well as this tension and stresses are directly responsible to break the relation or contact exists between the person to person, things or circumstance. The continuous increase of tension in a beam, results in development of cracks, loss of strength and finally the failure of component. Similar to the cracks and other deficiencies developed in a beam, the continues existence of the tension in a human mind also causes so many diseases like blood pressure, mental disturbance, depression etc. which are ultimately results in degradation of human body and mind.

So it is clear from above similarity analysis, the neutral axis in a beam and Sthitpragyata state of human mind are having the same position during the application of external forces. Both the states are ideal where no deformations or disturbances are observed due to external forces. In the case of a beam, it can be clearly seen that neither does it compression nor tension on the neutral axis. That is why there is no distortion is observed at neutral axis during application of external force. Through this example, it is very easy to understand that the reason for the deformity in our self is Raga and Dwesha and that similar to tension and compression developed in a beam. For a happy, peaceful, strong and healthy life, it is necessary that there should be no Raga and Dwesha in an individual. This will also make the life joyful and prolonged. Raga and Dwesha is the root cause of all diseases (Swami Sivananda 2016, 28). If we want to achieve the ideal state of Sthitpragyata mentioned in the Gita, we should not let Raga and Dwesha grow in our mind while dealing with the world. If we do not get into the state of Raga and Dwesha under any circumstances, we will definitely get state of Sthitpragyata like neutral axis which is a tension and compression free state of the beam.

II. CONCLUSION

The study of equality shows that the neutral axis in a beam and Sthitpragyata state of human mind is the only status or level where, there is no deformation or any type of disturbance are observed during the application of external forces. In a simply supported beam the neutral axis remains free from tension and compression and similarly the state of Sthitpragyata in human mind can be obtained by stopping the feeling of Raga and Dwesha that does not arise. The procedure of developing Raga-Dwesha, their adverse effects and techniques for stopping the feeling of Raga and Dwesha in an individual are explained through some very important verses of Gita and their similarity with behaviour of beam particles. The study of these phenomena provides benefits in two important areas. The first one is the field of spirituality or human psychology, where generally the scholars are having very less or no part of modern engineering mechanics topics. The students of this field can also learn about the physical behaviour of the substance, with the causes and procedure of material failure in case of loading. The students of spirituality can understand the act of compression and tension, through the concepts of Raga and Dwesha, by which they are assumed to be more familiar. Through it the awareness about the modern science can also be spread among those students who are generally not having the proper opportunities to get an introduction with it. The second field is the science and engineering, where the students not find any space and scope to learn about the human behaviour which is a very fundamental lacking regarding their concerned studies. It is a well recognised fact that the scholars of any faculty including science and engineering, ultimately has to deal with different types of persons, thoughts and circumstances in their daily life. But generally they deal with these factors, without having any
knowledge about the human nature and its reaction procedure in various circumstances. This situation is responsible to create different types of problems in result of anger, fear and mental stresses etc. To overcome this problem the similarity analysis helps the science scholars, where they can easily understand the thought developing process in action of the external factors as well as to prevent themselves from any type of disturbances. The very typical and complicated phenomenon of Sthitpragyata becomes very easy to learn for mechanics and engineering scholars, when it is explained through the principles of their own fields.

### III. Future Scope

In further study of beams in engineering mechanics the amount of stresses with respect to external forces are calculated. So there is a scope to compare the intensity and amount of various stresses developed in a human mind in different situations. The human nature may be define or classified in terms of Modulus of Elasticity as a ratio of stress and concerning strain indicated by different person. Stress and strain may also be defined in terms of human action. In civil engineering the reinforcement is provided to prevent tensile stresses in tension zone. By considering this factor some good thoughts, tricks or efforts can be find out as a reinforcing agent to reduce the effects of tensile stresses. The reinforcing agents may be established in the form of some spiritual advices. The over reinforced, under reinforced and balanced section may be used for comparison of neutral axis, Modular Ratio, can be matched with observed that various factors like A_{s1} (Area of Steel), Depth of neutral axis, Modular Ratio, can be matched with different thoughts etc. to provide some mathematical formulas for improvement of human behaviour in different circumstances. These aspects also contribute towards the establishment of harmony among the scholars of the science and spirituality and will helps to achieve happiness, which appears as the sole purpose of all human development.

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