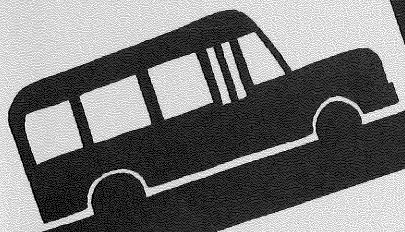
III. School Buses

TRANSPORTATION

SURVEYS



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FOREWORD

How Does Your Transportation System Rate?

In planning and carrying out the transportation service of a district, the safety of the passengers, economy of operation, and the efficiency of the service are of paramount importance.

While the information contained in this publication is primarily concerned with the factors of economy and efficiency, the safety of the pupils is influenced by the adequacy of these other two phases.

The purpose of this bulletin is to assist administrators and transportation supervisors in the evaluation of several characteristics of the pupil transportation system leading to the final objective of program improvement.

PAUL F. JOHNSTON
Superintendent of Public Instruction

TRANSPORTATION SURVEYS

I. Materials and Information Needed

To make a survey for the purpose of organizing a transportation program, including the establishment and description of school bus routes, the basic materials and information listed below are necessary.

1. A map of the school district showing:
   a. The district or proposed district's boundary lines.
   b. The attendance center boundary lines if there is more than one attendance center.
   c. The location of the homes of all pupils to be transported. Colored pencils should be used to identify the pupils in each home. The colors should indicate the attendance center the pupils will attend. Red, blue, and green are the preferred colors. For example, if there are three high school pupils and two elementary pupils living in the same home who will attend different centers, the figure 3 should be placed near the home in one color and the figure 2 in another color. The color red is preferred for high school pupils.
   d. The number of pupils living in towns and villages to be transported. These should also be identified with colored pencils indicating the center they will attend.
   e. A list of buses now owned by the district indicating the capacity of each.
2. Maps should be the official Iowa State Highway Commission, General Highway and Transportation Map. These are county maps drawn to a scale of one inch to the mile. The latest maps available should be obtained so that the present road conditions will be accurately indicated. Maps may be obtained for a small charge from the:

   Iowa Highway Commission
   Map Division, Building No. 1
   Ames, Iowa 50010

3. Indicate the time schools start and dismiss at all attendance centers.

II. Bus Route Principles

After locating attendance centers and the pupils to be transported, it is possible to define bus routes to serve them. In drawing bus routes the principles listed below should be kept in mind. They are based primarily on consideration for the safety, welfare, and convenience of the pupils to be transported. It is recognized that local conditions may require some deviation from them.

1. Routes should be set up on a "shoe-string" or "spoke" basis when feasible. A "shoe-string" or "spoke" route is one which provides for the first pupil pick-up at the point farthest from the schoolhouse and then proceeds as directly as possible to the schoolhouse. In general, the larger the district, the easier it is to organize routes on the "spoke" basis.

   The advantage of the "spoke" route is that it holds to a minimum the number of miles a pupil must ride in the bus. On a pure "spoke" route a pupil will not ride in the bus a greater distance than the distance from the pupil's home to the schoolhouse. The "spoke" route is the most economical if the driver of the bus lives in the vicinity of the first pupil pick-up and works in or near the attendance center during the day.

2. In certain situations, it may be more efficient to use "circular" or "loop" routes. With this type of route, the first passenger who boards the bus in the morning should be the first one to disembark in the evening.

3. Short distances often permit one bus to transport more than one load of pupils. This "double routing" or multiple load service, however, requires careful planning including school scheduling.

4. An "emergency" route should be established for each "regular" route and a copy of the route should be given to the patrons before the school term begins. When weather or road conditions dictate that it is not safe to travel on other than hard-surfaced roads, an announcement can be made by radio or other means that the "emergency" route will be used on that particular day or days. The patrons can then arrange to have their children meet the bus at a designated point.

5. If possible, routes should be arranged so that pupils need not cross a heavily traveled road to either board the bus or after being discharged from the bus. (Note: It is illegal for a school bus to stop on a highway with four or more lanes to load or unload pupils who must cross the highway, except where there are official traffic control devices or police officers.)

6. The size of buses contemplated should be governed by road conditions and the density of pupil population. If the time required to make the route is within reasonable limits, the number of pupils on the route is sufficient, and the road surface is good enough, a sixty or over passenger bus is warranted. The larger bus will, of course, if fully utilized, result in a lower per pupil cost.

7. Service should be from the driveway entrance, insofar as possible, for all pupils transported. However, the stops should not be so close that the driver of a school bus cannot legally shut off his flashing warning lights between stops. In suburban areas the designated stops should be established so that students could be grouped rather than having the bus stop at most of the driveways. (Also, see #10.)

8. Maximum riding time for any pupil should be kept within the reasonable limits of 75 minutes for high school pupils, and 50 minutes for elementary

pupils. This is a maximum. A riding time of more than 50 minutes for any pupil should be rare.

A rough "rule of thumb" by which the time required to run a given route can be ascertained is to "double the number of miles and add the number of pupil stops". From this, subtract one minute for each ten minutes of the total time. Thus, a twenty mile route with twenty pupil stops will require about 54 minutes to complete. (20 x 2 + 20 = 60 - 6 = 54.)

9. Routes should be established so that it will eliminate the necessity for school buses to traverse rail grade crossings at unprotected points or where the visibility is obstructed.

10. Bus stops should not be located at points where the clear vision distance in each direction is not sufficient to give the motorist adequate time to stop. The distance will vary in terms of traffic speed at the point involved. At the present time, Iowa law requires at least 300 feet of clear vision. In areas of high speed traffic, however, this is not sufficient.

11. A sufficient number of buses should be provided to transport all pupils without requiring groups of pupils to wait for a bus in the evening after school is dismissed.

12. Where "double routing"* is not feasible, opening and closing hours for the daily program in the elementary schools and the high school in the district should be approximately the same. This means that separate transportation systems for elementary pupils and for high school pupils should be provided if elementary and high school attendance centers are completely separate. Thus, if it is planned to operate a combined high school and elementary center at one location and several additional

*See paragraph #3

elementary attendance centers dispersed in outlying areas of the district, the outlying elementary centers should each have their own transportation system while the transportation system for the one high school-elementary center could transport all pupils attending that center.

13. Considerations for economy should be limited only by requirements for safety and reasonably efficient and convenient service to the pupils to be transported.

It is recognized that a board of education confronted with the task of setting up an operating transportation service, with limited financial resources, may find it necessary to establish general policies which vary somewhat from the above.

III. Feeder Routes

After route locations have been determined, it might be found that several of the routes show spurs on dirt or side roads from one to three or four miles in length to serve several pupils whose homes are on these side roads.

Such spurs may be eliminated and the large shool bus kept on the main road through provision of one or two small feeder buses. These could be eight passenger suburban carry-alls or station wagons. These small units could transport pupils living on side roads to meet the large bus on its main route thus eliminating these extra miles and saving some time for the bus. These feeder units might well be operated by properly qualified high school students who live in the rural areas.

The use of feeder units will permit a more complete application of the "spoke" route principle.

IV. Kindergarten

The Department of Public Instruction recommends strongly that schools offering half-day kindergarten sessions transport the children home at noon as well as to school in the morning. In some areas of the district the concentration of kindergarten children will be sufficient to warrant the use of a conventional school bus for this noon transportation. It is recognized, however, that kindergarten children will be so widely scattered in some areas of the district as to render the use of conventional school bus impractical and uneconomical. To meet this type of situtation we believe that a large school district might find it desirable to add two or possibly three suburban carry-alls or station wagons to its fleet of conventional buses. These small units used for noon kindergarten service could also serve as the feeder buses mentioned in the paragraph above.

V. Administration

To assure proper administration of the transportation program, responsibility for administration must be centered on one individual. In our typical Iowa school district this individual is the superintendent of schools. If a qualified member of the professional staff is available, he might be delegated the responsibility by the superintendent of schools for supervision of the transportation program. Districts operating twenty or more buses could well afford to employ a full time director of transportation, with responsibility under the superintendent of schools, for supervision of the transportation program.

In any case, definite and detailed arrangements should be made for the following:

1. Supervision of maintenance personnel to provide for a repair and maintenance program designed to achieve the utmost in safety, economy, and efficiency.
2. Training and supervision of drivers.

3. Detailed record keeping.

4. Routing of buses.

5. Purchasing of equipment and supplies.

6. Education of pupils, parents, and teachers in their responsibilities and relationships regarding transportation.

VI. Maintenance

A good transportation maintenance program acts to increase economy and efficiency in operation and to reduce the accident hazards. Preventive maintenance doesn't cost - it pays. It also helps to provide an educationally sound transportation environment and thus serves to reinforce the educational program.

Maintenance personnel should include:

1. For a fleet of ten buses, one full time master-mechanic capable of doing, expertly, all necessary repair work including major overhauls.

2. For each additional ten buses, one assistant mechanic capable of competently assisting with repair work and taking responsibility for greasing, oiling, washing, tire repairs, etc.

Adequate maintenance facilities would include a garage located at the main or high school attendance center with one repair stall and one washing and greasing stall.

It should be designed and equipped to handle all major service operations needed by all the buses of the system. A gasoline pump for fueling buses and adequate lubrication facilities should be provided. The facilities should include a heating unit capable of maintaining a temperature of 60 degrees during the winter months, and washing equipment should be provided to keep the buses clean.

One spare bus is recommended for each ten buses in the fleet.

VII. Statistical Information

When making a transportation survey in a proposed district, it is helpful to have information and facts concerning existing transportation systems in the

area involved in the survey. The information listed below is suggested.

1. Total number of buses
2. Average age of buses
3. Average number transported
4. Total number transported
5. Yearly bus route miles
6. Miles of bus travel per pupil per year
7. Total yearly cost
8. Cost per pupil per year
9. Cost per mile of operation
10. Average capacity of buses
11. Average number of pupils riding in each bus
12. Average bus route mileage

VIII. Program Objectives

The objectives of pupil transportation, which should be considered in any survey activity, are as follows:

1. SAFETY - Maximum safety must be provided for the passengers at all times.
2. ECONOMY - Emphasis upon economy should never be stressed to the extent that the system would have to compromise on the degree of safety provided.
3. ADEQUACY - Adequacy of the service provided is synonymous with the quality of service rendered.
4. EFFICIENCY - Efficiency in operation is closely related to the assignment of responsibility. Regulation and control of the operation are necessary to reach this objective.