

REPORT OF DIVISION III

EDUCATION, ECONOMICS, AND PUBLIC RELATIONS

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In 1935 the Committee on Education and Public Relations was set up with its present chairman, and a report was submitted for the year emphasizing the requirements of technical education, experience, and training for Landscape Architects and Engineers employed by the various State highway departments. Five years later this project committee brought out the need for more intensive study of roadside border control and land use planning in connection with highway design. In 1941 the project committee was reorganized with separate subcommittees on Education, Economics, and Public Relations. This year these subcommittees were again revised under the headings of (A) "Educational Programs", (B) "Evaluation of Practices", and (C) "Public Relations and Publications" -- each subcommittee being headed by a chairman under the Division head.

Two main questions were covered at the Division meetings. First, how can Division III and its project committees best function for the duration of the war; and second, how can the lessons of the past be best applied to the landscape development of post-war highways?

Reports of the various Project Committees of the Committee on Roadside Development will here be summarized from the point of view of application of improved methods and equipment to present landscape problems on military service highways, and airfields. Recent developments are covered pertaining to the planned use and control of highway borders and adjacent land. Increased emphasis upon these phases of highway development will be essential in the Post-war Highway Program.

During the past year the streamlined cross section, emphasized by the Committee on Roadside Development since its formation, has again proved its value in reducing the cost of mowing and other roadside maintenance. In those States that have constructed new highways with broad, rounded shoulder, gutter, and slope cross sections, flattened to the limits permitted by existing topography, hand mowing practices have been replaced by machine methods making possible a cost reduction of the order of 5 to 1. The elimination of guard-rail, projecting culvert headwalls and similar obstructions to machine mowing operation, is a natural result of the streamlining of the highway cross section. Without the elimination of steep slopes, V-ditches and these various obstructions, effective machine maintenance is impossible.

Education in War Time. Education in landscape architecture and engineering is now subject to necessary military controls and no recommendations can be made in this field at this time. A noticeable trend toward broadening basic engineering training to include courses in the fields of landscape and architectural design; and toward including basic engineering training in the courses studied by landscape students; may, for a time, be halted. There is now an urgent need for rapid training of engineering student in the simple and essential techniques required by the military engineer.

Research in War Time. Highway research in landscape development methods must, to a great extent, mark time for the duration because of the curtailment of State highway department funds due to the war. Fortunately we have available an immense "field laboratory" of cantonment service road, and airfield, operation and maintenance. Research in the selection of turf grasses and ground cover vegetation for roadside flight strip and airfield use is now in progress under the several Federal agencies cooperating with the War Department in all regions of the country. Out of this field laboratory have already come major improvements in machine equipment mentioned in the report of Division II. The improvement in machine mowing equipment adapted for airfield use is particularly noteworthy. For example, whereas the best seven-foot "sickle bar" type of mower equipment used by State highway departments operates at about 5 miles per hour and has a theoretical cutting capacity of not more than about 28 acres per 8 hour day, the high speed rotary gang mowers developed for airfield use operate at 15-20 miles per hour and will cut a swath 20 feet wide at the rate of about 46 acres per hour or 368 acres per day. The effects of war time progress in the development of new methods and equipment will go far toward decreasing costs of large scale roadside development and highway maintenance after the war, wherever the streamlined cross section can be, or may have been, installed.

Erosion Control on War Time Highways and Airfields. All recent contracts for industrial access and military road construction in humid regions have included mulching, sprigging, seeding, or equivalent protection measures against erosion on shoulders, gutters, and slopes. Mulching with local straw, hay, and equivalent materials is usually combined with seeding or sprigging, particularly on steep slopes. The value of erosion control as a part of original construction is now accepted in all humid regions, and is of special value under the existent shortages of labor and equipment among the State highway departments.

Dust continues to be a major problem in the operation of airfields. An extensive turf establishment program is now solving this problem. In this field new methods are being evolved which will be of great value in highway development after the war.

Necessary Preliminary Work for Turf Establishment. As already demonstrated in roadside practice, the establishment of effective turf on airfield surfaces requires that basic soil improvement and soil preparation be combined in original construction. Many airfields include from 600 to several thousand acres of turf. To establish such large areas of turf cover, loamy topsoil must be salvaged in original excavation, or, if no topsoil is available, surface soils may be prepared for seeding by mixing of sandy materials with clay or other heavy soils and fertilizers, lime, and organic materials. The time for soil preparation, tillage, and the addition of lime, fertilizers, etc., is during original excavation and grading.

Soil Studies and Soil Preparation. The soil study is now considered a necessary part of the survey and planning stages of both highways and airfields. Emphasis has been placed on the selection and mixing of available granular and binder soils in preparing a "stabilized" base for paved runways or surfaced highways. Experience now indicates that areas on which turf is to be established should also, as far as possible, be covered with a prepared surface soil (usually a mixture of studied proportions of sand, clay and loam) which has the following qualities:

The soil mixture on a road shoulder or airfield surface must support wheel loads even when saturated with moisture, and must be of texture favorable to turf growth.

Such a surface soil should be permeable, well drained, and stable under wheel loads and must therefore usually be mixed in grading with necessary clay binder soil, or sand or other granular material. Below the necessary 3 to 5 inches of surface soil either the same granular materials provided as a base in paved runways or roadways should be installed, or the subgrade soil should be compacted at optimum moisture content with sheeps-foot or other heavy types of rollers. The surface 3 to 5 inches of soil which supports the growth of turf should not be compacted with any but lighter types of field or agricultural rollers until the turf has become established.

Salvage of Selected Soils. Experience indicates that the need for soil mixtures which will support both wheel loads and a growth of turf must be considered in the specifications and during original excavation of highways or airfields. Loamy, sandy or clayey soils occurring on the construction site should be salvaged, spread where needed, or stockpiled, during original excavation. The State of Michigan, in its "1942 Specifications for Road Construction" provides for the salvage of all types of soils useful in stabilization of either subgrade or surface soils on road shoulders. This marks a new "high" in cooperation between the engineers of soils and construction, and the landscape engineers of a State.

Soil Research Needed. Experience indicates that more information regarding soil mixing, soil preparation, and use of lime, fertilizers, etc., on surfaces of road shoulders and airfields is urgently needed. The following recommendations are therefore made at this time.

1. Regular mechanical soil analysis and soil stabilization practices should be extended and adapted to include not only the preparation of sub-bases for paved areas, but also better preparation of road shoulder and airfield surface soils on which turf is to be grown.

2. Well known, standardized "quick" tests should be applied on soils of road shoulders and airfields to determine available plant nutrients where turf is to be grown.

Under these standard tests (Truogg test, Morgan test, La Motte test, etc.) the following four soil factors should be determined.

A. Presence of available nitrogen. This is the least important of the four tests because nitrogen contents are extremely variable and fertilizer nitrogen will almost always be required for turf whether tests prove negative or positive.

B. Soils should be tested for available phosphoric acid. Standard tests for this element are simple, accurate and conclusive.

C. Soils should be tested for available potash. Standard tests for potash are accurate and conclusive.

D. Soils should be tested for potential acidity or pH value. Standard pH tests accurately indicate amounts of lime needed for turf growth. When combined with examination of plant indicators on local grasslands, pH tests are of great value in selecting a kind of turf grass to be established on a selected highway or airfield site.

(Note: See appendix V., p. 127. for typical soil test outline.)

Highway Plans for Post-war Period. A well-known engineer at the St. Louis meeting was heard to remark that "building a highway is a land-use problem even more than a construction problem." Plans for post-war highway development should, we believe, include plans for use of land which would normally be included within the right of way, as well as adjacent areas of special value for rest, recreation, and aviation, which may need protection against undesirable private development. The integration of air traffic with highway traffic, marked by the present flight strip construction program, is one of the design factors to be seriously considered in future highway location and development.

Landscape Personnel Training Needed. With increasing integration of landscape development principles in post-war highway and airfield construction more landscape engineering personnel will be required. Trained and experienced field foremen and landscape designers will be in demand by State highway departments, the Public Roads Administration, and other agencies. Landscape engineering and architectural designers must come principally from the universities while landscape foremen must have the added training in the field by men experienced in the handling of soils, plants, timber, stone and other materials backed with basic training and knowledge of landscape design, causes, and effect.

Here is a challenge which will require increased and continuing cooperation ^{1/} between our universities and the State highway departments.

Regulation and Control of Roadside and Adjacent Lands. The trend toward better planned zoning and control of lands adjacent to the highway continues.

The famous Alaska Highway will include a zone 40 miles in width within which land-use plans are now being considered by the National Park Service. It is recognized that after the war this route, including three hundred miles within the control of the United States and some 1,300 miles within the Dominion of Canada, will be one of the finest recreational and scenic highway developments in the world.

Billboard regulation continues on its way with the recent Vermont Billboard Law marking another progress milestone. On January 5, 1943, the State Supreme Court declared that a billboard is essentially a use, not of private property, but of a public thoroughfare. "There is no inherent right to use the highways for commercial purposes". Furthermore, the Court declared that the private property owner has no inherent right to use or lease his highway property for commercial advertising unless such advertising applies solely to business on the property.

Town and Highway Planning After the War. It has been said that the Highway of the Future will provide "driver service" as well as "vehicle service". This point of view as a policy has already resulted in outstandingly good relations between the State highway department and the Driving Public in a number of States. Driver service, as contrasted with vehicle service, is largely a roadside development function, and driver service can be increased as the planned development of roadsides is improved in conception and execution. This is another way of emphasizing the land-use phase of highway planning and development.

A report by the Scott Committee appointed in Great Britain by the Minister of Works and Buildings, during the past year is of interest to American engineers. The report states in part: "We regard the present degree of co-ordination between Planning, Highway, and Agricultural Authorities as quite inadequate, and recommend that the machinery of the Central Planning Authority be used to secure close collaboration from the start of any new scheme, whether for town planning or for the construction of new roads. Increasing provision must be made for fast traffic. The new American highways of the parkway type show what satisfactory results can be achieved with new roads, though other (American) trunk roads of recent construction are unfortunately examples of most that is bad". We should appreciate this constructive criticism by our British cousins and do our part in the future to help highway engineers and

^{1/} Note: See records of 1942 Road Schools at Ohio State University, Iowa State College, etc.

the public to appreciate the need for better integration of basic land use (landscape) principles with original highway or airfield construction.

In a recent editorial in Contractors and Engineers Monthly the Editor says:

"Highway officials will best serve the public if they consider the future prospects and needs, not only of the highway system..... but of all phases of future development, industrial, agricultural, and recreational, within their States or counties before blue-printing their highway plans. Only thus can present highway planning meet the practical needs of the future."

Supplement to Report - Division III. Special attention is called to the Report of the Third Short Course on Highway Development recently issued by the Ohio State University in cooperation with the Department of Highways. Held at Columbus, Ohio, February 25 and 26, 1943. this Road School presented a series of most interesting papers to the representatives of highway departments and colleges present. Included among these papers were the following: (1) "What Aerial Photography Can Teach Us", by Oscar J. Marshall, Department of Civil Engineering, Ohio State University, Columbus, Ohio. (2) "Highways and the Bombadier", by Professor Morris E. Trotter, Department of Landscape Architecture, Ohio State University, Columbus, Ohio. (3) "Present and Post-War Planning of Roadside Development", by Robert S. Fisher, Regional Planning Engineer, Ohio Department of Highways, Middletown, Ohio. (4) "The Highway Maintenance Engineer's Responsibility to the Roadside", by W. V. Buck, Senior Highway Engineer for Ohio, Public Roads Administration, Columbus, Ohio. (5) "Earth as it Exists on the Highways", by Harry Marshall, Soils Engineer, Testing Laboratory, Ohio Department of Highways, Columbus, Ohio. (6) "Turf Establishment - Soil Preparation", by Professor George M. McClure, Agronomist, College of Agriculture, Ohio State University, Columbus, Ohio. (7) "Adaptability and Uses of Various Seed Varieties to Ohio Soils and Highway Conditions", by C. B. Mills, O. M. Scott and Sons Company, Marysville, Ohio. (8) "Seed Specifications, Seed Availability and Recommended Substitutions", by H. Trimble McCullough, President, J. Chas. McCullough Seed Company, Cincinnati, Ohio. (9) "Turf for Wear and Tear", by Harry Burkhardt, Turf Specialist, United States Army, Corps of Engineers, Fifth Service Command, Columbus, Ohio. (10) "Mowing as it Contributes to Good Maintenance", by R. C. Bowman, Engineer of Maintenance, Division No. 7, Ohio Department of Highways, Sidney, Ohio.

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