

A Concept of Human and Human Engineering

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Human Engineering challenging to a life

It is hard to say clearly how long a man has utilized tool, plough, for his better life. But we can say that his long-standing efforts have seeked a shorter way to improve human efficiency for more comfortable life.

Speaking easily, we think of human abilities, and find/make most suitable object for human abilities, and perhaps all of these efforts would be concentrated on human engineering. Today's modern human engineering as concerned about would focus it's will on the points that synthesize/arrange all the things related to human.

However human life up to now may have been contrary to the thoughts and methods. Because we are not without a case, for example, to design and make something before we think the abilities of human who use that, as we set a man in a suit not a suit on a man. So the aims of human engineering is the comfortable-ness of man's activities by means of setting new science on a man and elevating it's usage and efficiency.

It is hard to consider all the aspects of human engineering on this paper. But above all, we observe the back ground of theoretical history which tell indispensability of human engineering, and summerize the development of human engineering, and investigate human factors. Futhermore we consider the way of human engineering will be. However we set a view of human and human engineering in this paper forth as a promise in the aspects of management control and industrial engineering.

History of development which relate to the study of man's ability promised on human engineering usually deal with the fact of the subsequent Inderstrial Revolution. Of course there exist a few studies of man's ability after that time. These studies, however, were very fragmentary, very personal, and did not deal with the interactions of cause and effect, to say nothing of corelation Man's ability have evolved continually since the Industrial Revolution from common fields of inderstries especially in manufacturing industry. Im some degree, the fact that the evolution has oboectivity gains acknowledgement for the evolution of man's ability, enables to know the position of man's ability, certifies behavior needed in present and future.

The chage of a period mentioned above came out in early 19th century's American industry. At that time America showed the trend of large scaledfactory with the help of development of machine industry, however, a work station unit remained in trifling management cotrol.

So work methods remained in conventional too, and were under the control of personal skill, which occured waste and unresonableness. Specially demarits of wage system were indicated as problem that cause low productivity. In that historical background many pioneers expeerienced in person contradictones and defects in work field, and they made an effort early to get rid of unresonable problemes which should not exist.

Their efforts included improved Wage Rate System that based on the establishment of a large daily work to raise up productivity, and removal of needless work by means of scientific method of work, and many necessary things dthat did require all the systematical improvement in work field.[8],[9] At that time the general wage system was Straight Piece-Work System which was proportional to the amount of worked pieces. But the cycle time for a product was so extreamly vague that it was unfair because of it's depend-

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ence upon experiences and results of past.

More over the standard was usually based upon very professional workers. When a worker did his best, he got the high wage. But in that case, it was often occurred that the owner cut down the unit work price because of high wage of expert worker, which caused the owner being treated incredible. In such situation the workers tried to protect themselves by means of obstruction of improving efficiency, which was systematic soldiering.[4]

That vicious cycle made improvement of productivity and cooperation of capital and labor impossible. So the subjects that did consider human ability and reasonableness how many times a laborer work a day. By this efforts, as it were, trying to find out task: A Fair Day's Work, the methodology of human engineering which could be called Ergonomics was studied.

Man lives on a work. The works have many kinds. A work must be a means of life. However human engineering should be formed in the subjects how a man can work fruitfully and has a life worth living.[4]

The Formation and Development of Human Engineering

Many people think that the history of man had not began until the man had used stone as a tool. Because the history of man used tool would have related human society, and the history of manufacturing method too.[2]

Human Engineering is for happiness and worth of man. Other science may not deny the fact at all, but may regard it as trifling. However human engineering set the subjects to fix machinery equipment for human properties in the following needs.[13]

- ① Understand human sense organ and study the information that best fit for the sense organ.
- ② Special Consideration for human ability, that is to study the method of design, manufacture the machine and equipment which don't need attention and can use quickly.
- ③ All the subjects which give a definite report of human safety and comfortableness.

Describe human engineering like above, We can sure that human engineering itself is the very thing which seek human life and is a kind of science.

It would be thought that mankind civilization, after the Stone Age, have shared in benefit of machine civilization very quickly and with accelerative.

Machine civilization, of course, being made for human by human would press human who made it, if there were no human wisdom.

That induce human engineering with its purpose. So human engineering is the overall science to design machine and equipment for human properties, and intends using man-made machine with avail of reasonableness between man and machine including the problems of human aptitude and training.

That is, it is synthetic science to revive humanity in machine civilization.

Human Engineering will take its position firmly in industry, traffic and every life-day as rewarding and vital science.

This human engineering is said to have its basis of development and evolution in.

- ① experimental psychology
- ② medicine and physiology
- ③ operations management in a wide area
- ④ environmental engineering
- ⑤ control engineering
- ⑥ industrial design.[7],[11]

It is the methodology of human engineering that each machine, environment, system should be a being for human being.

And human engineering should have its errand to get rid of obsession for which man suffer at any time and any place.

In doing that the meaning of development and evolution of human engineering exist.

Human Engineering for the efficiency of Man-Machine System.

Human can't act alone at any rate, though he can do, it would be low efficiency. Therefore, he has to use the tools and utilize Machines. It made a system what is called a system. Now, we must think how man-machine system is human oriented.

However machine is interpreted in a broad sense, not only in its meaning. Machine is considered all of environments, for example, hammer, knife, ball-pen, desk, chair, and so on. The objectives of Human Engineering is to find the most efficient man-machine system.

Everyone may want to finish a work in haste. This status of quo is apt to require excessive competition, the increase of haste, defect and fatigue. Human Engineering is to make a reasonable man-machine system as follows;

- ① Standing Work is to use chair as possible
- ② Prohibit bending to body.
- ③ Prohibit dealing with a heavy one over shoulder.
- ④ Use other muscle in job needed particular muscle.
- ⑤ Decrease the monotonous job by adding other job
- ⑥ Substitute task job which requires psychological burden by conveyor.
- ⑦ Substitute monitoring the apparatus for flicker of bulb.
- ⑧ Eliminate fatigue which causes low productivity and safety accident by regulating the rest time.
- ⑨ Study the method of rest time considering work time and insertion rest time.
- ⑩ Utilize the physical standard properly.

The purpose of man-machine system is to utilize human ability effectively in human side and longing that.

Nowadays, Production activity is usually performed by man-machines job.

Human Engineering seek to reduce the hazard which exist in the connecting point of system to system, so the relation between man and machine should be adjusted reasonably in system to system point of connecting works.

We have studied the adjusting method of labour in given machine capacity, but now Human Engineering is to get new design of human capability. for doing this, in design stage, we have to exterminate human errors, mistakes caused by human characteristics; erroneous characteristic of human traits.

If machine has only a good performance, it doesn't help to operator, The machine must be manipulated with speed, accuracy and comfortable by operator. At the same time, when it is operated by him, faults, mistakes and misjudgements must not break out in its operation. Therefore, human and machine must not be regarded as separated one. In this point, Elevation of man-machine system efficiency is occurred as a problem. The subject of discussion have two methods as follow;

The first, Make a human fit for the machine. Primarily, nature of human gradually adapt to the condition of work, However, it is fact that a skilled worker is suited for machine better than an apprentice do it for the efficiency of man-machine system.

Doing that like above would be more safe.

The second, make a machine conform to human. The aim is to produce a good efficiency though a novice operate the machine which is fitted for man.

For the sake of this, the purpose of human Engineering is design improve easily operated machine and fatigue reduced environment by means of physical and engineering knowledge in view of physiological and psychological function and its boundary.

Promoting human capability by motivation

It is the aim of ergonomics that concerns rather the importance of labourers' psychological motive than the physical working condition as far as the productivity, the job itself and its motivation should be defined more clearly leaving the environmental factors as a second.

Speaking in easy word, providing the chance by which labourers are moved to do something is the given task the ergonomics.[11] However, it is used to be thought that the main source of motivation might come from the dignity and power. But the real meaning of motivation cannot be answered in terms of power at any late. Besides, if man is involved in that case, ergonomics would be able to apply the machines to man as well as stir up the man's hidden will as the man needs something by which he can satisfy himself.

So, ergonomics should start from understanding the human nature. We cannot achieve the goal without taking into account the human need such as biological and safety centered one.

If we look at the ergonomics as a cybernatics to improve the efficiency between man-machine relationship, two parties compose the system in case of driving a car. In order to work with the car and if the man has to overwork to operate the vehicle, it will finally give exhaustion of man finally ending up with an accident. Accordingly the aim of ergonomics is making up the total system between man and machine by improving the improver machine so that better human efficiency can be brought into. So, it is not the task of ergonomics to systemize the scientific methodology concerning human, rather finding the between man-machine systems and solving the problems from the view of human needs are the task of ergonomics.

Ergonomics is for man. By giving man the security thereby providing the willingness and satisfaction, it can achieve the goal any time. Man needs to work for survival. It should not compulsory or efficient. So, biological measurement should be the starting point which we don't have now for our Korean Standards. We are daring to produce the superficial imitation.

Take the expensive couch for instance that we think convenient and comfortable. We should recognize that even the products made in western industrialized countries sometimes contain some defects in their structure not fitting us. Ergonomics is to human capability be adjusted to human characters whether it is outer physical or inner metaphysical.

Today is the era of recovering and maximizing humanity. Human behavior should bear some type of satisfaction. It is the area of ergonomics that makes it possible to apply the discipline to a structural design and utilize it.

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