

Definition of Composite Pavement Structures

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THE definition, approved by the Subcommittee on Definitions and under consideration by the Committee, is as follows:

Composite pavement structure—A structure comprising multiple, structurally significant, layers of different, sometimes heterogeneous composition. Two layers or more must employ dissimilar, manufactured binding agents. (Note: surface treatments, thin overlays, membranes, lamina, and the like having no significant structural strength, shall not be considered layers in arriving at the type of pavement structure.)

A search for positive rules, a modus operandi, and principles to use in the approach to formulation of definitions of words and terms, became an immediate necessity in the initial efforts of the task group assigned to this project. The final objective was to prepare a definition for what was then described as a composite pavement, an objective which was soon found to be a laborious task. Actually, the task became one of an intimate study of every word which might possibly be used in a definition of the term, and a brief summary of the steps that were taken in the development of a philosophy governing the approach to the definitions is a necessity to its understanding.

The minutes of the first meeting of the HRB Committee on Composite Pavement Design shows that the item of major concern was a proper definition for the term "composite pavement." There was no agreement on a definition at the meeting. The chairman requested each member of the committee to submit (1) a definition of composite pavement, (2) types which he would include in the composite category, (3) definition of the term "flexible," and (4) definition of the term "rigid." The committee responded, and their replies were handed to a committee of two which had been designated by the chairman on December 7, 1960, as a task group on the definition of terms. This task group began immediately to find that the various definitions presented were so divergent as to approach and concept as to appear hopelessly irreconcilable. Identical words used by different members were so obviously different in usage as to contribute to the confusion when taken as a whole. It did not take long for the task force to find that this babel of scientific language was not attributable to individual usage but was a result of centuries of inattention and even conscious resistance to literal interpretations. The task group was already cognizant that this condition existed in a small measure, but it was not until they examined a number of state specifications that they found such common words as pavement, subbase, and subgrade, had entirely different meanings in the various states; and it was decided that this was the proper place to begin a solution to the problem. The word subgrade, for instance, in the state specifications examined, was found to describe collectively every level in a multiple layered pavement structure except the final pavement surface.

The study recognized and included standard definitions of technical terms and words wherever such definitions have been agreed upon and published by professional organizations. In this regard the manuals of AASHO and ASTM, and the major standard technical dictionaries were ready sources of reference. In addition, it seemed highly desirable to include pertinent legal terms, as defined in standard law dictionaries, and to refer

to particular interpretations given to engineering terms and concepts by the courts and legislatures.

A progress report was made at the meeting of the Committee on Composite Pavement Design, January 4, 1961, and the problems with which the task group was faced were pointed out. Later a summer meeting at LaSalle, Ill., September 21-22, was called to develop definitions for "rigid," "flexible," and "composite" pavement. Definite rules, the modus operandi, and the principles for which the group had been searching were submitted to the committee and unanimously approved as follows:

1. Words and terms used in committee communications shall, when possible, carry literal significance.

2. Definitions of words and terms approved by other Highway Research Board Committees, by the American Association of State Highway Officials, and the American Society for Testing Materials, shall be used by this Committee when not in conflict with each other and when not in conflict with the general policies of this Committee.

3. Words and terms shall, without exception, be interchangeable when descriptive of layered systems in all types of pavement structures.

4. In defining terms such as composite pavement structures and the like, this Committee, being committed to literal definitions, may include under this heading too many alternatives for effective consideration. Then too, in certain cases where there is no positive or agreeable distinction between, as for instance, a composite and a flexible type, the Committee shall determine its literal classification, and this classification shall be maintained even though, by agreement, consideration of the type is turned over to some other committee.

At the same meeting the committee approved definitions of a considerable list of words, after thorough study of various authorities on the subject, and agreed to the general policy submitted to them for approval, to-wit:

A study of words and terms by the subcommittee has disclosed an almost unbelievable number of idiomatic and dialectic expressions of definitions in addition to those which are explicit and generally recognized. There is no alternative than for the subcommittee to point out such situations and make recommendations for the substitution of explicit terminology.

We believe it is high time for engineers to cease being their own lexicographers. There is no good reason for neologism, dialecticism, or vernacularism. Our diction should be literally exact to be universally understood.

The task group was then directed to a further consideration of the definition for composite pavement, and was grateful at this point to receive new inspiration and reassurance that they were on the right track. It is of interest that 1961 marked the 400th anniversary of Sir Francis Bacon's birth. From the learned book by Charles Coulston Gillispie entitled "The Edge of Objectivity," the following paragraphs are quoted:

The subject matter of Bacon's writings falls into three categories: demonstration of the worth and dignity of learnings; analysis of the obstacles which kept it languishing in futility; and prescriptions for its reformation and advancement. It is not, perhaps,

necessary to insist much on the first point—indeed, it was not so necessary in the early seventeenth century as Bacon would imply. His pleas for learning generally took the form of a rather scornful repudiation of all that passed for such. As for the hindrances, it was trite enough to blame the sterile habit of reliance on authority and the circularity of scholastic logic. But though no student of science, Bacon was an extremely acute student of human beings, and in his discussion of the obstacles raised by the intellect against itself, he showed his mettle. There is that in the very constitution of our understanding which renders the mind a pesky instrument for innovation. "Idols," Bacon called these innate blinders. The "Idols of the Tribe" are distortions which arise from our common nature: "The human understanding is no dry light, but receives an infusion from the will and affections; whence proceed sciences which may be called 'sciences as one would.' For what a man had rather were true he more readily believes." The "Idols of the Cave" compound this common tendency to error with the favorite prejudices or enthusiasms of the individual man, each of whom "has a cave or den of his own, which refracts and discolours the light of nature."

Third, are "Idols formed by the intercourse and association of men with each other, which I call Idols of the Market-Place on account of the commerce and consort of men there. For it is by discourse that men associate, and words are imposed according to the apprehension of the vulgar. And therefore the ill and unfit choice of words wonderfully obstructs the understanding." This was perhaps the most penetrating and valuable of Bacon's observations. Not much can be done about human nature, after all, any more than about gravity or inertia, even when its disadvantages are recognized. But identification of the error that lurks in words was the first step to correction. The attempt to put precision into scientific language has never since been relaxed. Humanists may complain of the jargon of the specialties, sometimes with justice. But no science can flourish until it has its own language in which words denote things or conditions and not qualities, all loaded with vague residues of human experience.

At the annual meeting, January 6, 1963, the task group, which had been increased to four members, presented a definition for a composite pavement structure which was considered, amended, and remanded to the task force with the instruction that they should send out a questionnaire which would include many and varied typical sections, and which would prove or disprove the ability of the definition to define clearly the types which would fall in the category of composite pavement structures. The task group prepared such a questionnaire which included 18 typical sections including all those of normal usage as well as some in the fringe areas of the future and the past. That the definition is adequate is attested to by the fact that there was perfect agreement on 14 of the 18 typical sections, a vote of 8 to 1 on 2 of the typical sections, the only areas of disagreement being on sections 15 and 18 which were bituminous-filled brick on an asphaltic-concrete base, and monolithic brick on a portland cement concrete base.

The response to the questionnaire demonstrates that the classic definition of a composite pavement structure as amended, completely separates it from the fields of the Flexible Pavement Committee and the Rigid Pavement Committee. As a matter of fact, the classic definition of a composite pavement structure would leave new fields

for investigation by the Flexible Pavement Committee and the Rigid Pavement Committee, if it should be found desirable to make the general division of the work on such a basis.

That the term "composite pavement structure" as now defined would include all surfaced roads is fallacious as demonstrated by the committee's investigation of just such an objection which was made to their definition. The point was advanced that in the strictest sense all roadways except graded earth roads are composite; that as soon as crushed stone is placed on a clay subgrade, a pavement structure of two composite elements has been constructed having different engineering properties, and on this account such a road would be considered a composite pavement structure. The committee's investigation of this objection following the line of its adopted philosophy of delving into the literal definitions of words was as follows:

a. Soil - (HRB Abstracts Vol. 29, No. 6, June 1959) Stone, gravel, sand, silt, clay, or any combination thereof as defined by AASHTO M145 and M146. (Note: Particle size, rather than origin of material, is the basis of the foregoing definition. Cinders, crushed stone, slag, chert, caliche, etc., are thus considered within the definition of soil.)

b. Pavement - (Corpus Juris Secundum) The meaning of the word "pavement" is not limited by the particular material used, for no particular material is necessary, and a pavement may be made of anything which will produce a hard, firm, smooth surface for travel, and, as a general rule, any substance which is spread upon a street to form a compact, hard, or level surface or floor may be properly designated a "pavement," although ordinarily the term is not applied to the gravel and stone coating placed on country roads.

c. Pavement - In the legend on almost any road map there will be found substantially this ascending scale: dirt; graded; improved (gravel); paved; etc.

Thus, from the standpoint of the committee, an ordinary earth road surfaced with cinders, crushed stone, slag, chert, caliche, etc., is not a composite pavement structure, in fact, it is not even a pavement. The definitions just given indicate that there is engineering authority, legal authority, and the authority of cartographers for considering such roads to be nothing more than "improved earth roads."