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Quality Control on Construction Material

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QUALITY CONTROL AND CONSTRUCTION MATERIALS

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SYNOPSIS

Quality Control for industrial and technical activities and its importance in Pakistan cannot be over emphasised. It is vital for our industrial and economic growth. The key ot enhancing GNP and strengthening our economy lies in improving the quality of our goods and services. Pakistani industry has the potential and necessary infrastructure to exercise quality control activities provided our industrial workers and managers are made consious of the long-terms gains associated with it so that they endeavour to be well versed in the science and technoloty of quality condrol of their respective goods with positive attitude which is, to make the quality as a built-in-function of production activities. Although quality control is now fergarded as "Science" which covers all plans and systematic actions necessary to assure that whatever is being produced, installed or presented for service, would perform satisfactorily in service according to the laid down requirements; it is all the more important for our industry/setup to evolve, on voluntary basis, an acceptable system of quality control. This voluntary control could prove far more effective and productive than any imposed measure for achieving our goal as it may be appreciated that the question of quality control is not merely a technical one but as a matter of fact, it is interwoven with national economy, national attitude and way of life. The lack of quality consiousness has directly affected our industrial exports and domestic services. The advantages of the application of quality control principles are many but the penalties if these are not excercised are much more.

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Quality control for industrial and technical activities and its importance in pakistan cannot be over emphasised. It is vital for our industrial and economic growth. The assesment of local manufacturing faoiltities reveasls that Pakistani Industry has the potential and noecessary infrastructure to exercies quality control activities but the problem is that our industrial workers and even managers are sometime not conscious of the longterm gains associated with it. They just do not try to be well versed in the socience and technology of quality control of their respective goods with positive attitude which is, to make the quality as a built-in-function of production activities whereas the stride has been mostly otherwise. The question of Quality Control is not merely technical one but as matter of fact, it is interwoven with national economy, national attitude and way of life. The key to enhancing GNP and strengthening our economy lies in improving the quality of our goods and services. The lack of quality consiousness has directly affected our industrial exports and domestic aervices. It is an irony that within pakistan thee is rising demand among consumers for imported goods in preforence over indigenous products. Although Quality Control is now regarded as Science which vovers all plans and systematic actions necessary to assure that whatever is being produced or fabricated, installed or procented for service, would perform satisfactorily in service according to the laid down requirements, it is all the more important for our indus try/set up to evolve, on voluntary basis, an aooeptable, system of Quality Control. This voluntry control could prove far more offective and productive than any imposed measure for achieving our goal. There can be no other better system because until we overselves are consious of what we actually requiro and realise what we shoudl endeavour to produce, no improvement is likely to occur in our system.

Definitions

I understand that I will not do justice to the subject without entering into the established details and principles guiding quality controal system. To start from the very basics, QUALITY is a performance or a service. In industrial terminology, it is related with characteristics or specification of an industrial product. The dictionary meaning of this word is "Degree of excellence (attributes) of a product or service that bear on its ability to satisfy a given need. The definition of QUALITY is therefore". The conformance to specified requirements" and all those planned and systematic actions necessary to obtain confidence that an item or a facility will perform satisfactorily in

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service, is regarded as "Quality Control". The literature presents a more comprehensive defination as under:–

"Obtaining confidence through planned and systematic actions that an item or a facility has been designed, constructed, fabricated, manufactured, installed, inspected, tested and operated in accordance with given standards, procedures and specifications and that the obtained propeties of the item conform to pro-established requirements".

Even is a most sophisticated quality control system, there is not much for the quality control inspectors but to look at the product when it is partial or complete entity and except for discovering deficencies, cannot improve the product quality. In fact, the stress becomes more on "Control" than on quality. Hence the term QUALITY ASSURANCE (QA) came into field which omphasies more on quality consciousaness and preventive quality control to achieve the overall objectives as below:–

(i) Prevention of errors and potential component failures by correct performance of all basic functions important for making any product.

(ii) Timely detection of non-conformances. through verification actions such as stage inspections and testing alongwith subsequent corrective measures.

"Do it right the first time" is frequently used expression to illustrate the rold of QA in achievment of the objectives.

Role of Quality Control in Prevention of Failures

This may be emphasised again that a Quality Control programme iteslf does not provide any quality or assurance but is the individuals who exercise these programmes to maintain the established standards and obtain confidence that the product will perform according to the desired performance level. This confidence should based on evidence that quality control activities are contributing towards reducing the probabilities of some categories of failures/accidents.

Introduction of effective quality controo system with timely detection of non-conformances and elimiuation of efective components is directly responsible for prevention of these failures. Failures may be classified as "random" and commonmade" failures. While random failures which occureas independent events may by dealt acoording to the partioular situation, it is the comomode failures can be classified on the basis of the recorded failure statistice into two broad categories (a) Engineering causes and (b) Operational causes. By analysis of the causes in each of the two categories one may assess how the quality control activities are contributing to the reduction of the respective failure rate.

(a) Engineering Causes. These can be further subdivided into:

(i) Engineering design. Which contributes most frequently to the equiment failure due to technical errors contributed by human factors ivolved (such as mis-calculations), inadequate or improper materials, instrumental errors or direct design errors, faiulty dreqings, etc. These errors should be prevented or revealed in an effective quality control system.

(ii) Engineering Construction, causes are those which are introduced during manufacture, installation and commissioning. These originate in the use of inferior quality components, processes or workmanship introduced through inadequate or poor quality incpections and tests during various phases.

(b) Operational Causes. failure can be introduced into equipment by inadequate activities associated with the interaction between the equipment and operating staff involved, inadequate, unsuited or un-timed written procedures, lack of training or negligence/unfitnese (both physical and mental) of the operating staff; maintenance and test error; inservice inspection deficiencies or operation enviromental extremes not taken into account during design; use of improper auxiliary materials etc. Extension of quality control activities over operational phase of any equipment or plant has a rolo to eliminate or roduce the ocourences of failures to a significant extent.

Quality in Maintenance

The object of any maintenance activity is to minimise the manufacturing cost of a product or a service without secrificing its quality or safety by economical application of men, tools and materials. The management responsibilities in this regard are good operating conditions, prevention of loss of production (down time) and damage to equipment and safety hazards. Higher maintenance can be achieved by.

a. Adequate provision of materials, technique, T & P for assuring standard quality of repair and maintenance.

b. Preventive maintenance which is an important tool in minimising down cost of repair and replacement, assuring safety, avoiding equipment damage and assuring quality control with smaller inventory of stores. True analysis of causes of break down and effective remedial measures may lead to redesign, substitution and modifications, etc.

(c) Adherence to repair used maintenance schedules determined by the manufacturers of the equipment is equally important and essential. Procedures for inspections and maintenance intervals are indicated in detail, by the manufacturers for each class of equipment. Over-due inspections, maintenance and repair or overhauls may lead to lack of efficiency, higher or overhauls may lead to lack of efficiency, higher operating cost, increased down time and ultimate damage or loss of quality.

Regardlese of tremendous information given on the quality of maintenance, it should not be foregton that better results can only be achieved when similar attention is paid to the OPERATION part of it. In fact maintenance and operation are intergral elements and one cannot be given importance neglecting the other. The operation, within the specified parameters ensures that the equipment is not unduly stressed, risk is minimised, its useful life increases and maintenance requirements are reducod by ensuring high standard of performance.

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Quality Control in Non-Manufacturing Industry

It is general feeling hat Quality Control is only meant for manufacturing industry only where the materials ure professed into durable and non-durable products whereas the objective of all human institutions is the provision of products as well as services to the expectations and desires of the end user who is the sole judge of fitness for use of the facilities thus provided. In the nomenclature of NATIONAL ECONOMY, an industry is divided normally into "manufacturing industry," and non-manufacturing or service industry". Service is work performed for someone else. The service industry usually includes, among others, the transportation, comunication, public utilities, finance, marketing, government agencies, educational institutions, hospitals, hotels, professional and personal services like doctors, lawyers, engineering consultancy services etc.

Generally speeking, in the establishment of QUALITY the service industry follows the same broad principles as are followed by the manufacturing industry. These principles are outlined as below:

1. Indentification of factors contributing towards meeting the overall objectives of fitness for use.

2. Choice of design alternatives suited to the need of client or ultimate user.

3. Transformation of the selected design/scheme concepts into specification/standing rules and setting up controls to enforce these rules/standards.

4. Preparation of schedule of activities and the provisions for adherence to the time schedules.

An other parameter of the service industry towards quality is looking after the consumer's well-being; an area which although is difficult to define but remaing vitally important in nature. The ultimate user is not interested to what is happening to the service department internally but he is more concerned about the facilities and comforts being provided to him during the service. While internal processes like mechanical maintenance of the service unit, etc. are contributive towards external elements of ultimate use but the same are not visible and hence not appreciated until the end results are practically achieved and realised by the consumer himself. It has been observed that as long as water is coming from the tap, nobody is going to complain about it and whatever may be in between, the train is required to arrive in time, safe and sound. The data and analysis of consumer's complatints and claims etc. is therefore, of eventual importances for a service department. In the absence of such data, some reputable service organizations carry out personal interviews like Television Transmission-Service Industry and questionnairs like Air-Transport Industry.

Analysis of performance may also be carried out by comparison with other similar organizations like Pakistan Railways versus railway services of other developing countries. The financial control data may be taken as an index of performance particularly the amounts paid by the

organization against claims and covering risks etc., as well as the losses arising out of accidents which have direct bearing upon the efficiency of the service organization.

Thus "Quality Function" is the entire collection of activities through which we achieve "fitness-for-use " now matter where these activities are performed. The ultimate responsibility of fitness of service is generally brought on the senior managenent of an organization but it may be appreciated that it is a team work in which each working individual is ultimately accountable to the conmunity. It may be equally realised that the adventages of the applications of quality control principles are many and the penalties, if this is not done are even more.

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