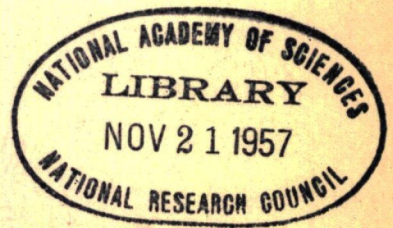


HIGHWAY RESEARCH BOARD

*Bulletin No. 30*

*Progress  
in  
Roadside  
Protection*



1951

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1950

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HIGHWAY RESEARCH BOARD

Bulletin No. 30

PROGRESS  
IN  
ROADSIDE PROTECTION

REPORT OF COMMITTEE ON LAND ACQUISITION AND  
CONTROL OF HIGHWAY ACCESS AND ADJACENT AREAS  
AND SPECIAL PAPERS

PRESENTED AT THE TWENTY-NINTH ANNUAL MEETING  
1949

HIGHWAY RESEARCH BOARD  
DIVISION OF ENGINEERING AND INDUSTRIAL RESEARCH  
NATIONAL RESEARCH COUNCIL

Washington 25, D. C.

January 1951

DEPARTMENT OF ECONOMICS, FINANCE AND ADMINISTRATION

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## FOREWORD

It is the objective of the annual reports of the Committee on Land Acquisition and Control of Highway Access and Adjacent Areas issued during the past few years by the Highway Research Board, to summarize and record the outstanding developments during the year in the fields of highway right-of-way acquirement, roadside betterment, the legal and administrative aspects of parking, and related matters.

The Committee hopes that this more or less permanent record will provide a source of useful information to State and local highway officials and others interested in the problems which concern the Committee.

# REPORT OF COMMITTEE ON LAND ACQUISITION AND CONTROL OF HIGHWAY ACCESS AND ADJACENT AREAS

David R. Levin, *Chairman, Chief, Land Studies Section, Financial and Administrative Research Branch, Bureau of Public Roads*

Perhaps the most significant development of the year in the field of highway land acquisition and control is an increasing awareness by top highway management of the importance of right-of-way and roadside control. This trend, if such it be, is evidenced by legislative and administrative action.

It should not be inferred from this fact, however, that all right-of-way difficulties are resolved. Quite the contrary is true, as the following record of accomplishment in the field will indicate.

The 1948 annual report of the Committee and papers were published by the Highway Research Board in April 1949 as Bulletin No. 18.

## LAND ACQUISITION

*State Authority to Determine Right-of-Way Widths* - In this day when wide rights-of-way are considered necessary to provide highways of modern design, adequate for ever-increasing traffic demands, it is important that the various State highway departments have adequate authority to determine these right-of-way widths. The State's authority to do so has been questioned recently in at least two jurisdictions, and in each instance the State's authority has been upheld by the courts.

1. *Louisiana*. In proceedings before the District Court for the Parish of Ascension, the jury was permitted to reduce the right-of-way width from 300 ft., desired by the highway department, to 200 ft. In reviewing the District Court's decision, the State Supreme Court upheld the highway department's right to take lands adequate for future as well as present needs. (*State of Louisiana v.*

*Cooper et al.*, 36 So. (2d) 22, 1948).

Controversy arose when the Department of Highways sought to acquire a 300-ft. right-of-way between Prairieville and Nesser. This road, located on US Routes 61 and 65 and a part of the National System of Interstate Highways is the remaining unconstructed link of the proposed highway between Krotz Springs and New Orleans. Owners of the tract in question were unwilling to sell the land to the highway department, and when condemnation proceedings were instituted, pleaded that the amount of land being taken exceeded that reasonably necessary for the purpose intended in the near future, and that other portions of the highway had been constructed on a much narrower right-of-way. In the event that the desired right-of-way was granted, judgment was asked in the amount of \$16,410, including payment for land actually taken, damages to remaining land, destruction of timber on the property, and cost of constructing bridges necessary to provide access to the property from the new highway.

The jury before whom the case was originally tried awarded the State a right-of-way of 200 ft. instead of the 300 ft. requested, and awarded damages in the amount of \$6,175, including \$200 an acre for the land taken and \$800 representing damages to the remainder of the land (also \$600 for timber and \$600 for construction of four bridges).

The Department of Highways appealed the case, protesting the reduction in width of right-of-way, the value of the land fixed by the jury and the amount of damages assessed. In connection with this last point, the State declared that property owners were entitled to no

damages for decrease in value of land not taken, since there was in fact no such decrease.

The Supreme Court amended the verdict of the lower court by increasing the width of the right-of-way which the highway department might acquire to the 300 ft. originally requested and by eliminating the \$800 in damages to the remainder of the property on the grounds that such payment was not justified. Payment for the necessary bridge construction and for timber destroyed were also adjusted downward but the value of the land taken was left as set by the jury.

The high court in approving the 300-ft. right-of-way requested by the State, reasoned that since the proposed section of highway was to be partially financed with Federal funds, it was necessary, in order to obtain these funds, to conform to standards set for sections of the interstate highway system, of which this road is a part. Since the highway department had classified the highway as Class or Type 1, a minimum right-of-way of 300 ft. was necessary according to specifications. In answer to the landowners' contention that the quantity of land sought exceeded that reasonably necessary for construction contemplated in the near future, the court stated that the duty of fixing right-of-way widths was imposed by statute on the chief engineer of the Department of Highways and that much discretion and wide latitude were permitted him in the execution of this function, it further being the duty of the chief engineer to provide for future as well as present needs of the traveling public. A section of the Louisiana law, as set forth below, was used by the court to substantiate this opinion:

"The width of rights-of-way shall be fixed by the Chief Engineer of the Department. The width so fixed may be sufficient to adequately accommodate the future improvement of the highway by the construction of additional lanes of pavement, service roads, intersections, traffic distribution devices and grade separations, and to provide sight distances

and insure stability and lateral support for the embankments, structures and appurtenances to the highway; to provide for proper drainage, or otherwise sufficient in the judgment of the Chief Engineer to provide presently and in the future for the public interest, safety and convenience". (Sec. 47, Act of 1942).

The court further quoted a previous opinion of the same court in connection with highway construction cases, as follows: "The engineers are the ones who should know, and as a matter of fact, do know. We cannot substitute our own opinions for the opinion of engineers in matters of this kind." (Crichton v. Louisiana Highway Commission et al, 172 La. 1033, 136 So. 43, and Louisiana Highway Commission v. Hays' Heirs, 186 La. 398, 172 So. 432)

The court found that no evidence had been submitted by the landowners to show that the chief engineer's decision for a 300-ft. right-of-way was unwarranted, the defendants having relied almost entirely on the fact referred to above that the Prairieville-Nesser link as designed would not be constructed immediately, and that rights-of-way on other sections of the Airline Highway were not all of this width.

With regard to this latter argument, the court pointed out as a recognized fact that these other portions of the highway, although adequate when constructed were designed without due regard for future needs and as a result could not be widened except at an exorbitant if not an almost prohibitive cost. The chief engineer having taken all of the factors mentioned into consideration could not be said to have abused his discretion or to have acted arbitrarily.

One more significant aspect of the court's decision relates to the subject of damages to the portion of the landowners' property not to be acquired by the highway department. Allowing for the fact that the land in its present condition was suitable only for farming and stock-raising purposes, and that its value for



these purposes would be reduced somewhat when cut into two parts by the proposed road, the court was of the opinion that due to its proximity to the City of Baton Rouge, construction of the new highway would render the land valuable for suburban home sites, a special benefit offsetting the reduction in value for farming and stock-raising purposes. Thus the defendants' plea for damages to the remaining land, granted by the lower court, was refused by the Supreme Court.<sup>1</sup>

2. *Missouri*. In another case, the right of the State Highway Commission of Missouri to determine the amount of land needed for a State highway was upheld by the State Supreme Court. (See *State of Missouri ex rel. State Highway Commission of Missouri v. Honorable Claude E. Curtis*, 222 S.W. (2d) 64, 1949). In this case, the Circuit Court of Pulaski County, Missouri, refused to act on the State Highway Commission's petition to condemn land for a State highway because the highway commission, it stated, was unable to prove that the entire right-of-way requested was necessary for the construction of the road.

The section of road in question, located on US Highway 66 and known as the Waynesville By-Pass, was to consist of 5.5 mi. of controlled-access highway with two 26-ft. divided pavements, to be built under two contracts, the south lane first, but the highway commission sought to obtain all of the land necessary for the entire project at one time.

It was requested by some of the defendant landowners, and the request was sustained by the lower court, that the highway commission be required to set forth the uses and purposes which were to be made of the land in question. In reply the commission stated that the land was to provide an adequate and necessary safety factor for all contingencies and

developments in the construction, reconstruction, improvement and maintenance of the entire highway which might be built ultimately, but which could not be foreseen fully or set forth definitely and in detail. Definite purposes in the bill of particulars filed by the commission included the provision of room for men and machinery in the present and future construction and maintenance, room for such changes as might be necessary because of rock, slides, drainage, etc., room for such changes as might become necessary because of future changes in design, size, weight and speed of vehicles and in traffic laws and customs, room to take care of erosion problems, sight distances, public utility installations, and to prevent the erection of dangerous structures too close to the highway.

The defendant landowners requested that the highway commission be prohibited from acquiring lands which were not shown in the plans on file with the county clerk as to be used for the construction of a roadway or not needed for immediate use.

The circuit court then entered an order stating that there was land included in the description in the petition which was in addition to the land which the State Highway Commission alleged it needed for public use, and which the condemnor did not even propose to use for the construction of a highway and appurtenances thereto. Under this order the highway commission was authorized to amend its condemnation petition, eliminating the land which was not shown to be necessary. Otherwise the case would be dismissed.

The judge of the circuit court insisted that the plans on file showed an aggregate width of 250 ft. (125 ft. on the outside, of the two 24-ft. pavements) for which the highway commission had failed to show any use whatsoever. The highway commission, however, in its brief, indicated that the highway as planned would consist of two 24-ft. lanes with a 4-ft. dividing strip, and 10-ft. shoulders. The remaining land was considered necessary to take care of any conditions which might be encountered in construction because of

<sup>1</sup>See Memorandum No. 22, January 1949, Committee on Land Acquisition and Control of Highway Access and Adjacent Areas, Highway Research Correlation Service, Circular No. 51

the topography of the land. In all a total of 278 ft. was to be condemned. The highway commission stated its belief that the judge of the circuit court did not understand the plans when he made the statement noted above, to the effect that an aggregate width of 250 ft. was being requested for which no use was shown. Further, the commission was unable to determine from the judge's order exactly which portions of the land the judge had decided were unnecessary.

The State Highway Commission then applied to the State Supreme Court for a writ of mandamus which was granted. The circuit court judge was ordered to show cause as to why he would not accept jurisdiction in the matter.

The judge of the circuit court, in his brief filed in connection with the highway commission's request for a writ of mandamus, quoted Article 1 of Section 27 of the State constitution providing for condemnation by the State of property in excess of that actually to be occupied by a public improvement or used in connection therewith as might be reasonably necessary to effectuate the purposes intended. He stated, however, that he did not believe this provision was self-enforcing since it was further set forth in the constitution that such condemnation might only be made under "such limitation as may be provided by law."

The Supreme Court held that the State was not seeking to take property in excess of that to be used in connection with the public improvement. The State alleged that all of the property to be taken was necessary for purposes of construction, drainage, safety and other purposes, specifically set out, even though not all the property was to be actually occupied by the highway nor was the entire improvement to be constructed immediately. Section 29 of Article 4 of the constitution expressly authorized the State Highway Commission to construct limited-access roads and Sec. 8759, Rev. Stats. Mo. 1939, vested the commission with authority to condemn lands for right-of-way and for any other purpose necessary for the proper and economical construction of the State

Highway system.

Although the highway commission did not contemplate construction of the entire project at that time, the above provisions authorized appropriation of land for the entire project. The Supreme Court quoted a previous decision to the effect that "if the opening or extending of a particular proposed street is but a part of a general scheme the court should know what the scheme is in order to appreciate the value of the particular street in question. That scheme may be shown . . . by the best evidence of which the fact is susceptible, if it has not been made a matter of record." (Kansas City v. Hyde, 92 SW 201) The court held that the allegations of the petition and bill of particulars were sufficient to authorize the appropriation of the land necessary for the entire project.

The judge of the lower court again quoted Section 28, Article 1 of the constitution as follows: "When an attempt is made to take private property for a use alleged to be public, the question whether the contemplated use be public shall be judicially determined without regard to any legislative declaration that the use is public." To sustain the State Highway Commission in its purpose of taking the land in question on the basis of a simple allegation that it was necessary in connection with the projects would in effect nullify and render ineffective this provision of the constitution, the lower court asserted. The Supreme Court, however, cited a previous case (City of Kirkwood v. Venable, 173 SW 2d 8) to the effect that public necessity or propriety for the exercise of eminent domain was a legislative or political question and not the same as "public use." It then stated: "The power to locate a State Highway, to determine its width, type of construction and the extent of land necessary for economical and proper construction are vested in the sound discretion of the State Highway Commission, uncontrolled by the courts except to compel strict compliance with the statutes and to prevent the taking of private property for a private or non-public use."

The highway commission had complied with the statutes by filing its petition and plans showing its decision to appropriate certain described land for certain purposes, to wit, for the construction of an extension to an existing State highway.

If the State's allegation that all the land was being taken for a public use did not prove itself, the lower court judge was not authorized to hold, without evidence, that a portion of the land was being taken for a non-public use. If the State Highway Commission was, in this case, taking more land than would ever be proper for any of the purposes mentioned, it was incumbent upon objecting landowners to point out and describe the excess.

In determining the question of "public use," when that question was properly raised, a court might inquire whether the public purpose stated was the real purpose or merely a sham. The court then quoted from a recognized authority to the effect that even in the absence of actual fraud, a taking of property in the ostensible behalf of a public improvement in excess of what by any possibility could ever serve any public purpose would to that extent be taking for a non-public use (Am. Jur. pp. 734, 736, Secs. 107, 109), "but the courts uniformly hold that the greatest weight must be given to the judgment of the delegated agents of the State as to the amount of property which should be appropriated."

The Supreme Court held that the State Highway Commission had large discretion to determine the extent of land to be taken and was not limited to a taking of the actual roadbed. It might determine what land was reasonably necessary for proper and economical construction and for purposes outlined in the bill of particulars. The circuit court judge was therefore ordered to exercise jurisdiction to determine all of the issues in the case.

A subsequent motion for rehearing made by the circuit court judge was overruled by the Supreme Court. And in so doing the high court amplified its decision, stating that the determination of the State Highway Commission as to how much

land was needed might be judicially questioned not only for fraud or bad faith but for an arbitrary and unwarranted abuse of discretion. In this case all the land taken was presumptively necessary for the public uses mentioned in the condemnation petition and bill of particulars. If the commission arbitrarily abused its discretion by attempting to take land which could never, under any contingency, be used for any such public purposes, the burden was upon the objecting landowners to allege and prove such abuse. Such objections, the court said, had not been raised.<sup>2</sup>

### *Land Acquisition Practices in Kansas* <sup>3</sup> -

The method used in the acquisition of land for highway purposes in the State of Kansas is unusual in that practically all right-of-way is acquired by condemnation, in one action, covering everything needed on a project, including right-of-way, borrow pits, stream changes, detour and backslope easements. The purchase method is used when the State considers it expedient to do so, but this is usually when only a few landowners are affected or when it is necessary to obtain a single tract for maintenance, a shop site, or a material storage site.

The right-of-way department's activities in connection with a proposed construction project begin when complete construction plans, showing the desired right-of-way lines, borrow pits, easements, etc., are received from the design department. The department then prepares a motion to be acted upon by the State

<sup>2</sup>See Memorandum No. 28, August 1949, Committee on Land Acquisition and Control of Highway Access and Adjacent Areas, Highway Research Correlation Service, Circular No. 78.

<sup>3</sup>This summary is condensed from a report prepared by Mr. J. A. Campbell, Right-of-way Engineer of the Kansas State Highway Commission, in connection with a survey of State right-of-way practices undertaken by the AASHO Committee on Right-of-way.

Highway Commission, authorizing acquisition of right-of-way for the project. When this has been done and certificates of title obtained from an abstracter in the county in which the project is located, the project is assigned to a right-of-way agent.

Next the division engineer is asked to stake the right-of-way lines, easements, borrow pits and stream channel changes, and the right-of-way agent accompanies him while so doing. The agent then makes a report giving the names of all tenants or lessees of properties involved and a second report showing all public utilities which will be affected and whether they occupy privately owned right-of-way. He then makes a preliminary appraisal of each tract involved, checks tract descriptions and recommends to the right-of-way engineer any changes which would decrease damages.

Descriptions of tracts required are forwarded to the chief attorney of the State Highway Commission with certificates of title and names of lessees or tenants for preparation of a petition to the court of jurisdiction, asking that the property be condemned for highway purposes. An attorney residing in the county is appointed to file the condemnation petition with the judge of district court.

Three appraisers are appointed by the court if the judge approves the petition. These appraisers are residents of the county and usually substantial property owners of high reputation in the county and thoroughly familiar with local values. They go over the land, accompanied by the right-of-way agent, who explains the construction plans, contacts property owners with them, procures estimates from reliable contractors for the removal of buildings and generally assists the appraisers in every way possible to arrive at an award fair to both the property owner and to the State.

The appraisers must notify property owners that their property is to be taken, not less than ten days before the final hearing date set by the court. Such notice is sent by mail and also given by publication. Resident landowners as a

matter of fact are informed regarding the project by the agent, who calls on all residents at the time of making his preliminary appraisal.

On the specified date, the appraisers file their report with the judge of the court, on forms prepared by the legal department. After the judge has approved the appraisers' report, the right-of-way agent delivers a copy to the right-of-way engineer with his recommendations as to acceptance by the highway commission. The report of the appraisers is checked with the right-of-way agent and compared with his preliminary appraisal, assessed valuation and recent sales in the locality, and is then forwarded to the commission for acceptance or rejection, with the recommendations of the right-of-way engineer.

If the report is accepted, as it usually is, the total amount of all awards made in the condemnation proceeding is deposited with the clerk of the court for disbursement to the various property owners. Title passes to the State at the time the deposit is made.

Appeals may be filed within 30 days after the date of court approval, by either the landowner or by the State Highway Commission. In actual practice, few appeals are filed. Unless there is wide divergence of opinion between the right-of-way agent and the appraisers, their judgment is accepted by the right-of-way agent and the commission.

If the report is rejected by the commission or if appeals are taken by landowners, the project may either be abandoned, upon payment of court costs, or appeals may be tried in court, or compromise settlements may be made by the legal and right-of-way departments, subject to approval of the highway commission.<sup>4</sup>

<sup>4</sup>See Memorandum No. 26, June 1949, Committee on Land Acquisition and Control of Highway Access and Adjacent Areas, Highway Research Correlation Service, Circular No. 67.

*Tenant Relocation* - One of the most acute problems of the present highway program, particularly in urban areas, is the displacement of families from dwellings located on property acquired for highway purposes. In an effort to solve this problem, a new section was added to the New York highway law in 1948, as section 31, providing for acquisition of property and relocation of dwellings. The 1949 legislature transferred the act from the highway law to the State finance law as Section 178-c-d, apparently in order to include in its provisions, dwellings on property acquired for other than highway purposes.

Under the provisions of this law, whenever it is determined by the officer or agency in charge, that any dwellings on State lands are not adapted or not needed for use, such officer or agency may so certify to the superintendent of public works, recommending removal and rehabilitation on a new site or sites, or rehabilitation on the existing site or part thereof. The superintendent of public works may, when funds for the purpose are made available, acquire additional property for the purpose of providing new sites for these dwellings in order that they may continue to be used for housing purposes. He may if necessary move the dwellings to the new sites, provide for new foundations and the restoration and rehabilitation of the dwellings in entirety, including heat, light, water, sewerage and other necessary facilities and appurtenances required for complete restoration of the property.

The superintendent of public works, subject to approval of the director of the budget, may provide for moving and rehabilitation by contract, or by State forces, or a combination of both, and may enter into contracts for installation of services and facilities, including water, sewerage, gas and electricity. Or he may contract with the municipality to have its forces and equipment perform the work.

If, in the relocation and rehabilitation of dwellings, the superintendent of public works finds that the improvement of streets, highways, sewers, water lines

or other facilities is desirable, he may, when funds therefor are made available, contract with the municipality for such improvements or extensions, and may pay the cost of the work required. Upon completion and acceptance of such work by the superintendent of public works the municipality must pay the entire cost of maintenance thereof.

After relocation and rehabilitation of the dwellings, the superintendent of public works may provide for their sale after advertisement for bids. If any dwellings and lands remain unsold, the superintendent may declare such dwellings and lands no longer useful or necessary to the department of public works, filing a declaration of abandonment with the board of commissioners of the land office. Such buildings or lands then become unappropriated State lands.

A dwelling relocation and rehabilitation fund is set up in the custody of the commissioner of taxation and finance, and necessary funds to carry out activities authorized by the act are made available to the department of public works upon issuance of a certificate of availability by the director of the budget.<sup>5</sup>

The City of New York also has authority to take land for the purpose of relocating houses displaced because of expressway widening, according to a decision handed down by the State Supreme Court (in the case of *Watkins et al., v. Ughetta*, (78 N.Y.S. 2d 393, 1948) and subsequently affirmed by the Court of Appeals (80 N.E. 2d 457, 1948)).

When the City of New York, in the process of widening Van Wyck Expressway, found it necessary to remove 48 one and two-family houses, it was decided to acquire land some distance from the expressway and relocate the houses thereon. However, an application was filed in the State Supreme Court by owners of land to be taken for this purpose to re-

<sup>5</sup>See Memorandum No. 27, July 1949, Committee on Land Acquisition and Control of Highway Access and Adjacent Areas, Highway Research Correlation Service, Circular No. 73.

strain the city from so doing, on the ground that the property to be taken was not for public use. The Supreme Court denied the appeal, holding that the property in question was being taken for public use and citing *Brown v. United States* (263 U.S. 78) wherein a protest was filed against the United States Government's taking land close by a portion of a town flooded by a reclamation project for the purpose of establishing a home site to replace the portion of the town flooded by the reservoir. The United States District Court held in that case that the acquisition of the townsite was so closely connected with the acquisition of the district to be flooded, and so necessary to the carrying out of the project that the public use of the reservoir covered the taking of the townsite. The United States Supreme Court concurred in this view.<sup>6</sup>

*Right of Immediate Possession* - The legal right to enter upon and take immediate possession of lands needed for highway purposes, prior to completion of condemnation proceedings, is extremely important in avoiding delays in highway construction programs. The Supreme Court of the State of Indiana has held that that State does not have this right, in the absence of statutory provision therefor, even though the State constitution exempts the State from the necessity of assessing and tendering compensation before taking property. (See *Thomas v. Lauer et al.*, 86 N.E. 2d, 71, 1949.) The court also ruled in this case that the State could not take possession of leased premises without permission of the lessee, even when the property had been conveyed by the landowner.

In this case, the State Highway Commission obtained a deed to the property from the owner, but the leaseholder did not join in the grant and did not in any

way convey his right or interest in the property to the State. Subsequently the leaseholder, who was operating a going business on the premises under the terms of a ten-year lease, asked for an injunction to prevent the State from occupying the land for the purpose of accomplishing the projected improvement. No action was filed by the State to acquire said leaseholder's interest in the property. The State contended that the leaseholder was not entitled to injunctive relief, since he had an adequate remedy under an existing statute, providing, in effect, that any person having an interest in land taken for public use without having been appropriated as provided under the condemnation law, might proceed to have damages assessed under the provisions of that law. (*Burns, Indiana Statutes Annotated, 1933, Sec. 3-1711.*)

Although the superior court of the county in which the property was located denied the injunction, the supreme court reversed this judgment on the ground that the action of the State in this case was entirely inconsistent with procedure authorized by law.

The supreme court in its decision called attention to the fact that Indiana State statutes provide a method by which the State may acquire land for highway purposes by purchase or gift or by condemnation. Under condemnation procedure the State does not have the right of possession until damages are assessed and paid to the clerk of the court, and although the State constitution provides that "no man's property shall be taken by law, without just compensation; nor except in case of the State, without just compensation first assessed and tendered," this provision is not self-enforcing. It does give the legislature the right to permit the State to take property without first having compensation assessed, but this right the legislature has not exercised. The court quoted from a previous decision (*State v. Pollitt, 45 N.E. (2d), 480, 1942*) as follows: "It would seem, therefore, that when the legislature provides an exclusive method of procedure to condemn land, available alike to all

<sup>6</sup>See Memorandum No. 22, January 1949, Committee on Land Acquisition and Control of Highway Access and Adjacent Areas, Highway Research Correlation Service, Circular No. 51.

bodies having the right to exercise the power of eminent domain, any such body seeking to exercise the right, even though it be the State itself by one of its administrative agencies, is bound by the provisions of the eminent domain statute." The State Highway Commission must therefore follow the procedure provided for in the regular condemnation act.

In answer to the State's contention that the leaseholder was not entitled to relief by injunction because he could, if he so desired, have his damages assessed under the provisions of Section 3-1711 of the Statutes, referred to above, the court held that this statute did not apply to the present situation, since the leaseholder's interest and right in the property had not actually been taken, but were merely being threatened to be taken. The owner of such land or right need not stand idly by and watch a State agency take his property or destroy his business before taking any steps to protect himself.

The State also contended that the leaseholder's complaint raised a question of title, and that title might not be tested in an injunction case. The court stated, however that no question of title was included in the complaint. The State's contention in fact was that it would be inconsistent for it, while claiming title under a deed, to go into a court and attempt to condemn a conflicting interest in the real estate covered by the deed. If this were true, the State could in every instance ignore the rights of persons in possession and ignore the rights of lessees, and purchase from the owner and claim title under deed from the owner as against a tenant in open possession. Without further ado the tenant could be forcibly ousted and have his rights in the real estate seized.<sup>7</sup>

<sup>7</sup>See Memorandum No. 32, December 1949 Committee on Land Acquisition and Control of Highway Access and Adjacent Areas, Highway Research Correlation Service, Circular No. 95.

*Relocation of Highways and Roadside Development* -- A Nevada court recently dissolved an order restraining the State Department of Highways from relocating a State Highway through the town of Verdi. The order was obtained originally upon the complaint of certain owners of land abutting on the existing State highway, who claimed that the relocation would destroy the business which they were conducting on their property. In response to the restraining order, the Department of Highways filed a reply wherein it was satisfactorily shown that the proposed change had been approved by the State Board of Highway Directors and by the Board of County Commissioners of Washoe County in accordance with the existing law. The reason given was that the present highway was too narrow and that it created a dangerous hazard to motor vehicles and pedestrian traffic. It was further shown that the expense of rebuilding and repairing the old highway would be unreasonably great. Construction of the highway on a new location would materially reduce the cost.

In dissolving the restraining order the court stated that since the highway department had complied with the provisions of the law it could not be enjoined from proceeding with the relocation of the highway "simply because of the fact a few people are to be put out of business," although the presiding judge stated that he found considerable merit in such an argument against the relocation.<sup>8</sup>

In a somewhat similar case, involving elimination of a railroad-highway grade crossing and the relocation of a road, the Ohio Department of Highways successfully contested the claim of a property owner to damages because of the fact that her privilege of through travel was ex-

<sup>8</sup>See Memorandum No. 31, November 1949, Committee on Land Acquisition and Control of Highway Access and Adjacent Areas, Highway Research Correlation Service, Circular No. 92.

tinguished and further that relocation of the road caused heavy damage to the trailer camp which she operated. (See H. G. Sours, Director of Highways, State of Ohio v. Ralston Steel Car Company, Maie C. Lampe, Court of Appeals of Franklin County, Ohio, Opinion No. 4109.)

The Lampe property is located on the west side of James Road, a short distance south of the railroad-highway grade crossing which was eliminated (see Fig. 1). The vacated portion of James Road extended north from the northeast corner of the Lampe property. Ingress and egress to and from the property from James Road were not disturbed. Access from and to the property from the north was cut off, but it was necessary for appellant to travel only several hundred feet in a southerly direction to reach the relocated road. Slightly north of the intersection with James Road an upgrade begins on the new road, and immediately west of appellant's property there is an elevation of some 30 ft. above said property, to provide for the viaduct over the railroad right-of-way some distance northerly. The Lampe property does not abut the improved highway at any point.

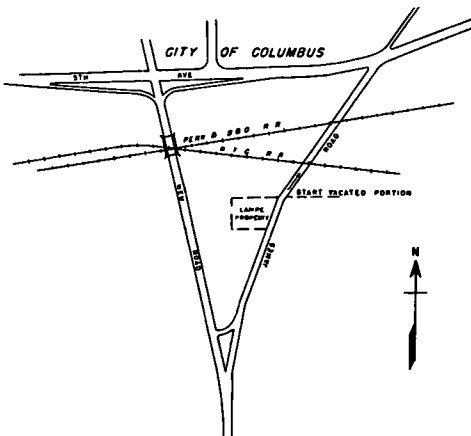


Figure 1. Location of Lampe Property

When the Director of Highways served notice on all property owners considered as abutting on the improvement, appellant was not personally notified, since she

was not regarded as the owner of abutting property. Notice was published, however, of the State's intention to proceed, as required by law. No claim for compensation or damage was filed by appellant at that time. At a later date, when the attorney general filed application for adjudication of claims on which there was a disagreement, she was made a party defendant in the proceeding, upon her application. A motion of the Director of Highways to dismiss appellant's petition was sustained by the Common Pleas Court of Franklin County, whereupon appellant petitioned the Court of Appeals of the county to reverse the decision.

In her petition to the Court of Appeals the question was raised as to whether she had the right to have her claim for damages tried by a jury when the trial court had ruled otherwise. However, the court ruled that her claim was deemed to have been waived by the fact that no claim for compensation or damages had been filed within the time designated in the notice published by the Director of Highways. Therefore, it was necessary to prove that appellant's property abutted on a portion of the highway which was physically changed or which had been vacated and therefore should have had notice served on her as an abutting owner. If the owner was not an abutting owner, she was adequately served by publication.

Determination of this issue required the court to construe the pertinent section of the State statutes (Section 1182-12, Ohio General Code) which in part provides:

"A true copy of said notice shall be served upon the owner or owners of all property to be taken, and on owners of land abutting on any portion of the highway to be physically changed, or which will be vacated in the construction of the improvement."

Appellant claimed that although none of her land was taken, her property did abut on a portion of the highway which had been physically changed and also on a portion which had been vacated in the construction of the property. And as a



consequence, access to her property was affected to her detriment, since her means of livelihood consisted of the operation of a trailer camp.

The court cited a decision of the State Supreme Court (N.Y.C. & St. L. Rd. Co. v. Bucsi, 128 O.S. 134, 190 N.E. 562) as follows:

"1. Where a duly dedicated and accepted east-and-west street of a city is vacated by the city some distance from its eastern terminus and completely closed to travel, the owner of property abutting upon such street, but not upon the vacated portion thereof, has no right of action for damages-because of such vacation, so long as his access to the city street system to the west is not impaired.

"2. Under such circumstances, the abutting property owner's damage, if any, differs in degree but not in kind from that of the general public, and his legal status falls within the category of *damnum absque injuria*.

"We are fully aware that the rule adhered to by this court in this case may be harsh under certain circumstances, but any other rule would breed untold confusion. If one nonabutter on a street that had been closed at one end could maintain an action for damages, then every other nonabutter would have the same right; and the rule of damages would be of such a speculative nature as to open a wide avenue for imposition.

"The time has come when Ohio must adopt one of the two rules. There is no middle ground. Either each and every nonabutter upon a vacated street must be given a right of action for damages, or such right must be denied all nonabutters. The term 'nonabutter' as used herein is used in the sense that the property in question does not abut upon that part of the street that is vacated."

The court also cited another decision (Albes v. Southern Railroad Co., 164 Ala. 356) in which the court held that where only the corner of property touched the corner of a street to be closed, and no part of said street was immediately opposite the property, such property was not abutting property, and the owner was not entitled to damages.

The court felt constrained to follow these principles even though it was pointed out that courts of other States had adopted a more liberal policy from the property owner's point of view. Appellant urged that a new and more liberal construction should be given to the Ohio statutes since the State was embarking on a new type of highway development which required the construction of viaducts and clover-leaf intersections which affected property owners over a wide area and that in such development there was a possibility of pieces of property being completely surrounded by the improvement and yet not considered as abutting property under the present interpretation of the statute. The court felt that this suggestion lay in the field of legislative policy and not with the courts.

The court concluded that the appellant was not an abutting owner within the provisions of the Ohio statutes and so was not entitled to be served with notice, under section 1182-12 quoted above. And on the basis of the ruling in the Bucsi case, also quoted above, was not entitled to compensation and damages.<sup>9</sup>

*Federal Participation in Right-of-Way Acquisition Costs* - Because of widespread interest in the new general administrative memorandum pertaining to Federal participation in right-of-way acquisition costs, Mr. C. W. Phillips, Sr., of the Bureau of Public Roads was prevailed upon to make a few informal remarks on the subject at a session of the land acquisition commit-

<sup>9</sup>See Memorandum No. 24, April 1949, Committee on Land Acquisition and Control of Highway Access and Adjacent Areas, Highway Research Correlation Service, Circular No. 57.

tee during the 1949 annual meeting of the Board. Mr. Phillips explained how the new memorandum was intended to simplify procedures for the various States seeking Federal funds for right-of-way purposes. Many of the difficulties the States experience in connection with land acquisition procedures, he said, are due to the fact that the problem is a comparatively new one. Until quite recently, local units purchased land for highways almost exclusively, in return for having the proposed road routed through their communities. And a great many landowners donated land, which incidentally accounts for some of the poor locations of the older roads. Highway engineers, Mr. Phillips said, are afraid of the right-of-way problem. They are engineers, and engineering is an exact science. Furthermore, they are used to doing the construction end of the job by means of competitive bidding. Right-of-way techniques on the other hand belong more in the field of public relations. In fact, the right-of-way official can turn out to be one of the most important public relations men in the department, on the basis of experience gained in the acquisition of rights-of-way.

*Offset of Special Benefits* - Special benefits which may be offset against damages to property in connection with highway improvements have usually been construed by the courts to include only those which arise from the peculiar relation of the land in question to the public improvement. Put under a recent decision of the Supreme Court of Arkansas, special benefits in that State may include a change from a gravel to a paved road. See Ball et al., v. Independence County, 217 S.W. 2d 913 (1949).

The controversy arose when a group of landowners filed claims against the county for damages occasioned by the County's action in condemning portions of their lands for the construction of a paved State highway to replace a gravel road. Damages were denied by both the county court and on appeal, by the circuit court, whereupon the case was appealed to the

State supreme court.

Property owners claimed that they received no new or special benefits from the improvement of this road, State Highway 11, between Batesville and Cave City, and in fact had been damaged far more than benefited. Such benefits as were received were also shared by other landowners in the vicinity from whom no land had been taken, and therefore were general in character.

In Arkansas, benefits to remaining property may be offset against the value of the land taken as well as against the damage to the remainder, under a provision of the law which states that "Any court or jury considering claims for right-of-way shall deduct from the value of any land taken for a right-of-way the benefits of said State highway to the remaining lands of the owner." (Sec. 6962, Pope's Digest.)

The main argument in this case, therefore, hinged on the interpretation of the term "special benefits." The court quoted from a previous decision (*Herndon v. Pulaski County*, 117 SW 2d 1051) in which "it was shown to be true that other owners, no portion of whose lands had been taken for the new road, received the same benefits which plaintiff derived; but this does not prove that plaintiff has not received special benefits to her lands. The fact that other owners have received special benefits without loss of land or other cost to them does not prove that plaintiff has not received special benefits. The other beneficiaries of the change of location of the road are not asking damages. If they were asking and had prayed damages it would then, in that event, be proper to offset their special benefits against their damages."

The appellants contended that the opinion of witnesses as to the increased value of the property in question was based in part at least if not wholly on general benefits and not on special benefits. In reply the court called attention to a previous decision in which precedent had been established to the effect that benefits to remaining land which resulted in increased value of said

land might be offset against damages (Weidemeyer v. Little Rock, 247 SW 62.)

Testimony by competent witnesses in the case established the fact, to the court's satisfaction, that the change from gravel to paved road greatly enhanced the value of appellants' land not taken by condemnation, and that all of their lands had received special benefits. According to these witnesses, the fair market value of the lands involved had increased in amounts ranging from \$900 to \$3,500.<sup>10</sup>

ture, is the first significant drop that has occurred since 1932-1933. The national index dropped to 167 from a high of 177 in November of 1948. Figure 2 indicates the percentage change for each State during the period November 1948 to November 1949. Contributing factors, according to the Department's report, are high asking prices for land and the more conservative policy adopted by many lenders, coupled with the fact that an expected decrease in net farm income for the year 1949 resulted in fewer buyers

**PERCENTAGE CHANGE IN DOLLAR VALUE OF FARM LAND\***  
November 1948 to November 1949

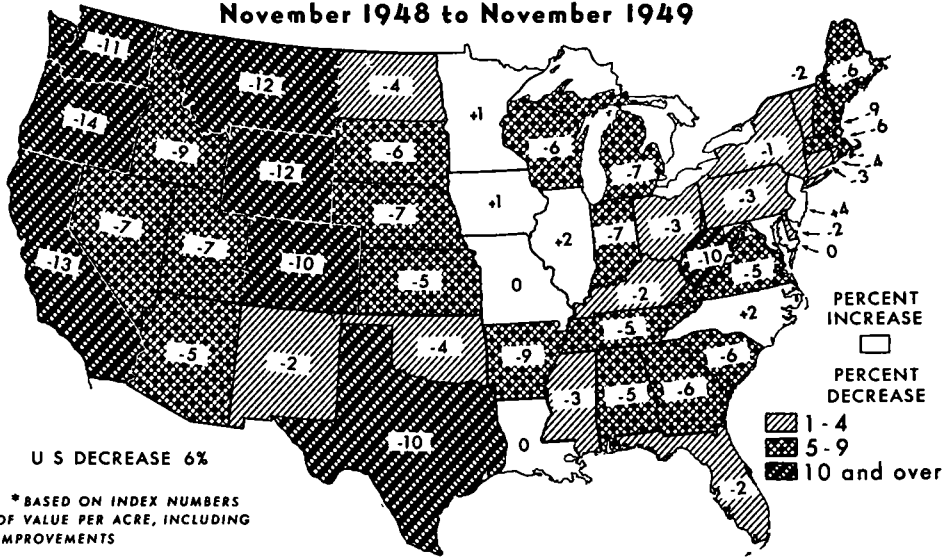


Figure 2. Decrease in Value of Farm Land May Influence Right-of-way Costs.

*Right-of-Way Costs and Land Values* - The latest release of the Bureau of Agricultural Economics, U. S. Department of Agriculture, indicates that the value of farm real estate for the United States as a whole decreased six percent in the period November 1948 to November 1949. This, reports the Department of Agricul-

being able to pay cash for farm lands.

Whether this small decrease will have an appreciable effect on right-of-way costs is problematical.

**CONTROL OF HIGHWAY ACCESS**

*California* - An interesting decision involving the State's authority to construct freeways in California has been handed down by the Superior Court of Sacramento County, Case No. 80104, Frank H. Holloway, et al., v. C. H. Purcell, Director of the Department of Public

<sup>10</sup>See Memorandum No. 28, August 1949, Committee on Land Acquisition and Control of Highway Access and Adjacent Areas, Highway Research Correlation Service, Circular No. 78.

Works, et al., (1949).

In this case the plaintiffs, consisting of a group of property owners in the county, sought an injunction to prevent the proposed relocation of a portion of State Route 3 between Sacramento and Roseville, and the construction of part of the relocated road as a freeway.

In objecting to the proposed relocation, plaintiffs presented three main arguments. It was stated first that State Route 3 was selected and constructed under the provisions of the State Highway Act of 1909, which authorized a bond issue to finance acquisition and construction of a system of State highways. The present location of the route had long been known and accepted as part of the State highway system. It traversed an old and well settled section, serving a large local residential and rural business community, and was a principal artery of travel in the county and for through travel to other parts of the State. Furthermore, the existing highway was a good traversible highway, fully equal to the wants of the traveling public and would remain so for many years. No necessity or emergency existed which called for extreme alteration or relocation. If necessary it could be widened and altered in alignment into a multi-lane highway at much less expense than the proposed new highway was expected to cost.

In response to the argument that existing Route 3 met the needs of the traveling public, an affidavit presented by the deputy State highway engineer pointed out the inadequacy of the present road, which consisted of two-lane and three-lane pavements whose borders were cluttered with motels, service stations and various roadside businesses. Sight distances were restricted at various locations by vertical or horizontal curvatures. As a result, the highway was congested at peak hours and rendered hazardous by vehicles attempting to pass other vehicles or to enter or leave business establishments along the highway. The deputy State highway engineer also challenged the statement that the present road could be converted into a multi-lane

highway at less cost than the proposed substitute, on the basis of public hearings held before the relocation was decided upon.

The second argument raised by the plaintiff was to the effect that the State was exceeding its authority in carrying out the proposed relocation, since no power or authority existed whereby the State might change, alter or relocate, reroute or substitute any portion of said Route 3 or to abandon or relinquish same or do anything which tended to destroy the identity thereof. In examining pertinent legislation, the court found that the Streets and Highways Code adopted by the legislature in 1935 defined a State highway as one which was acquired, laid out, constructed and improved or maintained as a State highway, pursuant to constitutional or legislative authorization, and vested the commission with authority to lay out and construct all State highways between the termini designated by law and on the most direct and practicable locations as determined by the commission. Also, the code expressly gave to the highway commission the power to alter or change the location of any State highway if in the opinion of the commission such alteration or change would be for the best interest of the State.

According to the court, there had been a persistent effort to avoid "freezing" the State highways into a rigid mold by legislative decree and instead to leave with the Department of Public Works and the commission full discretion to locate and relocate State highways according to the declared objective standard, the general public interest. During the years since the original State highway system had been established, under the provisions of the State Highway Act of 1909, many changes had been found necessary. At least 30 major relocations had been made, and the commission's authority had been questioned in connection with several of these relocations. In all cases where the opinion of the attorney general had been requested, that officer had stated that in his opinion the department and

the commission had the authority to carry out the proposed relocations, which in most cases involved more drastic changes than the proposed relocation of State Route 3.

These interpretations of the law were known to the legislature when it codified the Streets and Highways Code in 1935. By including therein the broad powers above referred to, the legislature recognized and acquiesced in the administrative interpretation of the statutes up to that time. Accordingly, the court stated that "it appears that not only has the administrative interpretation been that such segmentary relocations as is here involved were within the power of the commission, but the legislature has recognized and acquiesced in that administrative interpretation."

The third point raised by the plaintiff was that the original bond issue was for the improvement of certain highways and these funds could not be expended on a route materially different from the one embraced in the proposal for the bonds. But the court was of the opinion that approval of the bond issue by the people was needed solely because of the constitutional provision that no indebtedness of the State exceeding \$300,000 be incurred by legislative action without approval of the electorate. However, this approval went no further than to authorize incurring of indebtedness in the amount set forth and did not amount to a contractual obligation that the system proposed in such a general language was in respect to its exact location through its course to become fixed and immutable even when selected and designated by the proper officials as provided in the act. The court was of the opinion that the commission had express and implied statutory and constitutional authority to do just what it was alleged to have done.

Regarding the State's plan to construct a freeway on the new location, plaintiffs charged that the State's intention was to create a new and different type of State highway than was provided for in the constitution, and that existing legisla-

tion expressly and specifically giving the commission such authority was in itself null and void as being contrary to the constitution. Complete control over the creation and operation of such highways was given to the commission and the department, but no objective standards were set up in the legislation to guide such action. But the court was of the opinion that an objective standard was set up.

Under Section 100 of the Streets and Highways Code, full possession and control of all State highways was placed in the Department of Public Works, the department being expressly authorized and directed to "lay out and construct all State highways between the termini designated by law and on the most direct and practicable location as determined by the commission, and to improve and maintain such highways as provided in this code."

Under Section 100.1 of the code, the department is authorized "to do any and all things necessary to lay out, acquire and construct any section or portion of a State highway as a freeway or to make any existing State highway a freeway." Full power of condemnation with respect to property needed for the construction of highways, including freeways, is vested in the department, and the resolution of the commission is made conclusive evidence that the location determined by the commission is compatible with the greatest public good and the least private injury, thus submitting to the commission the duty and authority to determine within these standards the location of any highway, including a freeway.

The court found that the term "objective standards" had been liberally interpreted in previous judicial decisions in the State. For example, it had been held that the rate fixing powers of the public utilities commission are sufficiently objective when it is required that the commission fix reasonable rates. Therefore, the court felt that existing legislation pertaining to highways was sufficient for the present purpose.

Plaintiffs also contended that when the State constitution authorized the

establishment of State highways it did not mean, nor could it have meant free-ways, since limited-access highways were unknown when the constitutional provision was adopted. The court did not consider the constitution so inelastic. No question of the necessity for the condemnation of rights that might actually be taken when any section of a State highway was declared to be a freeway was here involved. The important question was rather whether or not the legislature had the constitutional power to authorize official acts whereby the general right of access to highways might be restricted and for certain distances completely denied. No constitutional inhibition could be found, and the court was of the opinion that the subject matter was one which must be the proper concern of the legislature. "Under modern conditions the right of an individual, if such right there be, to enter any highway at any point he pleases, is so inconsistent with the rights of the public generally to reasonable use of the highways that the right of the public to take such private right upon compensation being made therefor must be recognized. Aside from a property right the individual has no such right of general access that it cannot be made to yield to reasonable limitation for the benefit of the public generally."

The court was convinced that the intentions and actions of the State highway authorities were well within their powers and concerned matters properly committed to their discretion. Plaintiffs' request for an injunction to prevent the proposed relocation was denied on the grounds that no cause of action existed.<sup>11</sup>

*Washington* - In another decision the Washington Supreme Court held that the State had no authority to establish a controlled access facility on an existing highway. (See *State ex rel. Veys et ux.*

<sup>11</sup>See Memorandum No. 26, June 1949, Committee on Land Acquisition and Control of Highway Access and Adjacent Areas, Highway Research Correlation Service, Circular No. 67.

*v. Superior Court for Cowlitz County et al.*, 206 P 2d 1028.) Although the State has a controlled-access law--enacted in 1947--it specifically limits the authority of the Director of Highways to establishment of such highways on new locations. However, the State attempted to condemn access rights on a portion of a so-called existing highway under the provisions of the general law providing for acquisition of right-of-way. (Section 25 of Ch. 53 of Laws of 1937, Rem. Rev. Stat., Sec. 6400-25.)

The highway involved is located on Permanent State Highway No. 1, running northerly from Vancouver through Cowlitz County, to consist ultimately of four lanes. This is a relocation of the original Primary State Highway No. 1, a two-lane highway also running northerly from Vancouver. Permanent State Highway No. 1 was established by the Director of Highways in 1937, and rights-of-way through Cowlitz County were acquired in 1938 and 1942. Clearing, grading and draining of this portion of the highway was only completed in December 1948. It was expected that the contract for surfacing would be let in the summer of 1949. In the meantime, in 1947, the Director of Highways established a portion of the highway as a controlled-access road. In the process of acquiring the necessary access rights, the State's authority to do so was contested by Maurice and Matilda Veys, on the grounds that this was an existing primary State highway. The Superior Court of Cowlitz County was of the opinion that the State had the right to acquire such access rights by condemnation, but asked for review of this particular point by the supreme court of the State before the case was submitted to the jury.

The State, in its brief, argued that the pertinent section of the 1937 law quoted below permitted the State not only to acquire land but also all estates, rights, interests and easements in or appurtenant to said land:

"Whenever it is necessary to secure any lands for a right-of-way for any primary State highway, of (or)

for the drainage thereof or construction of a protection therefor or so as to afford unobstructed vision therefor toward any railroad crossing or another public highway crossing or any point of danger to public travel or for the purpose of acquiring sand pits, gravel pits, borrow pits, stone quarries or any other land for the extraction of materials for construction or maintenance or both, or for any site for the erection upon and use as a maintenance camp, of any primary State highway, or any site for other necessary structures or for structures for the health and accommodation of persons traveling or stopping upon the primary State highways of this State, or for any other highway purpose, together with right-of-way to reach such property and gain access thereto, the director of highways is authorized to acquire such lands in behalf of the State by gift, purchase or condemnation. . . ."

However, the State Supreme Court found that the State legislature had deliberately specified that the controlled-access highway law enacted in 1947 and the authority given thereunder should apply only to "new locations" which term was described as ". . . a new highway or new street and for the purpose of this act shall not apply to existing highways and streets." The court also stated that since the 1949 session of the legislature had turned down an amendment to the controlled-access law which would have permitted the State to acquire access rights on existing highways, the legislative intent was obviously to confine such authority to "new highways."

Furthermore, the 1937 statute, although it enumerated many things that might be acquired by condemnation in addition to the right-of-way and easement for the highway itself, did not mention rights of access, air, view and light of a property owner whose land abutted on the highway. Thus, in the opinion of the Supreme Court, the legislature, in enacting this statute,

did not have in mind the acquirement of access rights when establishing and constructing primary State highways. The word "lands" was used as applying only to the rights-of-way and easements and other purposes specifically mentioned.

The State in its brief cited court decisions in Minnesota, in the case of *Burnquist v. Cook*, 19 N.W. 2d 394, and in Missouri, *State ex rel. State Highway Commission v. James*, 205 S.W. 2d 534, in both of which cases the States' right to condemn access rights under general authority of the State highway department to acquire land for highways was upheld. The State further cited many authorities who, while recognizing the general rule that the creation of a public highway, at the same time subordinates the land on which it is established to the easement of access insofar as abutting land owners are concerned, nevertheless considered that there is nothing in this fact which prevents authorized public authority from later extinguishing such easement in subsequent condemnation proceedings, unless restricted from so doing by statute.

This, the court implied, might be the case in Minnesota and Missouri, since their statutes were couched in very broad, general terms, but in Washington, limitations were very definitely placed on the State's authority by the Act of 1947 authorizing the control of access on *new* highways.

The State has indicated that it may endeavor to have the court rule on the question of whether this particular highway might be classified as a new road since this portion of the highway was designated as a controlled-access highway prior to construction. Extensive relocations of existing highways might also be declared new locations under a liberal court interpretation.<sup>12</sup>

<sup>12</sup>See Memorandum No. 30, October 1949, Committee on Land Acquisition and Control of Highway Access and Adjacent Areas, Highway Research Correlation Service, Circular No. 88.

*Impairment of Rights of Access Light, Air and View - Impairment*, as well as destruction, of light, air, view and access has been held to be eligible for compensation under a recent decision of the Iowa Supreme Court. (See *Anderlik et al., v. Iowa State Highway Commission et al.*, 38 N.W. 2d 605, 1949.)

This case arose as the result of the construction by the Iowa State Highway Commission of a viaduct on State Highway 84 south of Cedar Rapids, to cross the Northwestern Railroad tracks running approximately east and west just outside of the city limits.

Three landowners asked for damages in connection with the construction of the viaduct in front of their properties. None of said landowners' property was actually taken, but it was claimed that the construction of the viaduct not only left them with a circuitous means of access to the highway, but that this means of access consisted of an extremely narrow road which came to a dead end at the south line of the railroad right-of-way. In addition, they suffered loss of light, air and view by the presence of the viaduct directly in front of their homes. Witnesses for the landowners testified that the value of the combined properties before construction of the viaduct was \$32,500, whereas after the construction, the entire property could not be valued above \$21,500. However, it was brought out in court that the project was not entirely completed at the time this estimate was made and the State Highway Commission claimed that the situation would be much improved when a crushed rock surfacing was placed on the roadway and the sides of the embankment were sodded.

Iowa's State constitution provides that "Private property shall not be taken for public use without just compensation." The trial court held that there was such a "taking" notwithstanding there was no actual physical encroachment upon the property. The State Highway Commission was therefore ordered to institute proceedings for condemnation to determine the amount of damages.

The State Supreme Court, in upholding the action of the trial court, based its decision mainly on a previous case, *Liddick v. City of Council Bluffs*, 5 N.W. 2d 361, in which it was stated: "We now hold that the destruction of the rights of access, light, air or view, or the substantial impairment or interference with these rights of an abutting property owner in the highways or streets adjacent to his property, by any work or structure upon such highways or streets, intended for the improvement thereof, done by the State or any governmental subdivision thereof, is a 'taking' of the private property of said owner within the purview and provisions of Section 18, Article 1 of the Iowa Constitution."

The State Highway Commission cited decisions rendered previous to the *Liddick* case in which opinions had been handed down which conflicted with those expressed in that case, but the Supreme Court stated that it had in effect overruled the earlier cases, insofar as any conflicts existed, in the *Liddick* case. The court had further stated in the *Liddick* case that the constitutional provision above referred to "should be broadly and liberally interpreted." Authorities were cited to support this statement.

The court further stated: "The basis of the *Liddick* decision is that real property consists not alone of the tangible thing but also of certain rights therein sanctioned by law, such as rights to access (ingress and egress), light, air and view, and when such rights are destroyed or substantially impaired by such a structure in the highway as was here made, there is at least a partial taking of the property in the constitutional sense. The record here shows such an impairment of these rights of plaintiffs." The judgment of the lower court was affirmed.<sup>13</sup>

<sup>13</sup>See Memorandum No. 31, November 1949, Committee on Land Acquisition and Control of Highway Access and Adjacent Areas, Highway Research Correlation Service, Circular No. 92.



*Effect of Expressways on Adjoining Lands -*

When access rights were acquired by the California highway department from the Padre Vineyard Company for approximately one and one-half miles on either side of US Highway 60, between Ontario and Riverside, it was necessary for the company to remove one row of vines adjacent to the right-of-way fence, in order to provide turn-around space for cultivation purposes. This space would also serve as a connecting road for hauling purposes to the crossroads at either end of the vineyard, where entry to the main highway might be had.

In acquiring the access rights the State offered to pay for the loss of the grapes necessarily removed and for the land needed for turn-around purposes. The State claimed that no damages resulted to the remainder of the land and that in effect the new arrangement would be beneficial to the owners because the fact that hauling trucks would not have access to the main road at any or all points along the road would undoubtedly result in reducing collision damages. The State's offer was accepted.

After two years' operation under this plan, the company agreed that the State's contention that no damages would result to the remainder of their land because of the taking of access had been correct. In addition the company spokesman stated that damage from pilfering of grapes had been totally eliminated by the presence of the fence.

The company's enthusiasm for the controlled-access idea found expression in the offer by the company engineer to cooperate with the State should the taking of access be contemplated for other highways on which abutted any of its other properties.<sup>14</sup>

The effect of expressways on adjacent land use patterns and land values has been the subject of extensive studies under-

taken by the State of California, the results of which are now becoming available. Perhaps the most comprehensive of these is a paper entitled "The Effect of Limited Access Highways and Freeways on Adjoining Property Values" (1948) by Frank C. Balfour, a member of this Committee. The first of a series of studies for 1949, entitled "Outer Highway, Increased Business for Roadside Restaurant" by E. P. Jones, was reported in California Highways and Public Works for January-February 1949, at page 38. Another study entitled, "Here's Proof, Outer Highway Increases Both Business and Property Values" by Harry N. Cook, appeared in the same magazine for July-August 1949, at page 13. The third in this series, entitled "Service Town, U. S. A., Outer Highways Enhance Small Town Development" by J. F. Powell, may be found in the September-October 1949 issue at page 1. The final study reported in 1949, entitled "Boost for Freeways, Factual Study Shows They Increase Property Values" appears in the November-December 1949 issue beginning at page 29. These are well worth study by those interested in the problem.

But few studies of this type have been undertaken elsewhere. Such information, if obtainable from the various States in which controlled-access highways are being constructed, would be of inestimable value in stimulating the widespread establishment of this type of highway, if it were shown that the abutting lands actually increased in value after construction of the expressway. For this reason, the Committee is endeavoring to evolve a technique for determining the effects of expressway developments on adjacent land values and the land use pattern. A pilot study of the Shirley Memorial Highway in Virginia is being considered.

*Highway Access Control in the Netherlands -*  
Some form of access control on roads has existed in the Netherlands at least since 1850, according to Mr. Jacques Volmuller, engineer with the Public Works Department of that country. In the early days, every

<sup>14</sup>See Memorandum No. 24, April 1949, Committee on Land Acquisition and Control of Highway Access and Adjacent Areas, Highway Research Correlation Service, Circular No. 57.

property owner whose land abutted on a main road had access to the highway, and this access was a matter of record. However, in 1937, a law was passed which had for its objective the limitation of access to State roads, or as stated in the preamble of the act, "to lay down regulations to check, in the interest of road traffic, ribbon development along roads under authority of the State or named in the State highway plan." This act, the title to which might be translated as "Traffic Act Restricting Ribbon Development," became law on May 31, 1937, and according to Mr. Volmuller has been quite firmly enforced.

The present law does three significant things. First, it prohibits the erection of buildings within a certain distance of State highways, second, it prohibits alteration of the purpose of an existing access on State roads, and third, it prohibits access to highways constructed on new locations. The law applies not only to roads on the existing State system, but also can be applied, by decree of the official charged with carrying out the provisions of the act, the Minister of Public Works, to roads under an authority other than the State, and to merely planned State roads, if these roads are included in the so-called State highway plan. However, the law implies that roads in these latter categories must be made a part of the State system within a five-year period after the date of this decree, or at the most ten years, in order to remain under the provisions of the law. A brief outline of the main provisions of the law follows:

The law prohibits the erection, rebuilding or alteration of any building within five meters (16.4 ft.) of the border of the road, including shoulders, road ditches, etc. Road borders for roads included in the State plan, but not yet built are designated by the minister. However, these prohibitions do not apply in the event construction of a building was started and a permit therefor obtained within certain time periods prior to enactment of the law. The minister may also grant other exemptions at his discretion.

Apart from the above the law prohibits the erection, reconstruction or alteration of any building within a distance from the center line of the surfaced part of the main traffic lanes of any road especially designated by the minister. This distance may not be more than 30 meters (98.4 ft.). Insofar as the road lies within the limits of the master plan of an urban area, these restrictions are subject to approval of the municipal government and provision is made for the hearing of objections thereto. Exceptions to the above provisions may also be granted by the Minister of Public Works when he deems it necessary.

There is also a provision prohibiting the erection of objects which obstruct the view at the intersection of two roads or on curves. These prohibited objects are to be designated by the minister, but do not include buildings. In the case of vegetations if objections are made, the minister must consult with the Forest Board before making a decision.

Under the 1937 law, no one has access to State roads or to roads which are in the State plan unless a permit for such access was issued or in effect prior to enactment of the law, or if such access existed prior to 1925 and continued uninterrupted after that time. In other words, anyone who can prove that a civil right of access existed before initiation of this act may retain such right as an exemption to the provisions thereof. Such access rights remain in force only for the purpose existing at the time of passage of the act or the granting of the permit. Mr. Volmuller explained that under this provision, if a landowner has a single access to a State highway and desires to subdivide his land or if he wants to erect a building on his land, he must make application to the minister for permission to construct additional entrances to the highway or to use the existing access as an access to the new building. And in most cases he will be refused such permission. This was not as true in the early days of the act as it is at the present time. The intent here appears to be to freeze the character of the land abutting on State highways. According to

Mr. Volmuller this plan is not meeting with much opposition from the people concerned.

The minister may, when necessary, make further exemptions to this act. He may also withdraw exemptions at any time or designate new conditions relative thereto. However, it is made clear in the act that exemptions may not be refused or withdrawn where previously granted except in the interest of traffic. A great deal of care is exercised in approving, denying, or withdrawing access rights, and where doubt exists as to the landowner's claim, he is given the benefit of the doubt.

Provision is made for enforcement of the act and for penalties to be imposed in case of violations. State or municipal police and officials of the Corps of State Engineers are charged with enforcement of the provisions of the act and may remove or cause removal of encroachments or restore the access to its former condition, but usually only after notice has been given to the offender.

Compensation for damages is provided for insofar as landowners suffer "unevenly and severely." The amount of such compensation, according to Mr. Volmuller, is arrived at in more or less the same manner as in the United States; that is by means of an appraisal made by landowners residing in the vicinity who are appointed by the court. No compensation is deemed necessary if the property owner has access "of equal magnitude" to a parallel road, unless the construction of the road results in separating a landowner's property into two isolated portions in which case he is either allowed access from the two portions or full compensation for the damage incurred. However, if the minister refuses to grant an exemption or withdraws an existing exemption, thereby making the exercise of a civil right of access wholly or partly impossible, full compensation may be claimed by the landowner. Mr. Volmuller states that access rights which have existed over a long period of time are seldom withdrawn, and if they are, compensation is quite liberal.

Provisions of the act do not apply within existing "built-up" areas. Such

built-up areas are designated by the Minister of Public Works, with the advice of the provincial government. However, the designation need not be revised when the built-up areas expand.

During the twelve years of operation of this act, no amendments have been made, indicating that its provisions were well thought out before its enactment, and that it is generally acceptable to those affected.

The main purpose of the law is on the one hand to make possible a network of expressways which the government has planned for future construction on the State system, which consists of some 2,400 kilometers (about 1,450 mi.) and on the other hand to protect the existing roads against excessive encroachment of new buildings, thus preserving the capital invested in them. Ultimately it is planned that this network of expressways will consist of two- or four-lane divided highways with absolute control of access. Most of these roads are planned as free roads. It is planned to have access points about ten miles apart. The development of this system will be watched with interest.<sup>15</sup>

*Motion Picture on Expressways* - The Land Acquisition Committee is exploring the possibilities of sponsoring an original motion picture on the subject of expressways and roadside control with the thought in mind that such a medium might prove an excellent device for informing a selected audience of the advantages of the controlled-access type of highway. In this connection, Mr. Francis E. Perkins of the Bureau of Public Roads was kind enough to give a brief outline of the tentative draft which he has prepared for such a movie, at a session of the land acquisition committee, during the annual meeting of the Board. Mr. Perkins suggested that there were two ways of approaching the

<sup>15</sup>See Memorandum No. 30, October 1949, Committee on Land Acquisition and Control of Highway Access and Adjacent Areas, Highway Research Correlation Service, Circular No. 88.

subject, one along educational lines, for use in schools, and the other, one which would be attractive enough to be shown generally to all types of audiences. The present draft is based largely on "Public Control of Highway Access and Roadside Development," (Bureau of Public Roads, Revised 1947) and illustrates, wherever feasible, principles set forth in that publication. Members of the committee expressed great interest in the project and there was some discussion as to ways and means of getting an appropriate movie produced. It was suggested that Walt Disney might be approached as a possible producer if the animated type of presentation were used, though the cost of such a production might be prohibitive.

Whether the tentative script suggested by Mr. Perkins is ultimately followed or not, the conception of a movie on expressways seems a good one.

## CONTROL OF THE ROADSIDE

### *Regulation of Access (not on expressways) -*

In response to an inquiry by the State Director of Highways of Ohio, the State's attorney general rendered an opinion (No. 3810, September 24, 1948) to the effect that said director has the authority, in the interest of public safety, to restrict an abutting owner's right of access, so long as such owner has reasonable and convenient access to the highway. The regulation of access here involved is separate and distinct from the type of access control used in connection with expressways.

Confronted with the problem of continuing in use many two-lane highways in locations where present traffic volume would appear to require multiple lane or divided type highways, the State considered that some control of access was as important on the former as on the latter types of highway.

In the opinion of the director, Section 1178 of the highway code obligated the director to provide safe transportation facilities for the traveling public, and to accomplish this purpose through proper

design and the regulation, under his police powers, of the location and degree of access from abutting property. So long as his interpretation of the location and degree of access was reasonable, no compensable damages should accrue. He asked, therefore, for formal advice, first, as to whether or not it was his obligation to provide safety to the traveling public in the design, construction, maintenance and regulation of access to State highways, and second, if this was so, was he acting within the scope of his authority in regulating or restricting such access, providing his determination was based on accepted engineering practice, and that the location and degree of such access were reasonable.

In rendering his opinion, the attorney general stated first that the State's obligation to provide safety to the traveling public by building highways to proper design was implied rather than expressly stated in the statutes. The exercise of powers conferred on the director "to alter, widen, straighten, realign, relocate, establish, construct, reconstruct, improve, maintain, repair and preserve any road or highway on the State highway system . . ." (Sec. 1178-2, Ohio General Code) would normally result in providing improved and safe highway facilities.

Considering the question as to whether the director of highways possessed authority to regulate and restrict access to the highway in the interest of public safety, the attorney general quoted Section 1178-21 of the Ohio General Code, providing for the establishment of limited access highways, which includes the following provision:

"Where an existing highway in whole or part has been designated as, or included within, a 'limited access highway' or 'freeway,' existing easements of access may be extinguished by purchase, gift, agreement or by condemnation."

Since this section provided for definite means of extinguishing an abutter's right of access, it might be argued that the means so prescribed was the only means.

But the act was for the purpose of authorizing the director to establish limited-access highways, vesting in him such powers as were necessary to make such improvements a reality. Rather than limiting or fixing a measure of power, this section conferred a new and additional power.

The attorney general was unable to find that the question of the director's authority to restrict the access of an abutting owner in the interest of public safety, aside from the responsibility in connection with express highways, had ever been before the Ohio courts, but cited decisions handed down in two other States, Louisiana and California, on this question.

In the Louisiana case (*State ex rel. Gebelin v. Department of Highways*, 8 So. Rep. (2d), 71, March 30, 1942) abutting landowners, subsequent to construction of the highway, had subdivided their property, and sought to compel the highway department to permit them to construct entrances for the individual lots. The State Supreme Court held that the department of highways had authority to limit the number of access connections to such extent as the department deemed necessary for public safety.

In the California case (*Genazzi v. Marin County et al.*, 263 Pac. 825, January 24, 1928) a property owner objected to the county constructing a drainage ditch in front of his land, along the highway, which said landowner contended made ingress and egress to his property impossible without the use of bridges. The District Court of California stated that ". . . an owner is not entitled, as against the public, to access to his land at all points in the boundary between it and the highway although entire access cannot be cut off. If he has free and convenient access to his property, and his means of ingress and egress are not substantially interfered with by the public, he has no cause of complaint."

In view of the foregoing the attorney general stated that in his opinion it was the duty of the director of highways within the limit of the powers conferred by the general assembly, and with the

funds available, to design, construct and maintain State highways, including the regulation of access thereto so that the maximum design of safety would be afforded the traveling public. And in the interest of public safety, the director might limit and restrict an abutting owner's right of access, as long as such owner had reasonable and convenient access to the highway, but that exercise of such authority might be subject to judicial review.<sup>16</sup>

*Set-Back Regulations* - An attempt to control the location of buildings and service stations along highways by other than statutory means appears to be working out quite satisfactorily in the State of Idaho. This is being done by incorporating a clause in right-of-way deeds restricting the construction of buildings closer than 20 ft. from the outer right-of-way boundary. Although this is apparently a recently inaugurated policy, the State reports that it has met with little opposition from property owners. In the first year the policy was in operation, no cases of encroachment were reported.

The clause incorporated in the deed is as follows:

'Grantor ----- agree ----- that no building or other structures will be permitted to be constructed closer than 20 ft. from the highway right-of-way line.'<sup>17</sup>

*Roadside Surveys* - Research by means of roadside surveys has been advanced in a number of States. Since first proposed by the committee, such inventories of roadside conditions have been initiated in Florida, Michigan, Minnesota, New Jersey and Ohio through the mechanism of the

<sup>16</sup>See Memorandum No. 23, February 1949, Committee on Land Acquisition and Control of Highway Access and Adjacent Areas, Highway Research Correlation Service, Circular No. 52.

<sup>17</sup>See Memorandum No. 22, January 1949, Committee on Land Acquisition and Control of Highway Access and Adjacent Areas, Highway Research Correlation Service, Circular No. 51.

State-wide highway planning survey. Since the data collected in Michigan and Minnesota is now being analyzed, Mr. J. Carl McMonagle, Director of the Planning and Traffic Division of the Michigan State Highway Department, and Mr. K. B. Rykken, Manager of the State Highway Planning Survey of the Minnesota Department of Highways, were requested to present progress reports on their respective State surveys, at the joint meeting of the Committees on Roadside Development and Land Acquisition. Preliminary results in Michigan indicate that there may be a relatively greater and closer correlation between highway accidents and the condition of the roadsides than between highway accidents and elements of the highway.

Mr. Rykken stated that in Minnesota they are beginning to detect a relationship between access points and accidents.

Reports on the pilot roadside survey recently completed in Iowa were given by Professor P. H. Elwood, Head of the department of Landscape Architecture at Iowa State College, and Mr. W. A. Rusch of Iowa State College, who conducted the survey under Professor Elwood's direction. Mr. Rusch's conclusion, based on the facts gathered in the survey, was that accidents occur more frequently in areas directly outside cities and towns, where roadside establishments are prevalent.

These four reports are reproduced in full in this bulletin. Members of the two committees were generally convinced of the desirability of such roadside surveys. It was suggested that a guide or manual be prepared by the land acquisition committee for use of other States wishing to undertake such studies.

*Regulation of Billboards* - The study of legislation providing for regulation of billboards in the various States, which has been carried on for the past several years, was continued throughout the year. The Outdoor Advertising Association of America which has undertaken billboard surveys of a limited character in a number of States during the past two years, is promoting "cooperative" improvement councils in the States, consisting of

representation from the Outdoor Advertising Association, State highway departments, garden clubs, women's societies, roadside councils and other interested groups.

A set of slides and an accompanying script, entitled "Protecting Our Highways from Roadside Blight," was prepared by the National Roadside Council, with the cooperation of the American Nature Association. This presentation, indicating the advantages, both aesthetic and practical, of highways free from billboards and roadside development, was shown at one session of the committee during the annual meeting of the Board.

## PARKING

*Parking Authorities Sanctioned* - The Pennsylvania Supreme Court in its decision, declaring the Pennsylvania parking authority law constitutional, in the case of *McSorley v. Fitzgerald et al.* (59 A 2d 142, 1948) has undoubtedly given encouragement to advocates of public parking authorities in Pennsylvania and in other States.

The Supreme Court took jurisdiction in the matter when a taxpayer challenged the constitutionality of the enabling act under which Public Parking Authority of Pittsburgh was set up, (P.L. 458, 53 P.S. Sec. 10271, June 5, 1947) asking that the authority be restrained from exercising the powers granted to it and the city be restrained from appropriating to it any public funds or entering into any agreement with it for the waiver of taxes on its properties. The taxpayer's bill was dismissed.

Under the 1947 parking authority law, cities of the second class are given power to organize parking authorities by adoption of a resolution or ordinance to that effect. The purpose of such an authority is to study public needs in relation to parking and to establish a permanent coordinated system of parking facilities by acquiring, improving, maintaining and operating land and facilities to be used for parking of vehicles. It may charge reasonable rates to provide for construc-

tion and upkeep of necessary facilities, but may not provide service facilities. None of its bond obligations are deemed obligations of the Commonwealth. The authority has the power of eminent domain, and property acquired or used by it is tax exempt.

The taxpayer's argument as to the unconstitutionality of the act was mainly based on the contention that the purpose for which the authority was created did not constitute a public use. Of secondary importance was the argument that the subject matter of the statute was not clearly set forth in the title of the act, which did not reveal the fact that the authority was to be allowed to lease portions of the first floor of its parking facilities for commercial use to assist in defraying its expenses, and further that no indication was given in the title of the broad powers to be conferred upon the receiver who might be appointed by the court in case the authority defaulted in payment of its bonds.

The Supreme Court in its decision went into some detail in refuting plaintiff's first contention, that the purpose of the authority was not public in character, enumerating the reasons for enactment of the law as set forth in the act itself. Stressing the increasing number of private vehicles now using the streets, the legislature declared that the free flow of traffic through the streets of cities of the second class was necessary to the health, safety and general welfare of the public. Because of the parking of motor vehicles on the streets, this free flow of traffic was becoming more and more difficult. Excessive parking impeded fire fighting and the disposition of police forces; it threatened irreparable loss of property valuations. Provision of sufficient off-street parking facilities would reduce this parking crisis. And the establishment of a parking authority would thus promote the public safety, convenience and welfare. The purposes of the parking authority permitted under the enabling act were thus held by the legislature to be public uses for which public money might be spent and private property

acquired by the exercise of the power of eminent domain.

The court quoted previous judicial decisions to the effect that the question as to whether the use to which a governmental agency intends to devote property taken under eminent domain proceedings is a public one, is a judicial question for the determination of the court. However, a legislative declaration with respect to that question, while not conclusive, is entitled to a prima facie acceptance of its correctness. The declaration in this case the court found impressive in its exposition of the urgent need of legislation of this type. The inadequacy of parking facilities in Pittsburgh and the inability of private enterprise to solve the problem had been pointed out in studies by the Pittsburgh Regional Planning Association and the Allegheny conference on Community Development. Under such circumstances it was obvious that public aid must accompany private enterprise if the desired results were to be obtained.

The purpose of such legislation, said the court, is not merely to cater to the convenience of the owners and operators of motor vehicles, but to promote the larger and more general good of the community by freeing the streets of the impediments and perils arising from dangerous and often intolerable conditions of traffic congestion. Its justification stems directly from exercise of the police power. The right of eminent domain in this case must be viewed not as though it were an independent and unrelated grant of such a right, but with regard to the major and primary object of the legislation, which is to facilitate and make safe the use of highways.

In upholding the constitutionality of the act, the court quoted a previous decision to the effect that views as to what constitutes public use must be made in accordance with changing conceptions of the functions of government. As governmental activities increase with the growing complexity and integration of society the concept of public use naturally expands in proportion. Constitution-

ality of the statute could not be questioned because the authority would engage in activities hitherto regarded as the sole prerogative of private enterprise.

Since it was thus established that the uses of the authority were public in nature, the taking of property by eminent domain for such use could not be held unconstitutional. Nor could exemption of the authority's property and bonds from taxation be so declared for the same reason. Objection to the appropriation or donation of public funds to the authority could not be sustained because the constitutional provision cited applied only to private enterprises and had no application to public corporations.

Plaintiff's contention that the enabling act was unconstitutional because the subject matter of the statute was not clearly expressed in the title, the court dismissed with the comment that the title to an act obviously need not be an index to its provisions or a synopsis of its contents. It need only indicate the general subject to which all the provisions of the act are incidental or germane.<sup>18</sup>

In another case, that of *Cleveland et al., v. City of Detroit*, 37 NW 2d 625, (1949) the Michigan Supreme Court not only upheld the city's right to construct and operate an underground parking garage to be financed by parking fees, but also stated that the use of the subsurface of a boulevard for underground automobile parking was a proper highway use for which abutting owners were entitled to no compensation.

In 1945, upon recommendation of Washington Boulevard Parking, Inc., a nonprofit corporation consisting of interested property owners, merchants, and other businessmen, the city of Detroit submitted to the electors the question as to whether the city should construct and operate a garage for the parking and storage of vehicles beneath the street

surface of the boulevard. The garage was to be financed by revenue bonds secured entirely by revenue derived from the project. Upon approval by the voters, a municipal parking authority was created by ordinance, plans and specifications were prepared, and the city adopted by resolution a plan to provide for financing the project.

Suit was brought by an abutting landowner, a Mrs. Cleveland, in the Circuit Court of Wayne County, to prevent the city of Detroit from "erecting, constructing, leasing and operating" the proposed garage under the street surface of Washington Boulevard abutting her property. As a result of this suit the Circuit Court issued a decree enjoining the city from proceeding with the project, finding against the city on several different counts all of which were subsequently reversed by the State Supreme Court, to which the case was appealed.

The Circuit Court held that Mrs. Cleveland held title to the center of Washington Boulevard, abutting and adjoining her property, "subject to the easement of the public for its use as a public highway." Consequently the erection and operation of the parking garage was unlawful, invalid and an unconstitutional invasion of the owner's rights, because such rights had not been acquired by condemnation or otherwise. However, the Supreme Court quoted a previous decision (*Detroit City Railway v. Mills and Breitmeyer*, 48 NW 1007, 1011) in which it said:

"Whatever may have been the ancient adjudications limiting the rights of the public in the streets to passage and repassage, and whatever may now be the rule with regard to highways in the country, with the growth of population in our cities have come increased needs for heating, lighting, drainage, sewerage, water, etc., and with these has come also a corresponding extension of the public rights in the streets. Immense sewers and water mains may be dug, and the soil removed, culverts and drains constructed, without compensating the abutting

<sup>18</sup>See Memorandum No. 23, February 1949, Committee on Land Acquisition and Control of Highway Access and Adjacent Areas, Highway Research Correlation Service, Circular No. 52.



owners. It may now be considered the well-settled rule that the streets of a city may be used for any purpose which is a necessary public one, and the abutting owner will not be entitled to a new compensation, in the absence of a statute giving it.

"So far, then, as these defendants are concerned, it is immaterial whether they or the city own the fee in the street. Their rights are the same in either case. So long as they are unobstructed in the use and enjoyment of their property, having convenient ingress and egress, and the use of the street is an authorized and proper public use, they have no legal cause for complaint."

and a later case (Re: Widening of Fulton Street, 226 NW 690, 691) more directly related to the parking problem:

"It does not seem to us that the dearth of adjudicated cases directly in point renders the rule of law obscure or doubtful. From the day of the oxcart there have been maintained in the public highways hitching posts and rails, by which provision was made for the leaving of animal-drawn vehicles at proper places on public thoroughfares. The demand of our motor age has greatly increased the necessity for space in the public streets for leaving vehicles. This right is of importance to the tradesmen along the street, as well as to the traveler thereon. One would hardly have the temerity to question that such a use is a lawful use of the highway. Its regulation is a matter for the exercise of police power, with which in the absence of abuse, courts should not interfere. In the future this space, which the city seeks to add to Fulton Street, may or may not be used for parking. The land was taken 'for street purposes.' But parking is a proper use of the highway, and, if necessity therefor exists, the right of eminent domain

may be exercised to establish or widen highways adequate for this purpose. The taking of the land for highways is not limited to that necessary for actual travel."

The Circuit Court further held that the proposed creation and operation would constitute the putting of the city of Detroit into "an unconstitutional private business of a nongovernmental character" in competition with the abutting landowner's use of her property as an automobile parking lot, and that the exemption of the proposed parking garage from taxation was also unconstitutional and unlawful. To this the higher court replied by quoting the case of *Bowers v. City of Muskegon*, 9 NW 2d 889, in which it said:

". . . we have in mind that we are now living in a modern age; that the traffic problems are a result of our present mode of living; that cities have spent untold dollars in the construction of elevated roads, subways and parkways to take automobile traffic out of congested areas; and that any city with a population equal to that of Muskegon has its own peculiar traffic problem. We also have in mind that, art. 8, Sec 28, Mich. Constitution (1908), provides:

" . . . The right of all cities, villages and townships to the reasonable control of their streets, alleys and public places is hereby reserved to such cities, villages and townships. . . .

"It must be assumed that parking in a city street is a privilege and subject to regulation by the proper authorities of the city entailing upon the city additional expenses in order that there may be proper supervision and regulation. If parking is a privilege and not an absolute right, the power to regulate implies the power to exact a fee for the cost of such regulation."

and further quoted from the case of *Parr v. Ladd*, 36 NW 2d, 157, 159, as follows:

" . . . we conclude that a municipal parking system combining parking facilities both on public streets and on off-street property of a municipality, for which a charge for use is made, is a public use, and a public improvement within the meaning of the revenue bond act, that the acquisition and operation of such system by a municipality is not forbidden by the Michigan constitution, that a municipality has the power to pledge the net revenues therefrom for the acquisition of off-street property and the operation and maintenance thereof as a part of such system; that the municipality has the power to issue revenue bonds payable solely out of the net revenues derived from the operation of such system, and to pledge such net revenues for payment of such bonds; and that the municipality has the power to pledge itself to acquire and maintain parking meters on such street and off-street property, and charge rates for the use of such facilities to provide for the payment of such bonds."

The trial court also declared unconstitutional the revenue bond act under which the project was authorized, but the Supreme Court disposed of this contention by citing several previous cases in which it has upheld the constitutionality of this act.

As to the Circuit Court's assertion that the payment by the city of the cost of relocating the utilities was an unlawful use and misappropriation of tax moneys, the higher court said that since a public purpose was involved, public funds might be used therefor. The Supreme Court did not agree with the lower court's finding that exemption of the proposed garage from taxation was unconstitutional and unlawful, stating that this was contrary to its decision in a previous case (*Ford Motor Co. v. City of Detroit*, 255 NW 272.)

And finally it was not necessary under existing law to submit the project in question to the electorate; the vote

thereon was merely advisory, and consequently the Circuit Court's statement that the approval obtained was not of such nature as to authorize the project had no bearing on the case.<sup>19</sup>

*Parking-Zoning Study* - During the year, the committee sponsored and completed a study of the zoning device as an aid in resolving parking difficulties. An analysis has been made of 155 local laws that require the provision of off-street parking facilities in connection with various property uses, a model ordinance on the subject has been formulated, and economic and administrative aspects have been explored. This study will be published by the Board as Bulletin No. 24, entitled "Requirements for Off-Street Automobile Parking Facilities in Zoning or Other Local Ordinances."

*Truck Loading and Unloading Investigation* - A companion study on off-street truck loading and unloading facilities is near completion and is expected to be available in 1950. The suggestion was made at a committee session during the annual meeting of the Highway Research Board that a study of the over-all terminal problem be undertaken with emphasis on the economic aspects of the situation. It was decided that the committee would explore the possibilities of such a study being undertaken under its auspices or perhaps by some other group.

*Parking Legislation Study* - The Committee is engaged in a revision of Highway Research Board Bulletin No. 2, Revised entitled *An Analysis of State Enabling Legislation Dealing with Automobile Parking Facilities*, 1947. Much State and local legislation on parking has been enacted in the last three years, and the revision will analyze and synthesize all of this new material, bringing it up to date.

<sup>19</sup>See Memorandum No. 29, September 1949, Committee on Land Acquisition and Control of Highway Access and Adjacent Areas, Highway Research Correlation Service, Circular No. 83.

*Use of Parking Meter Revenues* - During the past year, at the request of the Committee on Parking, the Committee investigated the use of parking meter revenues. A paper on this subject was presented at an open session of the Department of Traffic and Operations, Highway Research Board, at the 1949 annual meeting, sponsored by the Committee on Parking. It is being published in the 1949 proceedings of the Board.

The purpose of the investigation was to examine, objectively, the present significance of the parking meter in terms of the regulation it facilitates and the annual revenue it produces. Further, the study has sought to ascertain the legislative bases for the installation and use of the parking meter; and to review the judicial decisions involving such meters. Finally, based on these present legislative sanctions and judicial attitudes, certain economic aspects of the use of the parking meter have been investigated, particularly the potentialities of an extension of its present use at the curb.

#### INFORMATION INTERCHANGE

The Committee has issued 11 monthly memoranda during 1949, through the Correlation Service, covering current developments in the fields of its activity, including new laws and their significance, court decisions, State practices, and other items of timely interest as follows:

Memorandum No.	1949
22	January
23	February
24	April
25	May
26	June
27	July
28	August
29	September
30	October
31	November
32	December

Thus information not otherwise available for public distribution is furnished to highway administrators and technicians on the firing line as well. This service will be continued during the coming year.

### ACCIDENT ANALYSIS - TELEGRAPH ROAD 1947-1948

J. Carl McMonagle, *Director, Planning and Traffic Division,  
Michigan State Highway Department*

This accident study was initiated in an attempt to measure the relationship or association that exists between accidents and highway design and roadside features.<sup>1</sup> The section of road selected for analysis is a 70-mi. strip including that part of

<sup>1</sup>This analysis was undertaken as an exploratory study for the purpose of developing statistical techniques to be employed in a more comprehensive analysis at a future date. The first progress report entitled HOW ROADSIDE FEATURES AFFECT TRAFFIC ACCIDENT EXPERIENCE, was presented by Mr. McMonagle, at the 1949 Annual Convention of The American Association of State Highway Officials, October 11, 1949, before the Committee on Traffic, at San Antonio, Texas

US-24 which extends north from the Ohio state line to an intersection with M-58 at the southern city limits of Pontiac and the part of M-58 from its intersection with US-24 to its junction with US-10 just northwest of the city (See Fig. 1). This study section, known as Telegraph Road, contains a variety of roadside features and carries representative volumes and kinds of traffic. Ideally, for study purposes, it is improved with two-, three-, and four-lane pavements, and it traverses strictly rural areas, several industrial districts, and for a considerable distance the urban and suburban developments along the west city limits of Detroit. A heavy volume of traffic with a large commercial component is carried on the study section between

northern Ohio and several important industrial cities in southeastern and central Michigan. It is a convenient route for this traffic because it does not pass through the City of Detroit. However, due to its heavy traffic load and its proximity to metropolitan Detroit, extensive marginal development has taken place. Since most of the route is outside

have been used in the study. For a listing of the roadside and design features considered, see Table 1.

The analysis of these data and the conclusions drawn therefrom are based on the philosophy, that irrespective of the quantity of data available, the precise causes of accidents cannot be positively determined. It is only possible to record

TABLE 1

HIGHWAY DESIGN AND ROADSIDE FEATURES FOR ACCIDENT STUDY  
TELEGRAPH ROAD - 1947-1948

Highway Design Features	Roadside Features	Advertising Signs
Curve	Tavern	(Large
Intersection	Gas Station	(Medium
Hillcrest	Garage	(Small
Transition in Width	Store	(Placard
Grade Sepr., Culvert, Gd. Rail Bridge	Restaurant	(Illuminated
	Park	(Neon & Flashing Neon
	Recreation Building	(Reflectorized
	Private Drive	(Animated
	Other Establishment <sup>a</sup>	(Miscellaneous

<sup>a</sup>In the event that two or more of the same type of establishments, such as two gas stations, were located within 950 ft. of an accident, the gas station nearest the accident was recorded as "Gas Station" and the other was recorded as "Other Establishment." Establishments other than those specifically mentioned above were also recorded as "Other Establishment."

of incorporated areas, very little control of the development has been exercised.

A major stumbling block in previous accident studies has been the difficulty of locating accidents accurately in relation to design and roadside features. To overcome this difficulty, consecutively numbered station markers were positioned along the road every 1000 feet. Cooperation of the Michigan State Police and county sheriffs was secured in locating accidents in relation to the station markers. Accidents so located could then be plotted with accuracy on the strip map which was prepared for the study. (See Fig. 2).

The total number (2675) of fatal, personal injury and property damage accidents for the years 1947 and 1948

and study a limited number of conditions under which an observed number of accidents have taken place. With this philosophy in mind the statistical analysis of the data proceeded by two methods.

One was to tabulate frequency distributions of accidents by distance of occurrence from each specific feature. From these distributions accumulative percentages within various distances and rate curves were computed.

The other approach was to calculate correlation coefficients between the number of accidents and the number of various roadside and design features.

Following is a detailed analysis and presentation of conclusions obtained from the two statistical techniques employed.

## ACCIDENT ANALYSIS STUDY ROAD US-24 AND M-58

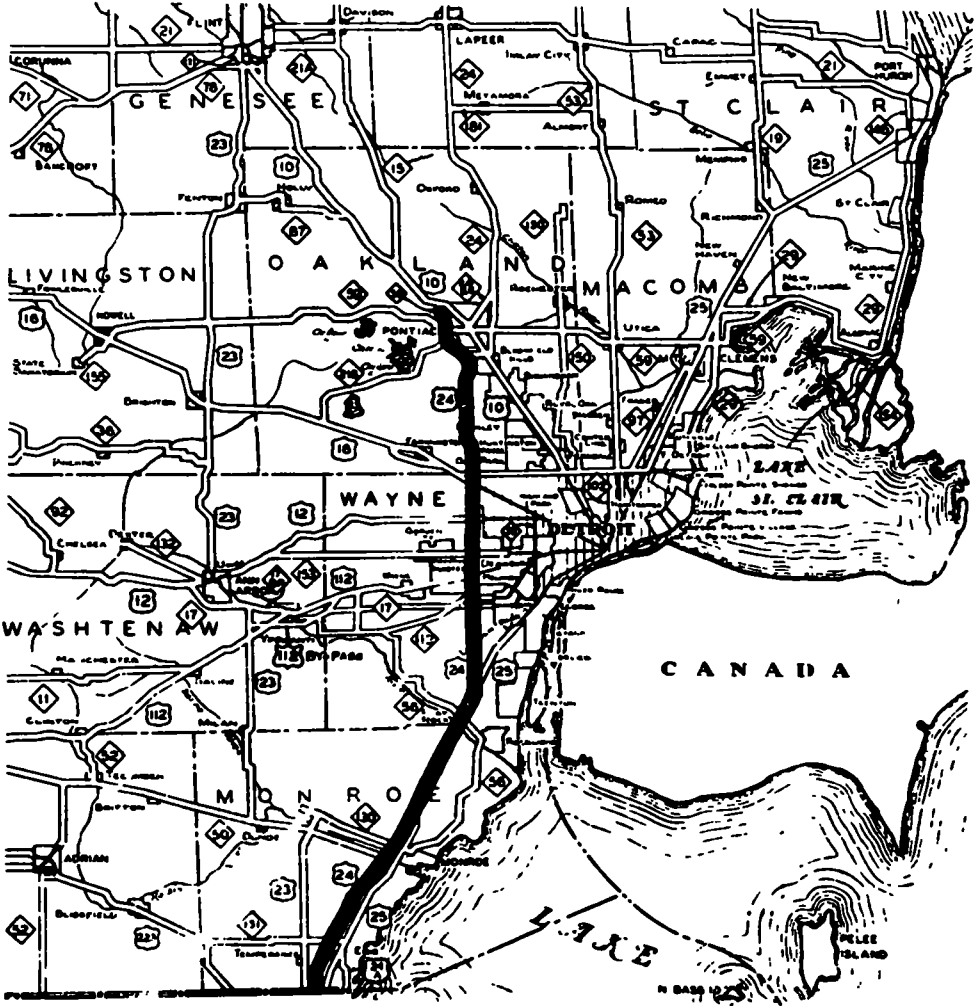


Figure 1. This map of Southeastern Michigan shows the importance of the study road both as an interstate highway between Toledo and industrial Michigan and as a route around the west side of Detroit. Telegraph Road was built as a by-pass route, but suburban developments immediately along its roadside have seriously impaired its usefulness for through traffic.

### I. Analysis of frequency distributions of distances of accidents from individual features.

These frequency distributions were tabulated in order to ascertain accident patterns by distance. In the event that a large percentage of the accidents

occurred within a relatively short distance of the feature, that feature could be considered hazardous. A study of the accumulative percentage table reveals three distinct groupings of features, according to their accumulation pattern.

## SAMPLE SECTION OF STUDY ROAD RECORD MAP

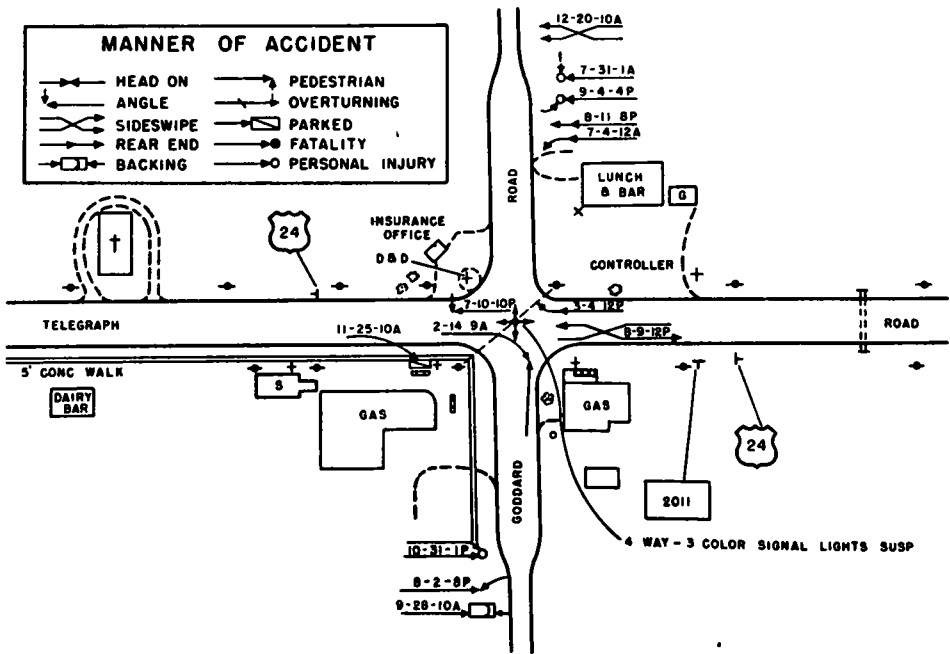


Figure 2. This is a section of the strip map which was drawn as an initial step in preparing accident data for analysis in relation to highway and roadside features. The features were inscribed on the map from the preliminary inventory of conditions. The data for each accident was then put on the map at the proper location in accordance with information contained in the police reports. Later all this data was punched into IFM cards for tabulation and machine computations and analysis.

(See Table 2.) Intersections lead all other features with 55 percent of the accidents occurring at the feature (zero distance) and by the criterion of accumulative percentage intersections are definitely the most hazardous feature in the study.<sup>2</sup> Gas stations are next with 38 percent of the accidents occurring at zero distance and the distribution pattern is very similar to that for intersections. The most significant comparisons of the data can be made by inspecting the percentages at zero and 250-ft. distances.

<sup>2</sup>Accumulative percentages are calculated with total number of accidents within 950 ft of the feature as a base.

The 250-ft. distance was chosen as a critical distance because a majority of the accumulative percentage curves exhibit a slope of 45 deg. or less beyond 250 ft. and also because of the flattening out of the rate curves beyond that distance. A study of the similarity of the accumulative percentage patterns for intersections and gas stations led to the belief that part of this similarity might be due to the fact that gas stations are located at intersections in many instances. To test this belief, a method was devised whereby the effect of gas stations on accidents could be considered separately from that of intersections. The procedure was to tabulate a frequency distribution

**TABLE 2**  
**ACCUMULATIVE PERCENTAGES OF ACCIDENTS OCCURRING WITHIN VARIOUS DISTANCES**  
**OF ROADSIDE AND DESIGN FEATURES**

Group	Feature	Distances from Feature								
		0 ft.	50 ft.	150 ft.	250 ft.	350 ft.	450 ft.	550 ft.	750 ft.	950 ft.
I	Intersections	55	66	78	84	89	93	95	98	100
	Gas Stations	38	49	62	73	78	83	86	93	100
II	Curves	37	40	45	49	54	65	68	89	100
	Crest of Hill	25	27	33	45	54	61	70	92	100
	Other Establishments	24	33	53	67	79	87	91	96	100
	Transition in Width	18	26	47	64	74	81	85	94	100
	Taverns	8	15	34	61	65	75	82	93	100
	Stores	18	25	44	57	70	77	87	94	100
	Private Drives	8	15	33	53	66	79	84	93	100
	Restaurants	17	21	39	52	63	73	78	92	100
	Garages	9	11	28	45	53	62	67	86	100
	Advertising Signs	8	12	26	44	53	68	77	87	100
III	Recreation Buildings	2	7	40	43	45	56	66	80	100
	Parks	10	11	20	33	41	58	69	86	100
	Grade Sep'r. & Guard Rails	8	12	22	33	43	55	65	78	100
	Bridges	3	6	10	19	25	35	45	64	100
	Intersections <sup>a</sup>	35	46	62	67	75	82	87	94	100
	Garages	9	14	24	34	48	57	63	78	100
	Stores	7	11	22	31	37	49	63	83	100
	Restaurants	11	14	23	33	40	50	60	81	100
	Gas Stations	4	7	13	24	40	53	62	76	100

<sup>a</sup>Percentages from a frequency distribution considering only those accidents 350 ft. or more from any gas station, garage, store, or restaurant. The percentages for garages, stores, restaurants and gas stations were computed from frequency distributions considering only those accidents 350 ft. or more from intersections.

of distances of accidents from gas stations which considered only those accidents 350 ft. or more from intersections. The same kind of tabulation was made for restaurants, garages and stores. Finally a frequency distribution of distances of accidents from intersections was made which considered only those accidents 350 ft. or more from any gas station, garage, store or restaurant. The accumulative percentage patterns for these distributions are shown in Table 2. In comparison with all other roadside and design features, intersections still have the greatest percentage of accidents within 250 ft. and therefore by the accumulative percentage criterion remain the most hazardous. Gas stations, garages, stores and res-

taurants, however, have distribution patterns similar to those of Group III. Therefore, the logical conclusion is that the situation where gas stations, stores, garages and restaurants are located away from intersections is less hazardous than the situation where intersections and the above features are found together.

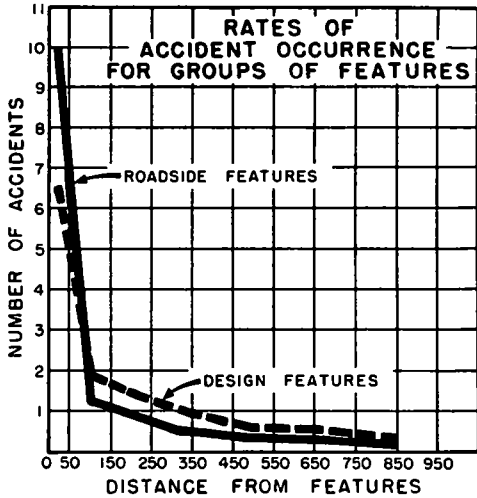


Figure 3. The two curves on this graph represent the rate of accident occurrence per hundred feet at various distances when the whole group of design features and the whole group of roadside features are considered. The roadside feature curve shows that the rate is more than 10 accidents per hundred feet close to such features, and that the rate falls to less than 2 at a distance of 100 ft. These rates are well above those for design features, which are about 6.5 close by, and fall to about 1.25 at a distance of 100 ft.

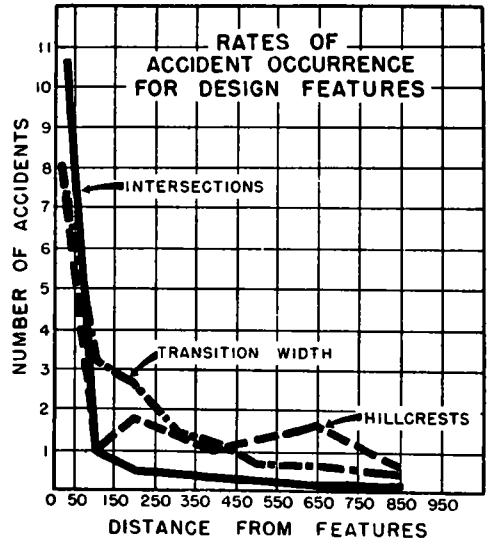


Figure 4. These curves represent the accident rates per 100 ft. for the three most significant types of design features. The intersection rate of more than 10 accidents within 50 ft. is the highest, though both changes in pavement width and crests of hills appear to be considerable factors. However, it should be noted how much more the influence of intersections is concentrated right at the feature.

*Rate Curves* - The rate curves (See Figures 3, 4, and 5) were obtained from the data furnished by the frequency distributions. The rate in this instance is defined as the number of accidents per feature per 100 ft. for each distance interval. The number of accidents per feature was determined by dividing the number of accidents in each distance interval of the frequency distribution by the total number of the particular feature under consideration. In determining the rate



per 100 ft., adjustments of the number of accidents were necessary because of the variability of the distance intervals established for the frequency distributions. To compute the accident rate per 100 ft. for the first 50 ft., the number of accidents of the feature and those from one to forty-nine feet from the feature were added together and multiplied by two. To compute the accident rate per 100 ft. for the 200-ft. distances, the number of accidents within each of these intervals was divided by two.

A study of the rate curves shown in Table 3 reveals a grouping of roadside and design features similar to that for accumulative percentages. The groupings are as follows:

Group I contains those features which exhibit high accident rates, eight or more per 100 ft. for the initial 50-ft. distance, and then display relatively low accident rates which are fairly uniform for the remaining distances.

*Group I*

Curve  
Gas Station  
Intersection  
Crest of Hill

Group II contains those features which exhibit accident rates, less than eight but greater than two for the initial 50-ft. distance, and then show marked fluctuations for the remaining distances.

*Group II*

Transition in Width  
Tavern  
Restaurant  
Garage  
Other Establishment  
Store  
Recreation Building

Group III contains those features which exhibit low accident rates, less than or equal to two per 100 ft. for the initial 50-ft. distance, and also show low rates for the remaining distances.

*Group III*

Park  
Bridge  
Grade Sepr. & Gd.Rail  
Private Drive  
Adv. Sign (Large)

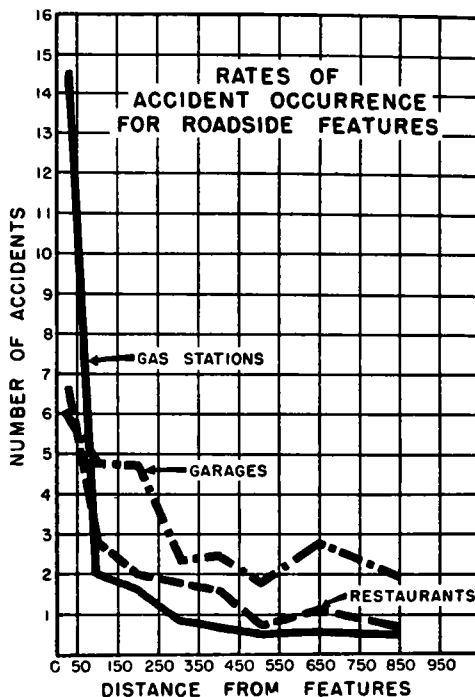


Figure 5. The clearly outstanding thing on this graph is the high accident rate at gas stations in comparison to the rates for restaurants and garages, the two roadside features of next importance. The gas station rate of over 14.5 within 50 ft. is by far the highest found for any other feature of any kind. But as I have pointed out, these stations are for the most part at or close to intersections, and it is suspected that this proximity influenced results obtained by our method of analyzing the data. The similarity in the curves for gas stations and intersections supports this view.

TABLE 3

## RATE OF OCCURRENCE OF ACCIDENTS PER FEATURE PER 100 FEET

## GROUP I

Distance	Curve	Gas Station	Intersection	Crest Of Hill
0-49	15.13	14.56	10.64	8.11
50-149	.90	1.98	.94	.92
150-249	.90	1.62	.48	1.81
250-349	.90	.82	.37	1.32
350-449	2.05	.69	.31	1.03
450-549	.63	.48	.19	1.32
550-749	2.00	.53	.10	1.62
750-949	1.03	.50	.08	.59

## GROUP II

Distance	Trans. In Width	Tavern	Restaurant	Garage	Other Establ'm't.	Store	Recreation Building
0-49	8.07	6.98	6.65	6.11	4.72	4.46	2.33
50-149	3.20	4.27	2.74	4.79	1.43	1.71	5.17
150-249	2.62	6.18	1.98	4.74	.98	1.18	.50
250-349	1.44	1.00	1.76	2.34	.79	1.17	.33
350-449	1.13	2.20	1.60	2.47	.55	.68	1.67
450-549	.65	1.62	.73	1.76	.30	.89	1.50
550-749	.65	1.24	1.12	2.76	.19	.30	1.17
750-949	.45	.78	.61	1.92	.13	.27	1.66

## GROUP III

Distance	Park	Bridge	Grade Sep'r. & Gd. Rail	Private Drive	Adv Sign (Large)
0-49	2.40	2.09	1.80	.84	.24
50-149	.93	.65	.77	.53	.13
150-249	1.50	1.57	.82	.57	.17
250-349	.85	1.09	.76	.35	.08
350-449	1.80	1.87	.97	.38	.15
450-549	1.18	1.61	.71	.15	.08
550-749	.98	1.69	.52	.13	.05
750-949	.75	3.17	.83	.18	.06

II. Correlation Analysis - The statement has previously been made in the report that it is only possible to record and study a limited number of conditions under which an observed number of accidents have taken place. By considering several conditions which can be measured and by correlating their numerical values with numbers of accidents, one can express numerically the degree of consistency with which each condition accompanies accidents. When this correlation coefficient, as it is called, is sufficiently high, a case of cause and effect can be implied and the assumption made that the condition under consideration made some contribution to the occurrence of accidents.

In computing a simple correlation coefficient it is necessary to have a number of pairs of measurements for the two items being correlated. These pairs of measurements were secured by dividing the entire road into sections of uniform length and then enumerating, within each section, the number of accidents and, for example, the number of intersections (if accidents and intersections are the two items being correlated). (See Figures

6 and 7) Before proceeding with this enumeration, it was necessary to decide on the length of section to be used. Some preliminary tabulations were made for sections 1000 ft., 3000 ft. and 5000 ft. long. It was discovered that sections 1000 ft. long, 369 in number, were too short to be representative of the road as a whole because many of the roadside and design features were not included in the individual sections. Sections 3000 and 5000 ft. long, totaling 123 and 74 in number, were found to give much better representation. The decision to use sections 3000 ft. long was due principally to their larger number which is of importance in gauging the reliability of the correlation coefficients. For sake of comparison, however, correlation coefficients were computed using all three section lengths. The resulting coefficients are shown in Table 4.

The table bears out the foregoing analysis in that the values of the coefficients for the 1000-ft. sections are considerably lower than those for 3000-ft. and 5000-ft. sections. Apparently the 3000-ft. section is sufficiently representative since the values of the coeffi-

NUMBERS OF DESIGN FEATURES AND ACCIDENTS

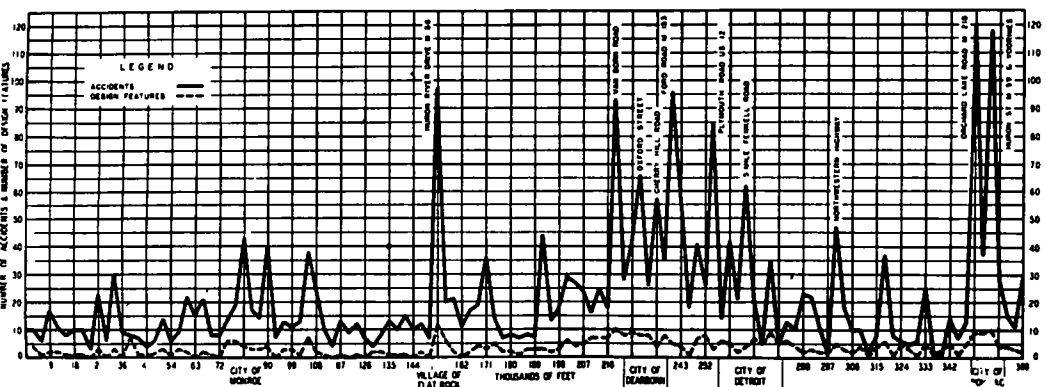


Figure 6. This is a strip graph covering the whole length of the study road. The curves represent the numbers of accidents and the numbers of design features occurring in each of the 3000-ft. sections into which the road was divided for analysis purposes. It will be noted that, while there are certain points where there appears to be some degree of parallelism in the direction of the curves, the correlation is by no means consistent.

TABLE 4

## VALUES OF CORRELATION COEFFICIENTS FOR 1000, 3000 and 5000-FOOT SECTIONS

Feature Correlated with Accidents	Total Number	1000 ft.	3000 ft.	5000 ft.	Adjusted <sup>a</sup> 3000 ft.
<b>Design Features</b>					
Intersections	296	.41	.64	.72	.53
Crest of Hill	37	.20	.38	.23	-.04
Transition in Width	55	.20	.17	.20	.32
Curves	39	-.02	-.05	.08	-.05
Grade Separation & Guard Rails	181	-.05	-.29	-.36	-.28
Total of Selected Design Features <sup>b</sup>	427		.61		.61
<b>Roadside Features</b>					
Other Establishments	295	.38	.70	.74	.49
Gas Stations	124	.63	.68	.67	.58
Stores	168	.41	.63	.59	.38
Restaurants	95	.43	.61	.57	.48
Taverns	45	.41	.59	.49	.14
Garages	38	.22	.37	.45	.32
Parks	40	.02	-.09	-.16	-.09
Private Drives	836	.00	.03	.17	.02
Total of Selected Roadside Features <sup>c</sup>	765		.79		.64
<b>Advertising Signs</b>					
Small	623	.34	.46	.44	.33
Medium	426	.30	.33	.30	.30
Large	232	.12	.11	.13	.04
Illuminated	189	.42	.52	.48	.39
Neon and Flashing Neon	232	.46	.56	.52	.42
Reflectorized	79	-.01	-.08	-.11	-.09
Miscellaneous	793	.09	.11	.13	.14
Total Advertising Signs	1307	.36	.41	.37	.30

<sup>a</sup>Correlations computed after removal of ten high accident rate sections

<sup>b</sup>Intersection, Curve, Transition in Width, Crest of Hill

<sup>c</sup>Other Establishment, Gas Station, Store, Restaurant, Garage

Note - Correlation coefficients were not computed for bridges and recreation buildings because of their low frequency of occurrence along the road.

cients for that length section are very similar to those for the 5000-ft. section.

Before looking at the individual correlations, it is best to explain the meaning of a correlation coefficient and some of its properties. A correlation coefficient is simply a measure of the degree of association that exists between two variables. Graphically, it is a measure of how closely two variables tend to lie along a straight line when plotted on a Cartesian coordinate system. Perfect correlation is denoted by a value of one and complete absence of correlation by zero. Perfect negative correlation is signified by negative one. The relationship is such that the greater the association between two variables the higher the value of the correlation coefficient.

Returning to the table, we find a correlation of 0.70 between accidents and other establishments, of 0.64 between accidents and intersections, of 0.68 between accidents and gas stations, etc. These values are sufficiently high to indicate a definite relationship between the occurrence of accidents and the above

named features. On the other hand we find a correlation of 0.17 between accidents and transition in width, and of 0.11 between accidents and large advertising signs. These values are so low that only a very slight association is indicated. There is also the negative correlation of -0.29 between accidents and grade separations and guard rails which gives some indication that these features might help prevent accidents.

When the study was initiated it was hoped that it might be possible to establish relative hazard values for some of the roadside and design features on the basis of the numerical size of the correlation coefficient. An analysis of the correlations between the features themselves precludes such a development however. In several instances the correlations between various roadside features are almost as high as the correlations between features and accidents. For example the correlation between accidents and gas stations is 0.68; between accidents and stores is 0.63. The correlation between gas stations and stores is 0.65.

#### NUMBERS OF ROADSIDE FEATURES AND ACCIDENTS

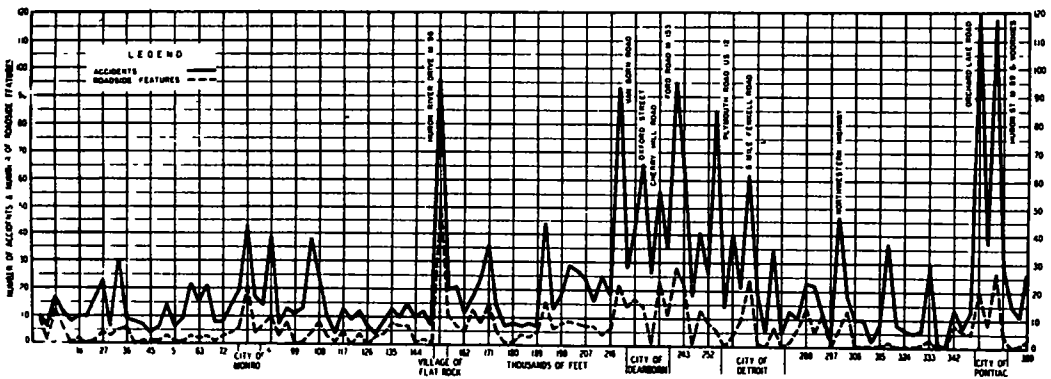


Figure 7. This is also a strip graph of the study road, but in this case numbers of accidents are plotted in relation to the numbers of roadside features in each 3000-ft. section. Contrasting with the preceding graph, the accident curve line in this case not only follows the direction of the curve representing roadside features, but tends to duplicate the amount of its movement. It should be pointed out that sections with many features usually have a larger proportionate number of accidents than do those sections with fewer features.

Items Correlated	Corr. Coeff.
Accidents and gas stations	.68
Accidents and stores	.63
Gas stations and stores	.65

The conclusion to be drawn from this analysis is that no distinction can be made between the contributions of these two features to the occurrence of accidents because of their frequent proximity to each other.

It is possible to distinguish between roadside features, design features and advertising signs as groups. Certain roadside and design features were selected on the basis of their relatively high association with accidents and their totals were used in computing correlation coefficients. A complete total of advertising signs was used in establishing a correlation. The correlations resulting from this procedure definitely indicate that a grouping of roadside features contributes more to the occurrence of accidents than a grouping of design features and both in turn contribute more than advertising signs.

Items Correlated	Corr. Coeff.
Accidents and Total of Selected Roadside Features	.79
Selected Design Features	.61
Accidents and Total Advertising Signs	.41

It is now evident, that although it is extremely difficult to single out the contributions of individual features to the occurrence of accidents, it is possible to distinguish between groups of features and their contributions. The high correlation between accidents and other establishments gives support to the theory that accidents came about because of the effect upon drivers of an accumulation of features in a group. Various features taken singly are not nearly as hazardous as a group of those features.

To investigate this grouping effect more thoroughly some multiple correlation coefficients were computed. All previous correlation analysis has dealt with associations between two variables only. However, situations frequently arise in

research studies which call for consideration of three or more variables bearing simultaneously on a problem. There are interrelations existing between three or more variables which must be investigated. By applying multiple correlation theory to this study it is possible to discover that group of intermixed design and roadside features which apparently contributes most to the occurrence of accidents. The results of the calculations are presented in Table 5.

TABLE 5

MULTIPLE CORRELATIONS BETWEEN ACCIDENTS  
AND VARIOUS ROADSIDE AND  
DESIGN FEATURES

Items Correlated	Corr. Coeff.
Accidents with Intersections, Gas Stations and Other Establm'ts.	.83
Accidents with Intersections, Gas Stations and Stores	.78
Accidents with Intersections, Gas Stations and Total Adv. Signs	.77
Accidents with Intersections, Gas Stations, Stores and Other Establm'ts.	.89

The table indicates a high degree of association between accidents and the group of features that includes intersections, gas stations, stores and other establishments. It is readily admitted that some of the intersections with considerable roadside development may also experience high traffic volumes and that such volumes may enter prominently into the occurrence of accidents. However, such a circumstance does not destroy the validity of the association that has been shown to exist between features and accidents. Traffic is variable which will be taken into consideration when further analysis is undertaken in connection with this study.

TABLE 6

## FREQUENCY DISTRIBUTION OF NO. OF ACCIDENTS BY NO. OF SECTIONS

Accidents	3000 Ft. Sections	
0-9	37	
10-19	43	$M_v = 23.1$
20-29	18	
30-39	8	$v = 25.0$
40-49	7	
. . . . .		
50-59	1	
60-69	3	
70-79	0	
80-89	1	
90-99	3	
100-109	0	
110-119	2	
Total	123	

The frequency distribution shown in Table 6, appears to portray two different situations. The ten sections below the dotted line exhibit accident rates which are considerably higher than the sections above the line. Simple computations reveal that:

1. 855 or 32 percent of the total number of accidents in the study occurred within 8 percent of the total road distance.

2. 57 or 20 percent of the total number of intersections are within the ten 3000-ft. sections.

A detailed analysis of each of the ten sections, made by reference to the strip map, revealed that in *every instance* the accidents were concentrated at intersections characterized by extensive roadside development.

In view of the abnormal number of accidents characterizing these ten 3000-ft. sections, the decision was made to separate these sections from the other 113 and to make a correlation analysis of the data after these sections had been removed.

It was believed that these ten sections might be responsible for a large part of the correlations previously computed. This was done and although some of the

individual correlations dropped in value (See Table 4), the coefficients for the total number of selected roadside features, design features and total advertising signs remained substantially the same.

## III. Miscellaneous Studies

A. *Manner of Accidents* - Frequency distributions by manner of accident revealed that angle accidents occur predominantly at intersections.

B. *Period Analysis* - Frequency distributions of distance of accidents from Large Advertising Signs were tabulated for the 4-6-month periods of 1947-48. It was discovered that the accident patterns by distance were approximately the same.

C. *Daylight and Darkness Study* - This study was undertaken in order to determine if there was a variation in the correlation coefficients between accidents and selected signs for daylight and darkness. See Table 7 for results.

TABLE 7  
CORRELATIONS BETWEEN ACCIDENTS AND  
SELECTED SIGNS DURING DAYLIGHT  
AND DARKNESS

Items Correlated	Corr. Daylight	Coeff. Darkness
Accidents and		
Illuminated Signs	.51	.49
Neon and Flashing		
Neon Signs	.55	.55
Reflectorized Signs	.10	-.06

The conclusion is that the effect of Illuminated, Neon and Flashing Neon and Reflectorized Advertising Signs is the same in daylight as after dark.

D. *Intersectional Study by Counties* - Accidents at or within 50 ft. of intersections comprised 68 percent of the total in Wayne County, 67 percent of the total in Oakland County, and only 32 percent of the total in Monroe County. This seems to indicate that the intersectional problem is greater in the densely populated areas than in the sparsely populated areas.

## MINNESOTA ROADSIDE SURVEY PROGRESS REPORT ON ACCIDENT, ACCESS POINT AND ADVERTISING SIGN STUDY IN MINNESOTA

K. B. Rykken, *Manager, Highway Planning Survey,*  
*Minnesota Department of Highways*

In 1947 the Minnesota Highway Department undertook, in cooperation with the National Safety Council and the Bureau of Public Roads, an analysis of accidents, their location and causes in relation to geometric design features. The purpose of that study was to determine whether there was any direct relationship between accident frequency and accident type and the several elements of roadway and roadside design. That pilot study covered US Highway No. 52 extending from the southeast portion of the state in a general northwesterly direction to a point on the Minnesota-North Dakota State Line at Moorhead, Minnesota. The basic study in connection with the 1947 data was completed and a set of tabulating cards prepared and forwarded to the Washington office of the Bureau of Public Roads for analysis in connection with similar information from some thirteen other States.

Studies of this sort have a tendency to mushroom and in 1949 Minnesota undertook, at the request of the Bureau of Public Roads and the Highway Research Board, a somewhat related study of access points and advertising signs with relation to accident type and frequency.

Feeling that elements of highway design when considered in conjunction with access points and advertising signs might have some relationship to accident rates, the study procedures were developed so that information with respect to access points and advertising signs could be correlated with the previous information secured with respect to items of geometric design. Feeling also that the 350-mi. pilot section did not adequately reflect the several predominant types of rural routes

in this state, an additional 150 mi. was added to the study and accident data, as well as other items of information, secured for the complete 500-mi. portion.

The study is now about 80 percent complete. It is expected that the data will all have been coded, tabulating cards prepared and basic tabulating runs completed by early spring. We anticipate the preparation of a complete report on the complete 500-mi. segment.

A very preliminary study of approximately 170 mi. of the 500-mi. study segment reveals no apparent relationship between accident occurrence and advertising sign type or location. A fairly definite pattern of relationship appears evident between frequency of access points and accident occurrence. Whether this trend will be borne out when a complete analysis of the 500-mi. pilot section has been made, we do not know. If first results are borne out, however, we wish to inject a note of caution into the interpretation of results. It has been our feeling that the type of accident reports and the system of accident reporting now in use in most states may not be sufficiently accurate nor adequate to completely fix the cause of many accidents. Reports filed by drivers involved in automobile accidents are prone to reflect only those things which fix themselves upon the mind of the driver at the immediate moment of the accident. There may be contributory reasons for an accident of which the driver in his excitement has not been aware. It may well be that a much more detailed system of accident reporting and a much more detailed questioning of drivers involved in accidents will be necessary at least on a test basis before



it will be safe to assume, if it should so develop, that advertising signs have no apparent relationship to accident occurrence.

As an illustration of this point during the summer of 1948 the Minnesota Highway Planning Survey conducted, in cooperation with the State of Wisconsin, a comprehensive origin-destination traffic survey of the Duluth-Superior metropolitan area. One of the roadside interviewing stations operated in conjunction with this survey was located near the extreme south edge of the city of Duluth, just outside urban development. Trunk Highway 23 is known as the Evergreen Memorial Highway. It was so designated by special action of the Minnesota legislature, which act provided that for a distance of some 45 mi. from Duluth to the Village of Askov, no billboards or advertising signs should be placed within viewable distance of the roadway surface. In several instances during the course of the summer operation of the station located on this route, drivers, particularly from out of the state, when interviewed inbound into the city of Duluth expressed a feeling of fatigue and unease after having driven the 45 mi. section. The road is of modern alignment with adequate right-of-way, some grades and some horizontal curvature, but almost without sight restrictions over its entire length. The several people who commented did not remember until reminded that there were no advertising signs whatever on the right-of-way.

None of them expressed any definite opinion to the effect that the absence of billboards contributed to the apparent monotony of the 45 mi. section. Yet all were somewhat puzzled as to why they should feel the way they did feel after having driven this portion of the route. Prior to and subsequent to those reports, I personally drove that section of Trunk Highway 23 a good many times and found that I experienced much the same feeling. After considering the matter carefully, however, I was inclined to attribute my reaction to the fact that without being conscious of it I drove that section at an extremely high rate of speed. There are no towns directly on that section of the route. There are few crossroads and not many farm units. The relatively small number of detracting features, together with the complete absence of billboards, produces a feeling of security which tends to result in higher average driving speed. The accident experience on this route so far since its completion has been good although several rather severe accidents have occurred which have been attributed to excessive speed.

When the results of the parallel surveys being conducted in other states have been assembled, it would be well to carefully scrutinize the procedures by which each of the several studies have been made with particular emphasis on the care with which the accident reports were studied and the effort put forth to locate the exact point of accident occurrence.

## HIGHWAY ACCIDENTS IN RELATION TO ROADSIDE BUSINESS AND ADVERTISING

Professor P. H. Elwood, *Head, Department of Landscape  
Architecture, Iowa State College*

For many years an increasing number of sensitive and conscientious American citizens have been deeply concerned, even shocked by the very rapidly increasing occupancy of our roadsides by outdoor advertising and business, often producing rural slums.

The rural slums adjacent to nearly every American City are fast becoming a national disgrace, until now the situation is so appalling and universal that the American public is aroused as never before to the situation and is determined to check this menace to the otherwise good life in these United States. With this development or along with it, is the even greater increase in the sale and use of automobiles and automotive travel, until now more than 37 million Americans travel 300 billion mi. over United States Highways each year.

This national disgrace was emphatically brought to our attention recently by the National Council of the Federated State Garden Clubs.

Highway engineers rightfully claim we have in the United States, the finest highway system in the world, and we kill many times more people yearly than are killed normally in all of continental Europe. More than one-half of the world automobiles are owned and operated in the United States.

Highway fatalities and accidents are rapidly increasing and will continue to mount unless something is done to improve driving conditions and lessen the hazards of driving in the United States.

Nearly 40,000 Americans will probably be killed on the highways of the United States during 1949 and nearly, if not more

than, 1-½ million accidents leading to serious personal injury, not to mention the economic loss or cost of perhaps more than one billion dollars annually. The National Roadside Council is another National organization vitally concerned with the disgraceful roadside conditions and is eager to further any move aimed to lessen or improve present conditions.

Last night I saw in this weeks "Life", the statement about New York's Thruway which when finished it said "will be one of the longest, nearly 500 mi. when finished, in the world, of 4 - 6 lane divided limited access highway from New York to Albany thence to Buffalo, and will have among other things, a minimum of 1000 ft. of driving sight distance for motorists, not of advertising. But, no traffic lights, no billboards, roadside stands, or business, or grade crossing or intersections from end to end." What a high standard for other states to shoot at.

It is all very well to cry "wolf, wolf" and to shudder at the devastation of the once fair scenery of our countryside, and to assail the presently legitimate roadside business. But to date we have not based our horror on anything but generalities and personal opinion. Even the great body of national organizations and millions of other incensed citizens are eagerly awaiting facts and figures. This is why we of the Roadside Committee welcomed the help and sponsorship of the Highway Research Board in promoting this work and these studies.

Therefore, last year with the help of the Iowa State Highway Commission and the Iowa Safety Council, a study was undertaken to ascertain some facts about

highway accidents and some of the possible causes. Mr. Wm. A. Rusch was assigned the task to work not only with the highway Commission and the Safety Council, but to make a sound, unbiased study and to follow the latest psychological and statistical procedures and methods in the study as well as to make a first hand reconnaissance in the field of the selected areas chosen for this study.

Mr. Rusch had from the start of the study, the experienced guidance and council of Dr. Lauer, *Head of our Dept. of Psychology* and of Dr. Jessen, *Head of our Statistics Dept.*, at *Iowa State College*, and Mr. Mark Morris of the *Iowa State Highway Dept.*

No experienced or able research student starts out to prove forgone and other conclusions as personal opinions which he may wish to justify or verify. A good research man has simply an insatiable yearning for facts and the truth, so with the further help and encouragement of the head of our Depts. of Civil Engineering and Economics, this study was begun to find out what, if any, evidence could be found for the rapid increase in highway accidents in Iowa.

Iowa has, as some of you know, one of the first completely concreted primary highway systems in the United States. Being one of the first states to completely pave its primary system it is now, after 25 - 30 years use, needing rebuilding and replacement. We killed about 500 in Iowa in 1948, and probably more will be killed on our highways this year and in 1950.

Therefore, the Highway Commission is very anxious to know what changes in their plans and regulations should be proposed for the future expanded system in Iowa and perhaps elsewhere. The Commissions Director of Research, Mr. Mark Morris, therefore was most helpful in promoting this study and carrying on this study, otherwise it would not have been possible.

It should be noted that Iowa has an evenly distributed population with no very large cities, the capitol, Des Moines, having less than 200,000. Also we must remember that to an easterner,

our countryside seems relatively undefiled by rural slums and billboards and advertising signs. But our cities, small as they are, will grow, and already are showing the awful effects of rural blight and slums.

Furthermore, it should be remembered that Iowa's greatest industry is agriculture and its greatest resource is its black soil. Twenty-five percent of the nations Class A land is in the State of Iowa. Anything that endangers the countryside of Iowa is harmful to all the people in the state. In other words, Iowans resent anything that injures the countryside or the interests of the farmer or agriculture.

In undertaking this study we had no great expectation that we would find any answers to this, the greatest nightmare of the planners. The two top planning problems facing modern planners throughout the world today are first, the decaying heart or core of our cities. These cities are being studied and plans are being prepared on a nationwide basis for their redevelopment. Second, but not less important, though perhaps less spectacular, is the development and gradual growth of rural slums on the areas adjoining our towns and cities. However, we just can't let things continue their present rate of growth and increase if we are to survive as a civilized people or if we are to preserve America the Beautiful. But, sentiment and opinions of idealists and wishful thinkers will never cure this evil and loathsome disease. We must have facts, we must analyze the facts before we can plan any course of action. The five essential steps in all planning are: (1) the survey and fact findings, (2) analysis of facts, (3) preparation of plan, (4) carrying out the plan, (5) operation and maintenance of the improved facility.

This study we present this evening is but a first step, feeble though it may be. We hope you will pick it apart and help us make the next one better and more fruitful in future years. We hope it will eventually mean safer, more economical and convenient and more beautiful highways in

America. If we prove nothing more than the fact that more than one-half our accidents happen just outside our cities in these fringe areas infested with business and signs and billboards, it should have proven well worthwhile. Then what is the next step in our forward

march toward preserving and cleaning up our roadsides?

Now, may I present Mr. Wilmer A. Rusch who made the study, and who will now explain how it was set up and how organized, the methods used, as well as explain some of the results. Mr. Rusch.....

## HIGHWAY ACCIDENT RATES AS RELATED TO ROADSIDE BUSINESS AND ADVERTISING

W. A. Rusch, Iowa State College, Ames, Iowa

Many persons have expressed the opinion that roadside business and advertising are causes of highway accidents. Proof of these accusations has been wanting. It is difficult to attribute any motor vehicle accident to any one direct cause. Such accidents are more often the result of two or more contributing causes, and individual influences bearing on the accident concerned are difficult to ascertain. This study is an attempt to classify accidents by location and by cause in order to determine whether a relationship exists between the number, location, and character of accidents and the immediate presence of roadside business and advertising. The study covers State and Federal highways only.

### LIMITATIONS OF THIS STUDY

1. Since not all accident reports were complete, a final disposition of all assigned causes could not be made.
2. The assignment of cause to any accident long after it occurred and by one person only must be kept in mind. The accident report was the only data available, and assignment of cause depended on personal interpretation of the facts presented.
3. This study contains information based on accidents occurring over a period of two years only.
4. This study was completed under very similar conditions for each approach. Perhaps studies in other States would

reveal new or different data when reduced to this basis.

### THE STUDY SAMPLE

The observed highways for this study were the immediate approaches to certain cities in Iowa. Since time available for the study was limited, it was necessary to choose a sample of cities. Cities with a 1940 population of 5,000 and above were included in the original group--44 cities in all. The State was then divided into four geographical units labelled A, B, C, and D. This division was necessary to enable a fair distribution over the entire State with an equal number of cities in each division.

The cities were classified in four groups according to population. The largest group contained 12 cities in the 5,000 to 10,000 population class, three in each geographical unit. The 10,000 to 25,000, 25,000 to 50,000, and over 50,000 groups were evenly distributed, one of each class in each geographical unit. Where a selection from a group of cities was necessary, cities were chosen by a table of random numbers to prevent personal bias from entering the procedure. The final sample selected for study contained 24 cities of over 5,000 population.

### DEFINITION OF APPROACH DISTANCES

It should be kept in mind that this study was limited to the State of Iowa.

Iowa has a very even distribution of population, and cities are well distributed over the entire State. Roadside business and advertising have not gained as strong a foothold as in the more populous sections of the United States--the eastern seaboard for example. Roadside business and advertising are usually confined to the immediate approaches to the city, perhaps within two miles in most instances. In order to distinguish between an area where roadside business and advertising were very evident and the adjacent areas, the following designations were formulated:

*A-B distance.*--This designation is used to identify the segment containing at least 90 percent of the advertising and roadside business on the approach being studied. The actual distance may be one-half mi. or two mi., depending upon the location of business and advertising. It begins at the corporate limits and extends into the countryside.

*X distance.*--This is a distance of one mi. immediately beyond the A-B distance.

*Y distance.*--This distance of one mi. follows the X distance where it was possible to include a third distance.

#### TRAFFIC DENSITIES

In only a few instances were significant differences in traffic densities between the A-B distances and the X or Y distances observed. Areas where such differences were noted usually occurred where more than one highway was assigned to the same route or where a well-populated business area had been established. Where roadside business was absent, there was no change in the traffic densities from one distance to another. Traffic densities on different highways varied from 700 to 7,000. The most common density was found to range between 2,500 and 4,000. Only one highway investigated showed a traffic density over 4,500 vehicles per day. All roads investigated contained two lanes except for two instances where very short lengths of four-lane highways were found.

#### THE APPROACH STUDY

After the sample for study had been

selected, each approach to the cities was investigated in person to determine whether it was of acceptable standards, i. e., in curvature, superelevation, alignment, condition of the driving surface, and width of driving surface. If the approach appeared to be sound in all these basic aspects, it was included as an approach to be studied. Each approach was mapped on the site and checked for accuracy. Photographs of approaches were included where such evidence might serve to clarify the locations and positions of roadside activities.

#### HYPOTHESIS AND ASSUMPTIONS

If roadside business and advertising are considered causes of accidents, it is proper to proceed on the hypothesis that accidents will be more likely to occur in these areas where the roadside has been occupied to the greatest degree. Another hypothesis may be advanced. If roadside business and advertising are causative agents, the character of the accidents occurring in the immediate area should differ from those occurring where little or no business and advertising are present.

Since it was impractical and perhaps impossible to investigate each driver and vehicle involved in the accidents investigated, certain assumptions were formulated. It was assumed that the condition or capability of the driver did not vary as he traversed the three distances, A-B, X, and Y as defined in this study. Each vehicle was assumed to be in a roadworthy condition and proper operating order.

#### CLASSIFICATION OF ACCIDENTS

For the purpose of this study, accidents were classified into three groups on the basis of attributable cause. These groups are: accidents attributed to roadside business, accidents attributed to inattention or misdirected attention, and accidents attributed to other causes.

Accidents attributable to business are those that are the direct result of a driver's attempting to gain access to the roadway after leaving a place of business, or attempting to leave the roadway to

patronize a place of business. Accidents were placed in this category only when the accident report specified the place of business involved.

Accidents due to inattention are those accidents that might easily have been avoided had the driver devoted full attention to his driving. Excluded were those accidents occurring under difficult or unusual weather or road surface condition, such as fog, rain, mud on pavement, snow, or ice. Also excluded from this group were those accidents caused by mechanical failure, headlight glare, sun glare, and drunken driving.

The third group, other accidents, contains the above-mentioned accidents plus those influenced by livestock on the highway, or roads under construction, or where accident information was incomplete or inconsistent. Where there was doubt as to whether the driver could have foreseen and avoided the accident, the accident was placed under "other accidents."

#### SOURCE OF INFORMATION

The basis for classification of these accidents was provided by the accident files of the Iowa State Highway Commission. The form used is quite complete and presents an accurate account of the accident when the reports have been completed in detail. A diagram of each accident as it occurred is included in the report to indicate the relative position of the vehicle or vehicles involved. The condition of the road, weather, alignment, etc., are provided for in detail. To avoid hasty judgment in assigning an accident to any of the three attributable causes, each accident was evaluated and then rechecked at a later date and results compared to the earlier analysis. Five hundred and seventy-one accidents were investigated on the studied approaches for 1947 and 868 for 1948. It is unfortunate that 1949 could not be included in this study. However, records for 1949 would not be available until 1950, and the schedule for the completion of this study would not permit this delay. The years prior to 1947 do not reflect normal habits of personal travel or motor vehicle

operation due to wartime restrictions.

#### RESULTS OF THIS STUDY

*Distribution of Accidents by Location* - Fig. No. 1 indicates that the greatest number of accidents for each year occurred in the A-B distance. In each year, the number of accidents in the A-B distance is more than double that of the number in X or Y distance. It is interesting to note that the proportional difference between the A-B and X and Y distances remains approximately the same regardless of the difference in numbers recorded for each year. This difference in numbers is no doubt due primarily to the financial liability clause enacted by the Iowa legislature in 1947. This law makes it mandatory to report accidents. (The legal effective date of this law was October 1, 1947.)

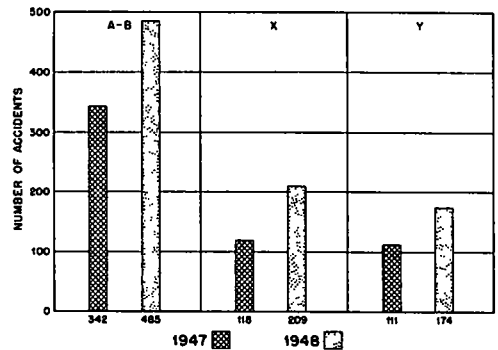


Figure 1. Distribution of Accidents by Location

*Distribution of Accidents by Cause and Location* - Fig. No. 2 illustrates how these accidents appeared when attributed cause and location were considered. The significant trend on these graphs seems to indicate that a greater share of the accidents attributed to inattention or misdirected attention occur in the A-B distance and that such accidents lead all others by a comfortable margin. In the X and Y distances, the accidents attributed to inattention are less than one-half of the total accidents recorded for those

distances for either year. Almost all accidents that could be attributed to business, as defined earlier, are found in the A-B distance. The proportions as they seem to recur in the various distances should be noted.

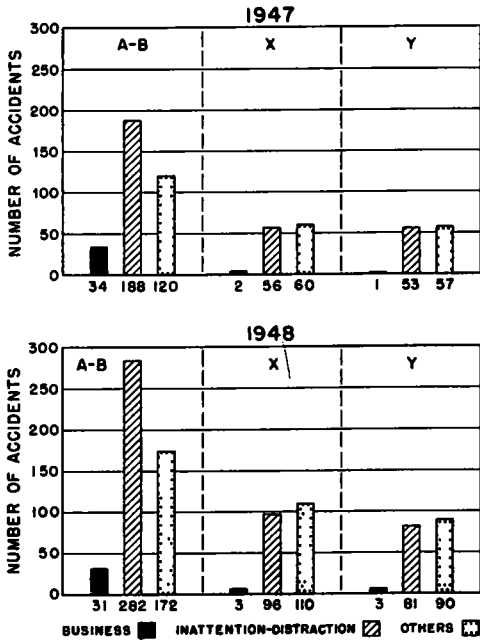


Figure 2. Distribution of Accidents by Attributed Cause and Location

*Accidents per One Hundred Miles* - The distribution of accidents as they occurred on a basis of physical distance (100 mi.) can be seen in Table 1. Though the A-B distance contains more mi. than either X or Y distances, the per mile rate for the various causes seems to indicate that accidents tend to occur more frequently in the A-B distance. Table 2 shows how the breakdown of accidents appears when placed on a percentage basis for the defined distances and causes as attributed in this study.

## CONCLUSIONS

1. The number of accidents based on vehicle density or accidents per mi. for the entire study is greater in the A-B distance than in the subsequent distances for any one year.

2. Where business and advertising have occupied a large portion of the private property adjoining the roadside, accidents classified as being due to inattention predominate over all other classifications used.

3. Segments of highways with equal or nearly equal traffic densities exhibiting little or no roadside business show lower rates by comparison. Accidents in these areas seem to occur more sporadically and exhibit less tendency to recur with the same frequency in the same locations the following year.

4. In the X and Y distances, more accidents are attributed to miscellaneous causes than to inattention and business combined.

## ACKNOWLEDGMENT

This study was prepared as a thesis (M.S.) in Town and Regional Planning under the direct supervision, encouragement, and assistance of Professor P. H. Elwood, head of the Department of Landscape Architecture of Iowa State College.

The material and financial assistance granted by the Iowa State Highway Commission made this study possible. The writer wishes to extend his special appreciation to the Department of Safety and Traffic which granted liberal use of accident files, materials, supplies, and personnel.

Acknowledged also is the guidance and assistance of Dr. A. R. Lauer, Professor of Psychology, and Dr. Bernard Ostle, Assistant Professor of Statistics at Iowa State College.

TABLE 1

## DISTRIBUTION OF ACCIDENTS BY CAUSE PER 100 MILES

Segment	Distance	Total Number of Accidents Attributed to				Accidents per 100 Miles Attributed to			
		Total	Business	Inat- tention	Others	Total	Business	Inat- tention	Others
1947									
A-B	118.3	342	34	188	120	290	28.8	159	102
X	74	118	2	56	60	160	2.7	76	81
Y	66	111	1	53	57	167.5	1.5	80	86
1948									
A-B	118.3	485	31	282	172	409	26.2	238	145
X	74	209	3	96	110	283	4.05	130	149
Y	66	174	3	81	90	263	4.54	122	136

TABLE 2

## SUMMARY OF ALL ACCIDENTS

Year	Distance	No. of Accidents	Attributed Cause			Percentage			Total Accidents All Distances
			Business	Inat- tention	Other	Business	Inat- tention	Other	
1947	A-B	342	34	188	120	9.94	54.97	35.09	59.91
1948	A-B	485	31	282	172	6.39	58.15	35.46	55.87
1947	X	118	2	56	60	1.69	47.46	50.85	20.63
1948	X	209	3	96	100	1.44	45.93	52.63	24.08
1947	Y	111	1	53	57	0.90	47.75	51.35	19.46
1948	Y	174	3	81	90	1.73	46.55	51.72	20.05



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