Q. M. 3

INHERENT QUALITY

One of the oldest concepts of the quality of a thing and one almost universally held either implicitly or explicitly by laymen and scientists alike is defined as that which makes a thing what it is independent of human interest or volition. This we shall term inherent or real quality. It is a type of quality customarily considered, in scientific circles at least, to be operationally non-verifiable. What rôle does this concept play in quality engineering work? If it is operationally non-verifiable, should we discard it as being a meaningless concept? If it is operationally non-verifiable, in what sense if any, can the inherent quality of a piece of apparatus be specified and controlled? If specified, in what sense, if any, can an inspection engineer inspect a piece of product to see if its inherent quality meets the specifications? The present memorandum considers the concept of inherent quality from the viewpoint of one interested in the answers to such practical questions. Friday 28.7.06

Intent of Specifications of Quality

Every engineer and particularly every one interested in inspection work hears a lot about the intent of specifications. Does inherent quality form any part of such intent? I wonder if the concept of inherent quality is not pretty much what an engineer has in mind at least when he first begins to write and/or use specifications. For example, consider the engineer who having made a tool-made model of a thing that works successfully, tries to write down the specifications of the essential quality characteristics of a thing of that kind. In so far as possible, he tries to think of the quality of the model thing A independent of how it was made and of who made it so as to be able to set down those quality characteristics which another thing B must have in order to be like the model within certain tolerance limits. He starts out to specify just what B must be in order to be like A within the chosen limits and not to specify just who is to compare the qualities of A and B and how these qualities are to be determined. Just as the legislator when he is intent on framing a statute or the people of a state when they are adopting a constitution are not trying to specify someone who is to judge what the statute or constitution is so also the engineer does not have in mind first and foremost the problem of specifying who is to judge when a thing B is like A, or even

how the judgment is to be made. Instead in both instances there is an intent to specify the quality of acts or things independent of any human bias - trying to specify inherent quality if you please.

Now, let us back off and approach this matter of specification of quality from the angle of measurement. Even though the specification engineer specifies the method of measurement he is likely to try to get in some clause fixing the prescribed accuracy that is to be attained in the process of measurement. In other words if we let X be the observed result of the prescribed measurement, then the engineer usually wishes to specify an upper limit to the difference $|X'-X|$ between the true value X' and the observed value X which is to be allowed. Once more we meet the intent to specify inherent quality, this time in the concept of true value.

Problem of Meaning of Inherent Quality

We do not have any way of directly experiencing inherent quality characteristics. All that we can experience are certain awarenesses and the pointer readings of science. Admitting that the intent of a quality specification involves an element of inherent quality, how can one determine whether or not a given thing has the intended inherent quality? It was much this kind of problem that led about the beginning of the present century to the development of the pragmatic theory of truth, and later to the operational theory of meaning in the sense that the meaning of a statement is its method of verification. From such a viewpoint, inherent quality is meaningless.

But now let us look for a moment at an operation such, for example, as that of measuring some quality characteristic such as mass, density, tensile strength, and the like. Some such operation is always involved in any operational method of verification. For example, let us represent such an operation by the symbol O. When we come to the process of carrying out a verification how do we know that we are carrying out the operation O? We need some way of verifying the operation O itself. The method customarily used is for someone, either the one performing the operation or someone else to judge that the operation is O. In fact, a scientist or engineer always implies, even though he does not explicitly say so, that the operation is to be carried out under the same essential conditions. In so doing, however, he introduces the human element of judging the conditions to be the same. The question arises as to whether inherent quality is any more meaningless than is the operation of verification, for after all is not the intent behind the concept of an operation

under the same essential conditions that of specifying that the inherent quality of the operation itself be kept constant? Hence there is reason to hesitate and think carefully before we throw the concept of inherent quality out of the window as being not practical simply because it is operationally non-verifiable.

Rôle of the Concept of Inherent Quality

Throw away the concept of inherent quality as meaningless; what then becomes the basis for determining errors? We may agree as scientists and engineers today to take the results of some operation, as the "measurement of" some quality characteristic, but no active scientific mind will likely agree never to want to substitute some other method of measurement which he may deem a "better" method. Broadly speaking, scientific methods of measurement are usually assumed to be progressively improved from year to year. Behind this concept of progressive improvement, however, I think we shall usually, if not always, find some concept of an approach to the inherent quality of the external world and its objects as a guiding construct or theory. Try though we may to get the "facts", the "raw facts" or the "hard cold facts" without the use of any hypothesis, theory, construct or anticipation of nature and we fail. What we take to be the operations of measuring quality and our concept of inherent quality are likewise hopelessly intertwined. What is more, the abstract apriori concept of what lies behind the observables of nature, such as measurements of "quality", usually leads the way. In this sense the concept of inherent quality plays a very important rôle. It perhaps cannot be specified any more definitely than can that of "the same essential conditions". On the other hand, the inspection engineer who judges quality of a product in an attempt to meet the intent of the specifications must consider himself responsible for judging whether the pointer readings given by the operations of measurement bear a constant relation to the inherent quality not directly perceivable just as he must be responsible for judging that the operations have been carried out under the same essential conditions. Wednesday 02.08.06

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