

ROAD SCHOOLS, HIGHWAY CONFERENCES, AND ROADSIDE DEVELOPMENT

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We seem to have arrived at the point where the surface or pavement of the average American primary highway is about the best in the world. Our highway designers in past years, however, have tended to neglect those portions of the highway that are not occupied by structures. As a result, on many of our most heavily traveled main highways, roadsides and road borders are still too often heavily damaged by erosion, and too often include deadly hazards to traffic and a wide variety of unsightly features. Roadside business development, for example, constantly tends to encroach on the traveled way of many of our primary highways. Is it surprising then, that some of the most dangerous highways in the country, to judge from reported accident rates, are relatively new roads with wide pavements but relatively narrow rights-of-way bordered by many roadside business structures?

Annual costs of highway maintenance have risen sharply since the war. A recently published index chart of country-wide annual highway maintenance costs per mile shows a rise from 100 in 1935 to 186 in 1948 with the index of labor cost alone above 200. All in all, it is evident that unsightly roadsides, high accident rates, and high annual highway maintenance costs are usually found together. Complete highway design which includes a well-designed roadside area is of even more value to both the traveling public and the highway departments today than it was ten years ago. How far has this evident need for better highway design and better development of the roadside portion of our highways been recognized by highway administrators and engineers? Light on this question might, it was thought, be obtained by a study of Road School and Highway Engineering Conference Programs over past years.

Types of Road Schools - There appear to be three general types of Road Schools or Highway Engineering Conferences.

1. Typical Road Schools or Engineering Conferences have been held at Purdue, Michigan, and the University of Colorado, and at other universities during the past twenty years. These have covered the whole field of highway administration, engineering design, construction, and maintenance and most of the special techniques which have grown up in highway practice.
2. Conferences or short courses at the Ohio State University and Syracuse, for example, have been largely concerned with the development of the roadside portion of the highway.
3. A third type of Road School is represented by that recently organized by the Florida State Highway Department and the University of Florida for

the purpose of in-service training of highway department personnel. Few of these training schools have issued published proceedings.

Road Schools of all three types appear to have done good work in getting information on latest highway practices into the light where those concerned can read it. This report, however, will be concerned with the first type of Road School only.

Analysis of Road School Articles - It was not possible within the time available to read all papers in the published proceedings of the many highway conferences listed in Table I. The Committee concentrated therefore on three representative regional road schools and on papers having titles dealing with highway design, highway safety, highway construction, highway maintenance, stream and soil erosion and other subjects closely related to the design and development of the roadside portion of the highway. Assuming that ten papers were found on one of the above subjects, all were read but only one or two of the best were selected for reference purposes. Where only two or three papers on a single subject were found and read in the published proceedings of the three typical road schools, all of the two or three are listed in Tables 2-A, 2-B or 2-C. Table 3 is a classified list of subjects covered during some twenty sessions of the Purdue Road Schools.

The selected papers listed and commented on are those believed of greatest value to highway engineers interested in better roadway and roadside design. Their value, it is thought, lies not so much in the sometimes meager facts contained, as in the conception they give of what their authors conceive to be satisfactory highway development. To "sell" better highway and roadside development to the highway engineer or administrator we must find out what he is thinking, and what among the various phases of highway improvement he considers important.

One thing these Road School proceedings bring out very clearly: Highway administrators and engineers have received very little definite information in Road School programs regarding the multiple advantages of complete highway design as compared with the partial or "roadbed design" found on most of our main highways up to the present time. This is a challenge to those of us who believe that a highway can be as beautiful, as maintenance-free, and as accident-proof in its design as a modern motor car.

Let us, then, briefly consider a few of the most important papers, from the standpoint of complete highway development, presented at the three Road School programs selected for study.

THE FIRST ROAD SCHOOL OR HIGHWAY ENGINEERING CONFERENCE IN COLORADO

The first highway conference records found were those of a meeting at Denver, Colorado, in 1906 attended by the Governor, the State Engineer, City and County Engineers, and representatives of Chambers of Commerce, automobile clubs and other interested organizations. This meeting was the forerunner of the annual conference now being held at the University of Colorado.

Road Schools. At this session, Professor Bainer of Colorado Agricultural College, suggested that Road Schools be set up at three or four places in Colorado "to train the road builders of the State." All road construction was carried out

under supervision of county road superintendents. School sessions he said should not exceed 10 days.

The reader will especially note Professor Bainer's recommendation that economy required that highways be located "to follow around the hill." He also suggested broad rounded ditches because these "could be protected against erosion" and were more effective in carrying water than V ditches. In some regions we are still, 42 years later, locating roads with long tangents in hill country, and with dangerous inefficient V ditches.

Close Relation Between Good Highway Design and Roadside Development - During the 1937 session of the Colorado Highway Conference, Mr. Howard W. Baker presented the first article covering the complete highway development in a road school program. It was evident, he said, "that the landscape architect, in our Midwestern States had not been given an opportunity to review or criticize highway locations or to offer assistance during the construction and maintenance stages of highway development. (As a matter of fact very few professional landscape architects were employed by State highway departments in 1937.) Mr. Baker brought out the following points:

1. Good highway location with respect to natural topography and topographic features "is essential for proper roadside development."
2. Protective strips of land between the roadway and right-of-way lines are essential.
3. Landscape features (trees, streams, shorelines, etc.) should also be protected during construction.
4. In locating recreational (park) roads it is permissible to increase the length of the road as may be necessary to reach scenic lookout points or special recreation areas.
5. Roads with long easy curves and short tangents do not encourage excessive speeds as do highways with long tangents with relatively sharp curves. Speed is not as essential on scenic or recreational highways as it may be on commercial roads.
6. On highways carrying large volumes of recreational traffic Mr. Baker recommended that:

Right-of-way should be wide enough "to dispose of public utilities and billboards and encroaching roadside business structures."
(This principle applies to any heavily traveled road.)

Desirable trees and interesting rock outcrops should be preserved.

Stream channel changes are to be avoided wherever possible.

Excessive cuts and fills should be avoided as far as possible in road location by fitting the road to the contours of the land.

Easy well-rounded cuts and fills are essential since only such slopes can be quickly revegetated.

Deep side ditches should be eliminated.

Complete control of erosion on all exposed earth surfaces is necessary to avoid excessive annual maintenance costs.

(It is of interest to note that Mr. Baker's comments follow closely the objectives sponsored by the Committee on Roadside Development over the years.)

Defects in Highways Leading to Erosion - At the 1938 session of the Annual Highway Conference at Boulder, Colorado, Mr. Frank Kimball cited the following highway practices which he said "tend to accelerate erosion and increase annual highway maintenance":

Lack of adequate preliminary surveys, inspection and cooperation between those responsible for highway design, construction and maintenance.

Excessive concentration of water in highway drainage structures.

Steep grades and excessive length of protective ditches and dikes.

Unnecessarily steep earth cuts and fills.

Lack of adequate protection against discharge of (highway) drainage structures outside right-of-way fences.

Blading of shoulders.

Tendency of highway officials to ignore probable future costs of highway maintenance in present new highway design.

THE PURDUE ROAD SCHOOL

Stream Erosion - An article in the 1930 proceedings of the Purdue Road School on stream erosion emphasizes the need for concrete dikes, piling, crib work and other structures to prevent erosion on embankments. Nothing is said of possibilities of anticipating stream erosion in location and design, or of the use of planted willows and other vegetation to control stream erosion.

Highway Safety - Mr. James D. Adams presented a series of three papers in the same number of years beginning in 1935, outlining the results in Indiana of widening shoulders to 8 to 10 feet, removing projecting culvert head walls, and rounding and sodding gutters. Among other points, these were brought out by Mr. Adams, then Highway Commissioner of Indiana:

Between 1920 and 1934, 10,630 persons were killed on Indiana highways. Twenty percent of these fatalities resulted, according to filed records,

"when cars forced to leave the traveled way drove over steep side slopes or into V ditches." Another thirty percent of the fatal accidents were related in some way to projecting culvert head walls, bridge abutments, and utility pole lines and trees according to the accident reports. Mr. Adams cited the absolute necessity of correcting these types of defects in future highway design.

A number of sections of primary highways were studied over a period of several years before widening and after widening shoulders to 8 feet, rounding ditches, flattening slopes, etc. Accident records showed over several years that annual fatalities had been reduced from an average of 25 per year to 16 per year on the same studied sections of highway because of elimination of the above-described types of roadside traffic hazards.

Mr. Adams in 1937 described a morning drive over a section of Federal-aid highway 30 miles in length under icy surface conditions. On the first 10 miles of the highway, with wide (10-foot) shoulders, rounded shallow side ditches, and 4:1 fill slopes without guard rails, he observed no accidents. On the succeeding 20 miles of highway, where shoulders were narrow, fill slopes steep and V ditches had not been graded to a rounded section, 22 cars and trucks were seen along the road in badly damaged condition.

These articles indicate beyond any reasonable doubt that a large percentage of serious accidents are caused by or connected with narrow shoulders, V ditches, steep slopes and other defects in the design of the roadside portion of highways.

ANNUAL HIGHWAY CONFERENCE AT THE UNIVERSITY OF MICHIGAN

Between 1926 and 1947, a number of papers were presented at Ann Arbor which are of interest to highway design and landscape engineers.

Highway Maintenance and Better Roadside - The first of these in 1926 by O. S. Hess, County Engineer of Kent County, Michigan, describes outstanding roadside maintenance problems which have been a feature of a number of county highway programs in that State.

Adequate Right-of-Way Space Needed - In 1927 and 1940 respectively, Chief Engineer Jay Downer and Chief Landscape Architect Gilmore D. Clarke described the main objectives behind the development of the Westchester County Parkway System. Both men emphasized the essential value of complete highway design on adequate right-of-way space. The need for planting and seeding is of minor importance by comparison. Mr. Clarke advised all highway design engineers concerned with freeway design to study the only two freeways then (1940) in existence. One of them, the Briarcliff-Peekskill "Parkway," and the other in the Tennessee Valley Authority parkway system.

Safety in Better Roadside Development - In 1944, Mr. Allan M. Williams presented an article on "Accident Prevention" which is a classic in this field. He

states categorically that highway engineers cannot change human nature and must design highways for the average relatively unskilled, and often careless driver. The engineer, he says, can design and construct highways which will reduce accidents to a small percentage of their present number.

Mr. Oscar M. Gunderson, three years later (1947), again drove some of the same points home in his "Engineering Aspects of Roadside Control." He says that to provide the type of service needed by the public, the engineer must concentrate on removing roadside as well as roadbed hazards. He implied that the cost of incomplete highway design, which fails to give proper consideration to the portion of the highway outside surfaced traffic lanes, is too high in both lives and property.

Conclusions - More than one-half of the right-of-way area of most of our primary highways outside the cities is not occupied by pavements or other structures. The articles mentioned in this report as dealing with the various phases of roadside area development, represent less than two percent of the total number of papers presented at the 23 road schools and highway conferences listed in Table 1. Table 3 listing the subjects covered in 443 papers presented at a typical road school over a twenty-year period shows that exactly four of these articles deal with roadside development.

The possibilities of complete highway design and development as a means of providing the traveling public with highways safer, more effective in carrying traffic, lower in amount of maintenance cost, and finer in appearance than the best of our present highways, are as yet hardly appreciated in this or any other country. This is a challenge which must be taken up by those of us who realize that measures rendering a highway more beautiful also enable that same highway to provide safer, less costly, and more effective service to the traveling public. The Road School and Regional Highway Conference can and should play a leading part in the education of all concerned toward the multiple advantages of complete highway development.

TABLE I

A Partial List of Road Schools and Highway Engineering Conferences

Road School or Highway Conference	Cooperative Agencies	Year of Beginning	Days Duration	Published Proceedings	Remarks
West Virginia Road School	State Road Commission University of West Virginia	1934	5	None	For State highway department personnel
University of Washington Annual Conference on Road Building	Department of Civil Engineering, Student Chapter of ARBA	1948	3	None	(((Programs were not available for study
Rhode Island	Rhode Island Highway Association	1937	3	None	((
New York State (Cornell University) Short Course in Practical Highway Administration	Colleges of Agriculture and Engineering (Cornell University); Bureau of Public Roads	1930	4	None	For Town and County Highway Superintendents
Virginia Highway Conference, held at Virginia Military Institute	Sponsored by: Virginia Dept. of Highways Virginia Military Institute Cooperative Agencies: Public Roads Administration League of Virginia Municipalities, etc.	1947	2	Annual	Program for highway administrators, engineers and public education. Program emphasizes legal and administrative and general highway development problems
University of Utah Annual Highway Engr. Conference	State Road Commission Department of Civil Engineering (University of Utah)	1940	2-5	Annual Issued as a bulletin by the Utah Engr. Station	Program covers various fields of highway administration, design, construction, etc.

Road School or Highway Conference	Cooperative Agencies	Year of Beginning	Days Duration	Published Proceedings	Remarks
7. Purdue University Annual Road School	School of Civil Engi- neering and the Engr. Extension Department County Highway Supervisors City Engineers Highway Con- struction, etc.	1915	3-5	Annual	Began as a county engineers conference in 1913. Present school covers whole field of highway administration, design construction and maintenance
8. University of Michigan Annual Highway Conference	State Highway Department	1915	2-3	Annual	Began as a conference on highway engineer- ing. Programs cover whole field of high- way administration, design and construction.
9. University of Colorado Highway Conference	Civil Engr. Department and Extension Division of University of Colorado Public Roads Administration State Highway Department City and County of Denver State Association of County Commissioners	1927	1-2	Annual	Programs cover whole field of highway administration, design and construction.
10. Tennessee University Highway Conference	University of Tennessee (Department of Civil and Highway Engineering) Tennessee State Highway Department - TVA County Officials Association	1939	2	Annual None pub- lished prior to 1939	Each annual conference has a special program. No conference in 1941.

Road School or Highway Conference	Cooperative Agencies	Year of Beginning	Days Duration	Published Proceedings	Remarks
Ohio State University Short course in Highway Development	University of Ohio Department of Highways	1941	2	Annual	Program emphasizes develop- ment roadside portion of highways.
Ohio State University Highway Engineering Conference	Department of Civil Engineering (O.S.U.) Ohio Department of Highways	1947	2	Annual Issued as a bulletin of the Engineer- ing Experiment Station	The first conference emphasized structural aspects of highway design.
Kansas Highway Engi- neering Conference	Kansas State College Kansas Highway Commission Kansas County Engineers Association	1909	2	Published beginning in 1940. Issued as a bulletin of Kansas Engi- neering Exper- imental Station.	Held annually. Program covers wide field of highway administration, construction, mainte- nance, etc.
Arizona Conference on Roads and Streets held at University of Arizona	Arizona Highway Department Public Roads Administration Department of Civil Engineer- ing (University of Arizona)	1938	1-2	Annual	Programs cover fields of highway law, administra- tion, construction, maintenance, etc.
New Mexico University Annual Highway Engi- neering Conference	Department of Civil Engineering New Mexico State Highway Department		2	Bulletin 356 5th - 1940	" "
Syracuse University School of Extension Teaching Annual Road School for Highway Employees and Others	Syracuse University Department of Public Works		Variable		None available Program for "in-service" training of personnel for study

Road School or Highway Conference	Cooperative Agencies	Year of Beginning	Days Duration	Published Proceedings	Remarks
Texas Agricultural and Mechanical College Annual Short Course in Highway Engineering	School of Engineering (A. & M. of Texas) State Highway Department of Texas	1922	2	Annual Experimental Station bulletin.	Program covers whole field of Highway Development.
Montana State College Highway Conference	Department of Civil Engineering Montana State Highway Department Public Roads Administration		2	Annual	Program covers general field of Highway Development.
University of Illinois Conference on Highway Engineering	Department of Civil Engi- neering (University of Illinois) Illinois Division of High- ways. Illinois Association of County Superintendents of Highways	1914	2-3	Annual None pub- lished earlier than 1935. Published as part of Engi- neering Exper- imental Station circular series.	Began as Short Course in Highway Engineer- ing as a two weeks training course for new county superinten- dents of highways.
North Carolina School for Street Superintendents and Assistants	University of North Carolina cooperating with Association of Municipalities	1938	2	Bulletin 17 of Program covers various Engineering specific problems of Experimental highway development. Station	

Road School or Highway Conference	Cooperative Agencies	Year of Beginning	Days Duration	Published Proceedings	Remarks
21. University of Oklahoma Annual Highway and Street Conference at Norman, Oklahoma	School of Civil Engineering, Oklahoma State Highway Commission, Oklahoma County Highway Engineers Association, Oklahoma Section of ASCE, Oklahoma State Chapter of American Association of Engineers	1935	3	Occasional Mimeographed 1940	Program covers wide field of highway construction, maintenance, etc.
22. Florida University Annual Florida Highway Conference at Gainesville, Florida	Civil Engineering Section of Engineering and Industrial Experimental Station, State Road Department	1947	2	Not published. Reported on annually in "Florida Highways"	Program mainly for "in-service" training of personnel.
23. Wisconsin Annual Road School	Highway Commission	15th - 1926 34th - 1947 35th - 1948	3-4	Occasional. Papers not compiled for distribution. Reported on annually in "Wisconsin Counties."	Program mainly for "in-service" training.

TABLE 2-A

PAPERS OF SPECIAL INTEREST

Annual Highway Conferences
University of Colorado

<u>Date</u>	<u>Subject and Author</u>	<u>Comments</u>
1927	"Highway Location and Design" by A. E. Palen	Describes all stages of highway location surveys and design from field reconnaissance to the final staked-out road.
1936	"Landscaping Our Highways" by M. Walter Pesman	Author describes his conception of roadside development, emphasizing planting of native plant material.
1937	"Roadside Improvement of Our Public Highways", by Howard W. Baker	Article outlines essential stages of location, design and construction in which engineer and landscape architect collaborate in development of highways in the National Parks.
	"Roadside Development and Erosion Control", by Frank Kimball	A description of various problems of erosion control on highways by a representative of the Soil Conservation Service.
1941	"County Zoning and Roadside Development", by Irwin J. McCrary	Cites need for zoning to control roadside business development.

TABLE 2-B

PAPERS OF SPECIAL INTEREST

Purdue Road School - Purdue University

<u>Date</u>	<u>Subject and Author</u>	<u>Comments</u>
1930	"Protection Against Stream Erosion" by John L. Stewart	Concrete dikes, piling, stone work and cribbing recommended. No mention of vegetation, best means of slope protection.
1934	"Eliminating Danger Hazards on our Highways", by James D. Adams	In Indiana from 1920 to 1933, 10,630 persons killed on highways, 20 percent of them accidents caused by "cars leaving road"--30 percent caused by projecting culvert head walls, utility poles. Author suggests necessity for widening roadbed.

TABLE 2-B - continued

<u>Date</u>	<u>Subject and Author</u>	<u>Comments</u>
1935	"Looking to the Future", by James D. Adams.	Cites great reduction of accidents on selected highways where roadbeds were widened and culverts lengthened. Reduction of total accidents 40 percent average over a period of years compared with same highway mileage before adequate shoulders and rounded gutter provided.
	"Roadside Development", by Wilbur H. Simonson	Demand for improved highway appearance cited. Present status of state highway landscape organization described. Need for improved graded cross section with better architectural design of structures.
1936	"Indiana Roads in Relation to Her Future Development", by James D. Adams.	Describes need for safer cross section design. "Observed 22 accidents on 20 mile section of highway due to V ditches etc. On 10 miles of same highway with wide shoulders and rounded gutters no accidents occurred."
1937	"What Are We Doing About Traffic Safety?" by James G. Hayden	Factors on road safety listed as: <ul style="list-style-type: none"> - The driver to be licensed. - The vehicle periodically inspected. - Speed--zones on each section of posted highway. - Lighting. - No mention of improving highways.
1938	"Protecting Trees Along our Roads", by H. J. Schnitzius	Laws concerning public utilities on highways and control of tree trimming by highway department.
1944	"Identifying Land Forms and Soils by Aerial Photos", by D. J. Belcher	Outstanding article on use of aerial photographs--of interest to all highway engineers.
1944	"Some Experiments with Turf or Granular Materials", by G. O. Mott	Describes tests showing how turf can be established on gravel, crushed stone and other granular materials with voids filled with soil particles.

TABLE 2-B - continued

<u>Date</u>	<u>Subject and Author</u>	<u>Comments</u>
1946	"Why Roadside Development", by W. H. Simonson	Cites objectives of roadside development, including: Increased traffic safety through cross section improvement. Provision for needed traffic and driver services, turnouts, way-side parks. Improved architecture of structures. Facilitate use of modern road equipment by better cross section design.
1947	"Tree Clearance on Roadways", by Paul A. MacLeod	Highways should be laid out with wide right-of-way zone assigned in row to public utilities.
1947	"Experimental Program on Roadside Development" and "Establishment and Maintenance of Stabilized Shoulders For Our Highways", by Dallas D. Dupre, Jr.	There is need for field demonstration and proof of best roadside development methods. It has been demonstrated that it is possible to establish turf on a stabilized granular soil now.

TABLE 2-C

PAPERS OF SPECIAL INTEREST

Annual Highway Conferences
University of Michigan

<u>Date</u>	<u>Subject and Author</u>	<u>Comments</u>
1926	"Maintenance of Right-of-Way", by O. S. Hess, County Engineer, Kent County	Author describes various types of roadside maintenance in Michigan.
1927	"County Parks and Roadside Development in Westchester County, New York", by Jay Downer	History and main features of Westchester County Parkways.
1928	"Roadside Development", by Phelps Vogelsang	Emphasizes selective mowing and tree care as main feature of roadside development.
1929	"Roadside Development", by J. W. Bennett	Subject of roadside development first discussed in 1924. Author outlines needs of the work as seen in 1929. Cites futility of mowing all vegetation fence to fence.

TABLE 2-C - continued

<u>Date</u>	<u>Subject and Author</u>	<u>Comments</u>
1940	"Parkways" by Gilmore D. Clark	There is a renewed interest in Free-way construction. Advises highway engineers to study design of New York Parkways before designing new Free-ways. Only 2 Freeways in existence in 1940--one in New York, another on TVA development area.
1944	"What Country Road Commissions Can Do Toward Accident Pre-vention"; by Allan M. Williams	Cites futility of blaming accidents on driver. Engineer can design and construct highways which will reduce accidents to a small percentage of present number.
1947	"Engineering Aspects of Roadside Control", by Oscar M. Gunderson	To provide the type of service needed by roadside traffic, highway authorities must direct their energies to eliminate roadside hazards as well as those within the roadway.
1947	"The Place of Roadside Development and County Park Programs in a County", by L. C. Palmer	Describes various classes of roadside development in Michigan. Emphasizes value of wayside parks and small county parks to the traveling public.

TABLE 3.

Analysis of Subject Matter of Papers
Presented at a Typical Road School or
Highway Conference over a Twenty-Year Period

<u>Classified Subject</u>	<u>1925 to 1935</u>	<u>1936 to 1946</u>
Highway Research	--	7
Highway Planning Surveys	--	5
General Highway Administration	2	22
Road System Development	12	12
Soil Stabilization - Soil Science	--	5
Aerial Surveys and Photography	--	6
Public Relations	--	3
Highway Requirements for Military Purposes	--	9
Soil Maps and Geology in Highway Field	--	2
Off-Street Parking	--	2
Postwar Planning	--	3
Traffic Surfaces - General	6	2
Concrete Surfaces	6	5

TABLE 3 - continued

<u>Classified Subject</u>	<u>1925 to 1935</u>	<u>1936 to 1946</u>
Bituminous Surfaces	22	13
Gravel - Stone Roads	14	2
Brick Surfaces	4	--
Resurfacing and subgrading	6	7
Highway Maintenance	17	5
Highway Design	6	3
Highway Drainage	6	11
Right-of-Way	2	--
Highway Finance and Taxes	9	2
Bridges and Culverts	6	10
Urban Streets and Highways	13	6
Road Surveys, Plans, Specifications	9	4
Highway Accounting	--	2
Plants and Equipment	4	16
Contract Construction (General)	6	5
Traffic Studies and Control	5	8
Highway Law	5	5
Stream Erosion	1	--
Roadside Development	1	3
Testing of Materials	--	1
Unclassified	<u>63</u>	<u>32</u>
TOTAL	<u>225</u>	<u>218</u>

COMMENTS

Comments

A well known Editor of Engineering periodicals remarked that: Tabulation of subject matter covered at the various road schools shows an appalling lack of printed information on the subject of highway design and development outside the traveled way.

It is suggested that conclusions of the final draft of the Committee's report emphasize this fact.

Conclusions should also emphasize need for Road Schools and Highway Engineering Conferences to present more articles and papers regarding that portion of the highway which lies outside the traveled way.

Comments

The Committee should emphasize the dollar value of many types of roadside development. Publicity in engineering literature has not adequately brought out the following points:

Great savings in maintenance possible by proper erosion control, etc. Need for control of and better design of entrances to roadside developments such as gas stations, roadside markets, etc.

Comment

In regard to zoning it is of interest to note that Pennsylvania has attempted eight times to get a highway zoning act passed. Public education will be necessary if this is ever to be successful. The public does not understand the need for wider rights-of-way, or of zoning - if we are to have safer highways.

Comment

Zoning legislation must come gradually, a piece at a time. It is badly needed. Filling stations move to new highways. Value of public investment is lost because limited access facilities are not provided.