TECHNICAL NOTES
U.S. DEPARTMENT OF AGRICULTURE — SOIL CONSERVATION SERVICE

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Engineering Technical Standards and Specifications

Oftentimes when working directly in the field of engineering you have probably been asked questions about engineering standards and specifications which leave you somewhat at a loss for clear and convincing answers. These occasions usually result from a lack of knowledge or understanding of the basic engineering principles involved.

It is not feasible to attempt making engineering experts in all things out of Service personnel. It is, however, desirable that we all know some of the fundamental concepts of engineering which can and will prove very useful in carrying out conservation work.

This issue of technical notes is intended to provide a start toward knowing and understanding some of these fundamentals.

It has been observed in our work in engineering that there is considerable misuse and misunderstanding of the terms; "Engineering Standard" and "Engineering Specification". We are prone to say "Specifications" when we mean "Standards" and vice versa. We all should know what these terms mean and encompass.

What is an Engineering Standard? This term means the minimum level of quality for an engineering practice. Planners and designers use a standard as a basis to select a practice and start development of a working plan to solve a conservation problem.

In the Soil Conservation Service an Engineering Standard consists of a definition of the practice involved, the purpose of the practice, and under what conditions it is applicable. In addition, certain mathematical formulae, minimum or maximum linear dimensions, volume, velocities, stress, etc., are stipulated. These are known as design criteria and are applied by the designer in his calculation of hydraulic, hydrologic and structural determinations for the job.

The Soil Conservation Service has established Engineering Standards for the purpose of carrying out its assigned responsibilities in the field of engineering on a technically sound basis and to provide a means of getting a desirable degree of uniformity in the quality of technical engineering assistance given to landowners and operators.

A conservation practice is installed to carry out its intended function for a reasonable period of time. The very minimum period of time would be that necessary to receive benefits equal to the cost of installing and maintaining the practice. Engineering Standards and Specifications have been developed to assure the planner, designer, builder and owner that, under normal operating conditions, the benefits will exceed the costs.

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What is a Specification? This is a term which is used to describe the construction and materials requirements necessary for the proper installation of a job according to the designed plan made under the Engineering Standard.

Specifications for elements of work for a job are selected or developed such that they carry out the intent of the Engineering Standard. For example, if established design criteria for earth embankment requires a minimum density, a specification for this earth work is written such that the builder will be required to place the material, control its moisture content and compact it in a manner that will assure the finished product being at or above the density required.

In general a Specification consists of a description of the work it covers; the quality of construction required; the kind, quantity and quality of materials to be used; details of installation; expected quality of the completed work and any other technical instructions necessary to carry out the work.

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Did you know that:

After October 1, 1964 all of our E&WP Unit assistance will be coming from Portland, Oregon, instead of Lincoln, Nebraska.

Our Washington office has issued our revised National Specifications for Construction Contracts as Section 20, of the National Engineering Handbook. (You will be hearing more about this in the near future).

From 1951 through 1963, the Soil Conservation Service in Wyoming provided engineering assistance to 2,218 Cooperators on 69 jobs costing over $5,000 each for a total construction cost of $4,222,400. This was all under CO-1 Operations.

State Conservation Engineer