

REPORT OF COMMITTEE ON SIDEWALKS ALONG RURAL HIGHWAYS

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Based upon data assembled, the experience of members, and other sources of information the Committee recommends the following general warrants for rural sidewalk construction.

Sidewalks should be constructed along highways where considerable numbers of pedestrians walk on the highway and the records show that this is resulting in frequent pedestrian accidents.

The need for sidewalks must be foreseen before the impending toll of pedestrian deaths and injuries start.

Separate walkways should be provided on bridges and through underpasses to fulfill immediate or anticipated needs

Pending further research the tentative recommendations of the Am Assoc. of State Highway Officials are suggested for guidance in providing sidewalks.

1 Any sidewalk surface must be as comfortable and convenient to use as the roadway which it parallels

2. Proper provision should be made for continuity of walkways and for proper crossings of minor street approaches.

3. Provision should be made for proper maintenance and for the removal of weeds and brush which may extend onto or across sidewalks.

4. Rural sidewalks should be at least four feet wide and should be as much wider in suburban sections as anticipated growth will require.

5. Sidewalks should be separated from the roadway a sufficient distance to allow the stopping or parking of vehicles between the two when necessary. The distance should not be so great, however, as to discourage the use of the sidewalks due to inconvenience in reaching them. When walks must be located close to the traveled roadway safeguards should be provided to protect pedestrians against vehicles running along the roadway.

6. Sidewalk grades should not ordinarily exceed 7 per cent and surfaces with grades in excess of 5 per cent should have a rough or non-skid texture. If grades above 7 per cent are necessary, steps of the proper height should be introduced.

7. Proper provision should be made for drainage between the walk and the roadway and also between the walk and any embankment adjacent to it.

8. When walks are built on one side of the highway the choice must depend upon the sources and destinations of pedestrian travel. Where there are existing lights on one side of the highway and sidewalks are to be placed on one side only, they should be located on the same side, if possible.

Pedestrian accidents are usually considered mainly as an urban problem. It is there that they account for the majority of traffic deaths and a large part of the injuries. Vehicular and pedestrian traffic are more concentrated and the opportunities for conflict are greater than on rural roads.

In cities, however, many of the possible conflicts between vehicles and pedestrians are avoided by segregating the pedestrian traffic along the roadway on the sidewalk and, unquestionably, this has limited the accident toll. In some suburban and

rural areas which provide the traffic density of city residential districts but are under rural jurisdiction, walkways are not provided and vehicles and pedestrians must intermingle in their use of the streets.

It is there that sidewalks are frequently lacking although their need may be as great as in many residential areas in cities. It is there, also, that street lighting is often lacking or insufficient to reveal the pedestrians who must use the roadway as their paths. It is in such zones, therefore, that the night

pedestrian problem is at its peak, and that problem is the most serious in the entire field of traffic accidents.

Such conditions are also often approached in small towns and unincorporated communities as well as in the vicinity of rural schools, churches, and other meeting places on important highways. The Michigan Highway Planning Survey revealed that 38 per cent of the fatal pedestrian accidents on rural trunk lines occurred within one mile of the limits of cities. Less than 15 per cent occurred between one and two miles from cities.

Rural pedestrian accidents are particularly severe. While they produced only 6 per cent of the total injuries they produced 22 per cent of the total deaths in the rural areas of this country in 1939. What they lack in number when compared to urban pedestrian accidents, they make up in severity. Furthermore, they have been increasing rapidly in number, 41 per cent during the past nine years while total deaths rose 17 per cent.

The pedestrian who does not drive a car has been shown to be the most susceptible to accidents because he does not understand the dangers to which he subjects himself in traffic. If he must walk on the highway in rural areas the dangers of this lack of understanding are multiplied by the higher speeds of vehicles there. They are further increased at night by lowered visibility.

The rural highway sidewalk, when properly used, is recognized as a substantial part of the solution to this problem. No one can hope to have sidewalks built along all rural highways, for the cost would be prohibitive. A practical question is "Where should such provision be made for pedestrians?"

The fact that sidewalks cannot be constructed along all rural highways must not be allowed to prevent their construction along any highway. In the absence of practical criteria, however, this is apt to happen as it has often hap-

pened in the cases of other needed safeguards. The purpose of the study for which this Committee was established was to determine where rural highway sidewalk construction is practicable and then to define the general type of sidewalks that should be constructed.

PROCEDURE AND DATA GATHERED

A questionnaire sent to all states in 1939 revealed about 1825 miles of rural sidewalks. About two-thirds of this mileage were of concrete, asphalt, or oiled material, and about one-third of gravel, cinders, or similar lower grade materials.

Some states and counties presented data showing reductions in pedestrian accidents following sidewalk construction. Others expressed the belief that there were reductions but did not have sufficient data. There is yet a lack of sufficient information available in compiled form to show the effect of sidewalk installations of different kinds upon accidents. This Committee repeats emphatically its recommendation concerning the keeping of accident records, that in all sidewalk construction records should be maintained concerning pedestrian accident experience, traffic volumes, and numbers of pedestrians, for comparable periods of time before and after construction, to show the effectiveness of the walkways in preventing accidents in proportion to the exposure. It emphasized that such information would be valuable in refining criteria and specifications for sidewalk construction in general.

GENERAL WARRANTS FOR SIDEWALK CONSTRUCTION

Based upon the data assembled, the experiences of members, and other sources of information the Committee recommends the following general warrants for rural sidewalk construction.

1. Sidewalks should be constructed

along highways where considerable numbers of pedestrians walk on the highway and the records show that this is resulting in frequent pedestrian accidents. In studying records for this purpose accidents to pedestrians crossing highways should be distinguished from those to pedestrians walking along highways. Records of accidents to be used as warrants for sidewalk construction should be confined to those of a type which such construction can conceivably prevent. Likewise, records of accidents distributed along the highway should be distinguished from those concentrated at a single point, the distributed pattern being most likely to indicate the need for sidewalks.

2. In its publication "*A Policy on Highway Types (Geometric)*" the American Association of State Highway Officials suggests tentative pedestrian traffic densities which justify the construction of sidewalks on one side and both sides of highways. Sidewalks on one side are suggested where the number of pedestrians ranges from 50 per day with more than 100 vehicles per hour on highways designed for speeds of 60 to 70 miles per hour, to 150 per day where there are 30 to 100 vehicles per hour with design speeds of 30 to 50 miles per hour. Two sidewalks are suggested where the number of pedestrians range from 200 to 500 per day for the corresponding traffic densities and design speeds. Table 1 shows these criteria in detail. It is pointed out that special conditions or locations of highways or timing of pedestrian and vehicular traffic may alter these warrants, particularly if pedestrian and vehicular peaks occur simultaneously. The Committee presents these as possible guides in sidewalk construction rather than specific recommendations until further study has been made concerning them.

3. In anticipation of accidents due to new highway construction, increased

vehicular traffic, or growth in adjacent population, the need for sidewalks must be foreseen before the impending toll of pedestrian deaths and injuries starts. Sidewalks may be expected to become necessary along major highways in the transition zones between urban and rural sections, in the vicinity of rural schools, churches, and other group meeting places, and near country clubs, airports, fairgrounds, and similar locations

TABLE 1
WARRANTS FOR PEDESTRIAN SIDEWALKS FROM
"A POLICY ON HIGHWAY TYPES (GEOMETRIC)"
American Association of State Highway
Officials

Suggested pedestrian traffic densities in number per day justifying the construction of sidewalks. The number of vehicles per hour is the average of the probable maximum hourly traffic of several peak days of some future year, the year chosen depending upon the probable life of the construction

Assumed designed speed	One sidewalk Vehicular traffic density classifica- tion		Two sidewalks* Vehicular traffic density classifica- tion	
	30 to 100 vehicles per hour	More than 100 vehicles per hour	50 to 100 vehicles per hour	More than 100 vehicles per hour
<i>m p h</i>				
30, 40, 50	150	100	500	300
60, 70	100	50	300	200

* Smaller pedestrian traffic densities may justify two sidewalks to avoid a considerable amount of cross pedestrian traffic

4. Walkways, separate from the roadway, should be provided on bridges and through underpasses, anticipating the need for such pedestrian facilities resulting from the growth of vehicular or pedestrian traffic if the need does not immediately exist.

SIDEWALK SPECIFICATIONS

In rural or suburban areas, where sidewalks are not traditionally a part of the highway and where conditions are not as

conducive to their use, such walkways must conform with certain minimum requirements if they are to be effective in pedestrian protection. If these requirements are not fulfilled their use will be proportionately reduced and the intermingling of pedestrian and vehicular traffic will continue.

1. Any sidewalk surface must be as comfortable and convenient to use as the roadway which it parallels or many pedestrians will use the latter, even at the risk of accidents. Surfaces that will become muddy in wet weather or dusty in dry weather, for example, are likely to be avoided at such times.

2. Proper provision should be made for continuity of walkways and for proper crossing of minor street approaches. If pedestrians must enter the roadway to pass points where the sidewalk is omitted or low type surface is provided, they are apt to remain in the roadway instead of returning to the walk.

3. In constructing walkways provision should be made for proper maintenance and for the removal of weeds and brush which may extend onto or across them. The growth of weeds or brush close to the sidewalk increases the opportunities for crime and discourages the use of walkways at night and during inclement weather. It may also obstruct the view of pedestrians at intersections.

4. Rural sidewalk widths should be based upon the probable need for pedestrian traffic as indicated by the type of locality through which it passes. This width should be at least 4 ft. for strictly rural communities and should be as much greater in suburban sections as anticipated growth will require.

5. Sidewalks should be separated from the roadway a sufficient distance to allow the stopping or parking of vehicles between the two when necessary. It should not be so great as to discourage the use of the sidewalks, however, due to

inconvenience in reaching them. Distances between roadways and sidewalks as great as 26 ft. were reported in this study. When, for economic or other reasons, walks must be located close to the traveled roadway safeguards must be provided to protect pedestrians against vehicles running off the road, such as a planted separating strip between the shoulder and the walk, locating the walk back of an existing guardrail, building a curb or buffer, or having the walk on a bank above the elevation of the road, when practicable.

6. The profile grade of sidewalks should be limited by comfortable foot travel, which depends upon the type of surface and climatic conditions. Grades will normally be determined by highway grades, but special conditions of topography may require departures. Grades should not ordinarily exceed 7 per cent and surfaces with grades in excess of 5 per cent should have a rough or non-skid texture. Where grades exceeding 7 per cent are necessary, steps of the proper height should be introduced.

7. Walks should preferably not be lower than the centerline elevation of the highways. Proper provision should be made for drainage between the walk and the roadway and, also, between the walk and any embankment adjacent to it. This will eliminate drainage across the walk and will minimize the accumulation of snow on it.

8. When walks are built on only one side of the highway, the choice must depend upon the sources and destinations of the pedestrian travel. The criteria for one or two walkways may be varied materially by the locations of these sources and destinations. Where there are existing lights on one side of the highway only and sidewalks are to be placed on one side, they should be located on the side with the lights when conditions permit.

ALLOCATION OF COSTS

The question of who should bear the cost of sidewalks along rural and suburban highways depends to a large extent upon local conditions in each case. Where the sidewalk is distinctly a service to the residents on abutting property the cost should be assessed against such property. When, however, it is more distinctly a public service the sidewalk should be considered a part of the roadway cost and handled in accordance

A modification of the first of these cases is a real estate development along a major highway. The building of residences on such an area, many of them on lots not abutting the main highway, will increase the amount of pedestrian traffic along the thoroughfare and make sidewalks desirable. These should be provided in the original real estate development or, if provided later, they should be assessed against the entire area rather than the lots immediately abutting the roadway.

Sidewalks leading to public centers of pedestrian concentration, such as rural schools, should be considered public services and either financed as a part of the highway construction and maintenance cost or should be distributed through taxation over the area affected rather than assessed to the abutting property

ACCIDENT EXPERIENCE ON SECTIONS
OF ROADWAY WITH SIDEWALKS,
REPORTED TO THE COMMITTEE

In Kalamazoo County, Michigan. (Furnished by Michigan State Highway Dept.) The sidewalk was constructed on one side of a 2.84 mile section of U. S. 12 east of Comstock, Michigan, on October 26, 1937. In the two year period prior to October 5 of that year there were three fatal pedestrian accidents and in the two year period following October 26 of that year there were

no pedestrian accidents. The road parallels a railroad and only one walk is needed. The walk is four feet wide and is 26 feet from the pavement edge.

In Kent County, Michigan. (Furnished by Michigan State Highway Dept.) Concrete sidewalks were constructed on both sides of U. S. 131 for a distance of 2.75 miles. They are 21 ft. from the pavement edge and are 4 ft. wide. Before construction, January 1, to November 21, 1934, there was one fatal and one non-fatal accident while crossing the road and one non-fatal while walking in the roadway. During a similar period in 1935 no accidents were reported.

In Wayne County, Michigan. (Furnished by Board of Wayne County Road Commissioners.) Six-foot sidewalks were constructed along and 24 ft from the edges of the pavement on base line road M-102 when the road was constructed. Hence, no accident data before construction are available. However, the accident experience here is compared with that of two other roads without sidewalks, but otherwise with fairly similar conditions. During 1939 in this 1.5 miles there were three non-fatal pedestrian accidents, all involving pedestrians crossing the road.

On one mile of U. S. 112, without sidewalks, during 1939 there were five fatalities and five non-fatal injuries to pedestrians crossing the road and two fatalities and one non-fatal injury to persons walking in the roadway. Both vehicles and pedestrians were fewer on this road than on M-102.

On 1.5 miles of Telegraph road without sidewalks, during the year 1939 there was one fatality involving a pedestrian crossing the road and one involving a pedestrian walking in the road. The number of vehicles and the number of pedestrians were both appreciably below the numbers on M-102.

DISCUSSION ON RURAL SIDEWALKS

MR. C. N. CONNER, *Public Roads Administration*: I would like to know how the committee determined the need for steps on 7 per cent grades.

MR REEDER: That was taken largely from observations made on ramps used in industrial plants.

PROFESSOR F. C. MIRGAIN, *Rutgers University*: I would like to know about the construction of rural sidewalks in areas not necessarily high in pedestrian count. Are there any investigations along that line? It seems to me that we are approaching the time when low cost rural sidewalks might be desirable for hiking and public recreation.

MR. REEDER: There were no special investigations on that. I do know that steps are being taken for promoting paths of various kinds for both hiking and bicycling.

It seems, however, our immediate problem is that of providing sidewalks where there is definite hazard due to the fact that pedestrians are walking on the pavement or out on the roadway, such as in newly developed districts or in suburban districts of the type I have mentioned.

QUESTION: One of the troubles of sidewalk construction is the cost. Now if a type of construction could be evolved that would be reasonable, might it not be conceivable that it could be used in rural areas.

MR REEDER: If it presented as comfortable and satisfactory walking surface as the roadway itself, because strange to say even for their own protection people do not want to subject themselves to any discomfort. Consequently, if it is

not a comfortable surface on which to walk they are not likely to use it.

MR. HAROLD HAMMOND, *National Conservation Bureau*: I understand Massachusetts has about 200 miles of these rural sidewalks. What type do they use?

MR. REEDER. I think their sidewalks exceed that figure. Their walks are of two or three major classifications. I gave you major classifications, a rather high type, some that were of concrete, some of oil surface, and some of the lower type.

MR HAMMOND: Have they developed any yardsticks by which they measure whether they should or should not go in?

MR. REEDER: Mr. Coppell reported some general measures although we did not obtain any information as to direct application of yardsticks.

MR W W MACK, *Delaware State Highway Department*: I would like to mention the matter of 7 per cent grade. I think that many sidewalks exceed that, which have been operated for many years without any additional hazard. It seems to me that ordinarily up to considerably above that point grades are much safer and easier to navigate than steps. Another comment made is with regard to distinction between rural and urban. The U. S. Bureau of the Census considers that anything below 10,000 population is rural. The problem of most of us I think is in the neighborhood of incorporated towns of 10,000 population and if this study should be divided between inside and outside incorporated towns, it would be helpful.

MR. REEDER: I might say that distinction between urban and rural here

was not intended, although I did mention some data on urban and rural divided on the basis of communities of 10,000 population. Our general recommendations were intended to be based largely upon incorporated and unincorporated areas.

MR. G. H. HENDERSON, *Rhode Island Department of Public Works*. Did the Committee give any consideration to maintenance of sidewalks especially in the rural sections outside of incorporated towns? I have in mind the snow nuisance in winter when there is a considerable mileage of sidewalks which becomes practically useless. The snow is piled on the sidewalk which becomes practically useless. It goes on the sidewalk areas and the people walk on the road. The State police last year made an attempt to force the people off the road but they gave it up after learning that they could not enforce it. There is no other place for people to walk in rural sections when the sidewalks are blocked with snow.

MR. REEDER. We have not specifically recommended concerning that authority or responsibility. We of course did mention the importance of maintenance if sidewalks are to be made usable for the pedestrian.

MR. W. J. COX, *Connecticut State Highway Department*: The problem of sidewalks will unquestionably be with us for a long time to come. It seems to me that the most difficult aspect of it is the question which the committee's report touched on, but not very specifically, as to who is going to pay for sidewalks. I hope that the committee in the continuation of its work will consider this, although the fact must be recognized that conditions vary so widely from State to State that each situation in the

last analysis must be considered individually. Nevertheless it seems to me that the committee should work out a general statement of the principle which should control the apportionment of cost.

In Connecticut in the last session of the General Assembly two years ago, there were several sidewalk bills. No one of them was very well considered. They were introduced by individual members of the Legislature. The Roads, Bridges and Rivers Committee, before which each of these bills was heard, showed very interesting divergence of opinion as to the whole matter of sidewalks. People from the more rural regions which were not particularly impressed with the need of sidewalks stressed the opinion that the motorist had no business to pay for them. The persons who introduced these bills and who were from suburban areas where the need of sidewalks was apparent stressed the fact that but for the motorist the sidewalk would not be needed. It seems to me that the situation is not as simple as either of these statements implies. It is very true that if there were no motor cars, pedestrians could safely walk in the roadway. It is also true if there were not motor cars or motor vehicle revenues, we probably still would have the muddy roadways that we had before the motor car did develop. It seems to me that what the pedestrian is entitled to at the expense of the motorist is as good a place to walk as he would have, had there been no motor vehicle revenues for the construction of highways.

Most of the States now provide a shoulder area, this practice differs I know. In Connecticut we provide a width of from 5 to 8 or 10 ft depending on the traffic. But in all cases the shoulder area is probably comparable to the area the pedestrian would have to walk in if the motor car had not come and led to the development of our roads.

How much of a sidewalk should the motorist be called upon to pay for? Stating the problem another way, how much of the cost of sidewalks, which are locally used, should be borne by the State? People do not often walk ten or a dozen or hundreds of miles. We expect the sidewalk will rarely be used by people walking much more than two miles. It is a local need that is to be met. How much of the cost of any

specific sidewalk should be borne by the whole state and how much of the cost should be borne by the community in which the specific piece of sidewalk is built? Those are the problems which are confronting us when the Legislature convenes next month, and some general philosophy of the financing of sidewalks, it seems to me, needs to be worked out. I know of no organization better qualified to undertake this job than this committee.