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ABSTRACT

A summary is presented of a study to determine the building needs of the school transportation operation and to suggest possible uses of aluminum. The report outlines the magnitude of school transportation systems as an indication of buildings necessary to house and maintain equipment. The types of areas needed to fulfill the bus housing and maintenance functions, spatial relationships, utilities provisions, cross-sections and schematic drawings are shown. Emphasis is placed upon flexibility and adaptability to local needs. Data were gathered by questionnaire from 200 school districts; by letter from 48 state departments of education; through analysis of bus chassis manufacturers specifications; from interviews with school bus supervisors, shop foremen, and transportation company officials; and from a survey of the literature. (FS)

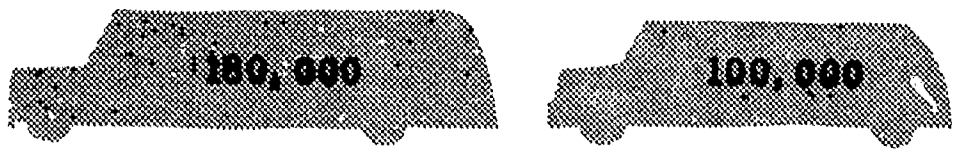
SCHOOL BUS

FACILITIES

SCHOOL
PLANNING
LABORATORY
STANFORD
UNIVERSITY

This Report is a brief summary of a study conducted by the School Planning Laboratory, School of Education, Stanford University, for the Kaiser Aluminum and Chemical Corporation to determine the building need of the school transportation operation and to suggest possible uses of aluminum.

The Problem of school transportation is critical today due to the sheer magnitude of the operation alone. For every commercial passenger carrier on the roads today there are 1.8 school buses in operation.



Present trends foretell continued growth in pupil transportation. Schools are being consolidated or closed in sparsely populated areas, increasing the distance between the child and the school. Expanding suburban complexes are not adequately serviced by local commercial carriers. The need for special transportation of the handicapped is being recognized. Also, more field trips, presentations, and athletic events requiring transportation are being initiated.

School buses are carrying eleven-and-a-half million children. Insuring the safety of these children is vital. Yet, over three thousand are injured annually in school bus mishaps. This figure suggests an increased emphasis on routine preventive maintenance and on expanded driver training programs.

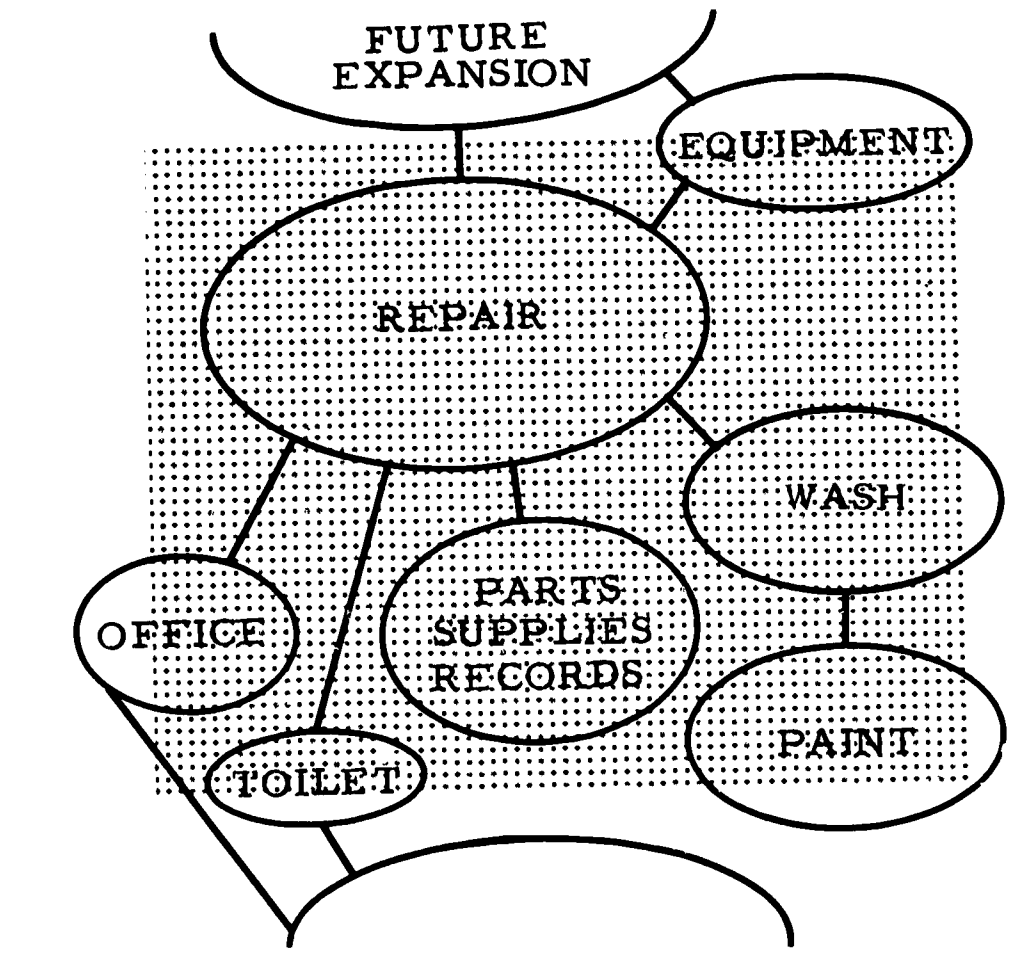
A Solution is to provide a flexible building able to service an existing fleet and be economically expandable to meet increasing needs. In addition to the maintenance facilities the structure should contain space for pre-training and in-service training of the drivers.

Due to the autonomous nature of school districts no one "stock plan" can adequately serve all districts. Even within a given district, policies and practices change and new space requirements arise. For this reason the walls within the main structure are non-load bearing partitions which may be shifted as desired, the one exception is a fire resistant wall around the paint stall.

The size required for any specific area must be computed by the district. Care should be taken to provide for expansion of areas by not using the wall on the side of possible enlargement for working storage. Also, if an additional bay is contemplated the structural poles on that side must be 8' O. C.

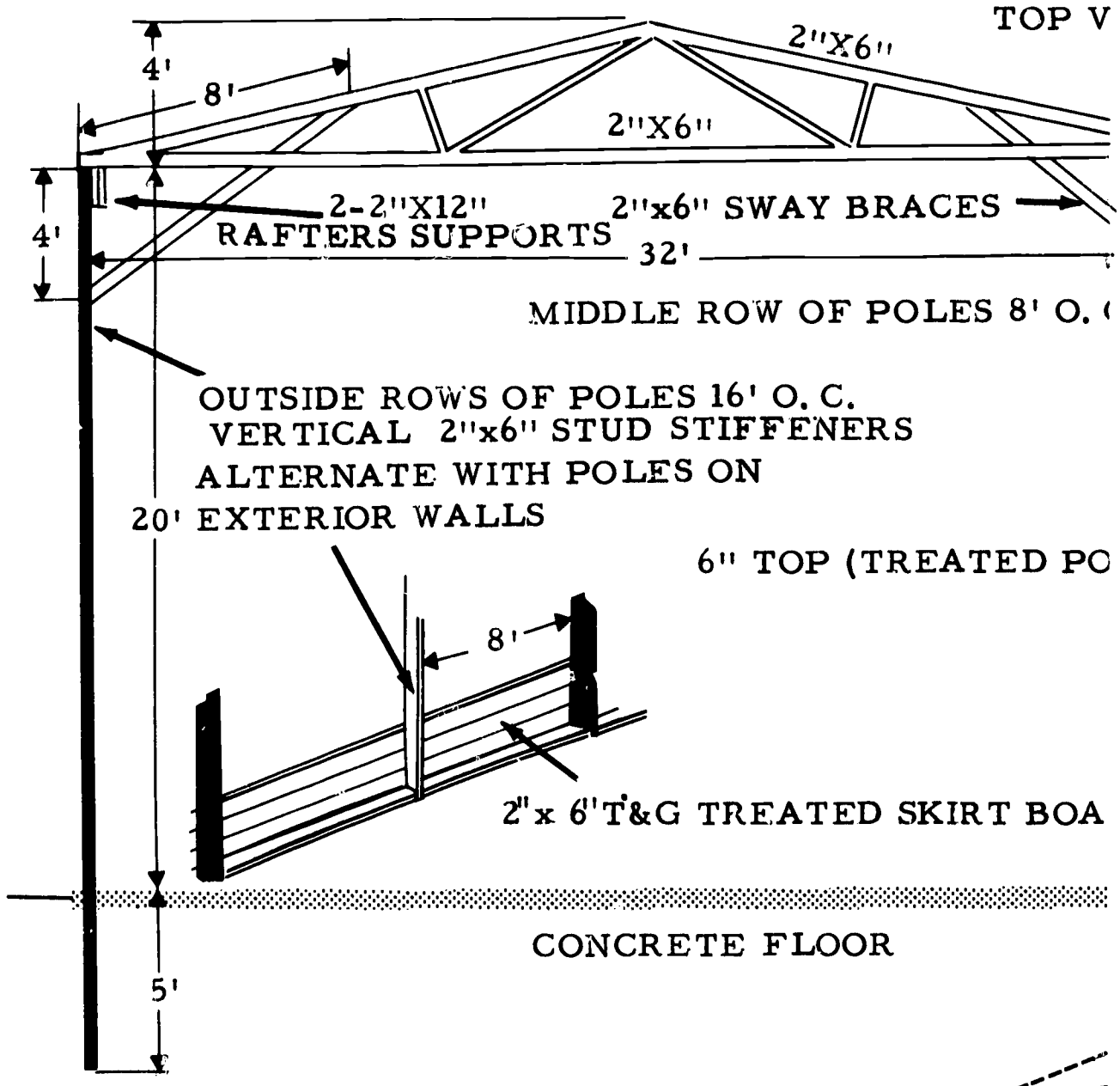
The building does not provide grease pits or hydraulic lifts which would commit an area to one function; rather portable lifts are recommended which may be moved to different locations. An eave height of 20' allows their use even with overhead doors. The eave height of the 16' shed addition would be 16'.

Area Relationships

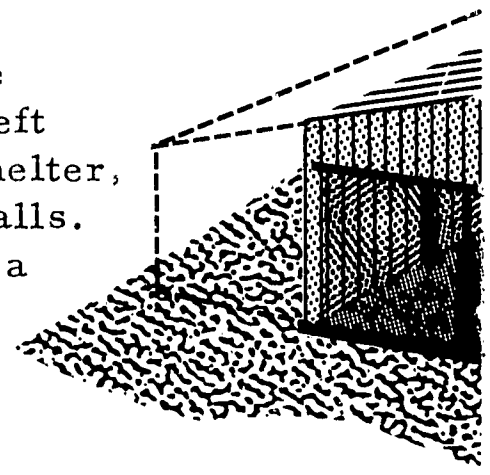


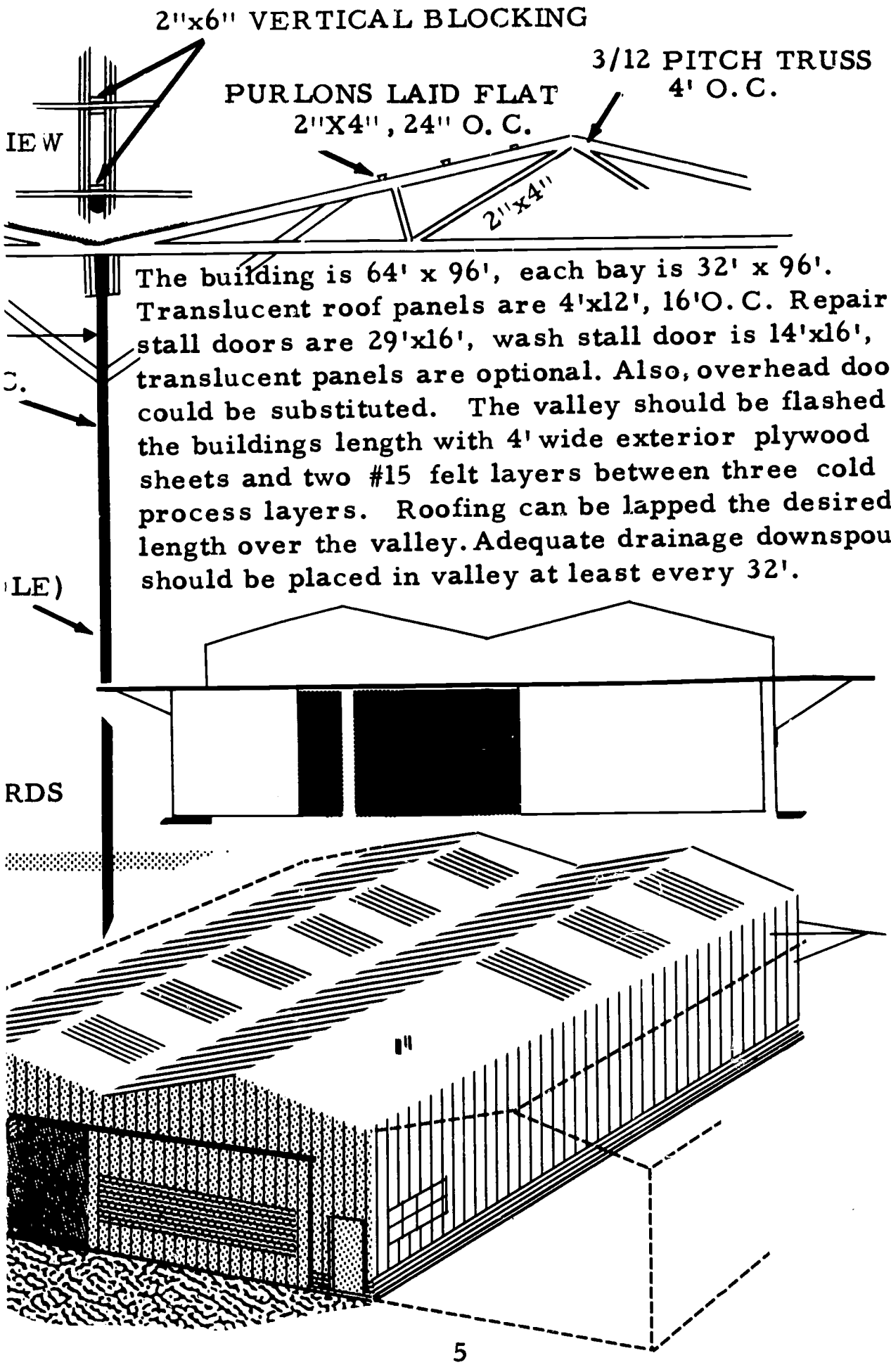
Within the core structure (shaded area) are three repair stalls, a wash and a paint stall. Equipment storage is next to the future expansion building preventing undue congestion around the office and parts section. The latter areas are together to assist inventory recording. The office facilitates visual supervision of the maintenance area and the pump block. If a district intends to combine a warehouse with this structure the office and toilet are accessible from the new building. Space is available between the office and parts-supplies and records section for driver training activities.

Cross Section and Schematic



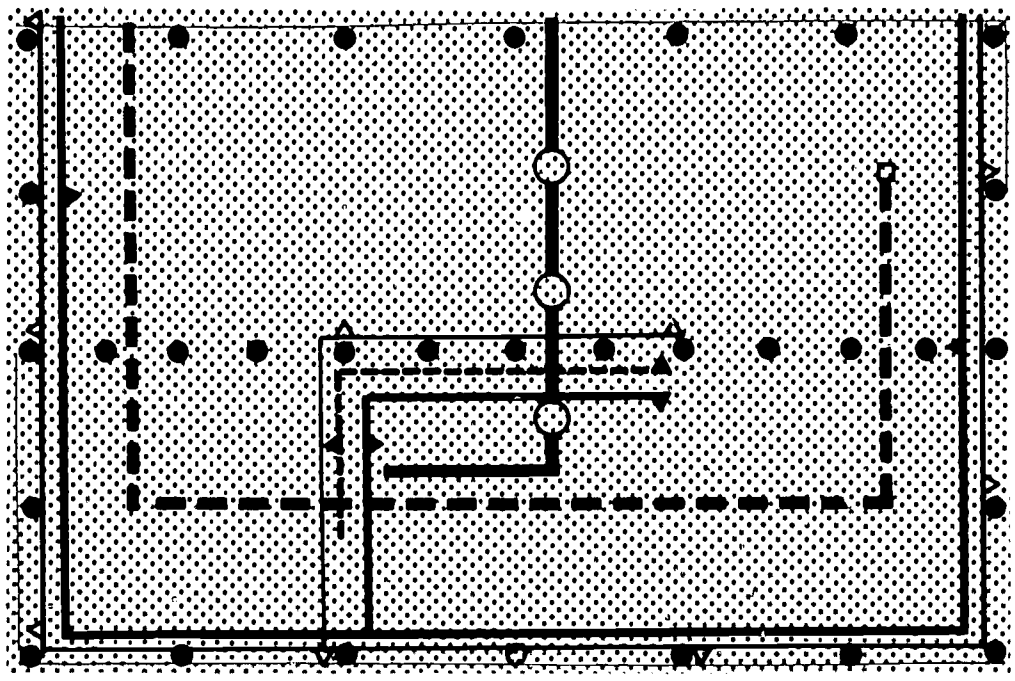
The broken line represents possible additions. The 16'x96' shed on the left could be utilized as an equipment shelter, bus shelter, or additional repair stalls. The bay on the right could serve as a central warehouse facility.





The building is 64' x 96', each bay is 32' x 96'. Translucent roof panels are 4'x12', 16'O.C. Repair stall doors are 29'x16', wash stall door is 14'x16', translucent panels are optional. Also, overhead doors could be substituted. The valley should be flashed the buildings length with 4' wide exterior plywood sheets and two #15 felt layers between three cold process layers. Roofing can be lapped the desired length over the valley. Adequate drainage downspouts should be placed in valley at least every 32'.

Utilities are cast in the floor with provisions for extention into additional facilities. The poles act as protection and mounts for electrical and water outlets, providing each stall with a double electrical outlet and a shared tap. A DC welder would require additional 3-phase current. The hot water serves the wash stall and toilet. The drain is protected by two grease traps and a dirt trap. The exhaust tube serves all stalls.



LEGEND

CONCRETE FLOOR WITH WALL
STRUCTURAL POLES
WATER PIPE WITH OUTLET
HOT WATER PIPE WITH OUTLET
CONDUIT WITH JUNCTION BOX
EXHAUST REMOVAL TUBE
DRAIN WITH GREASE OR DIRT TRAP

Areas suggested for the core-structure are:

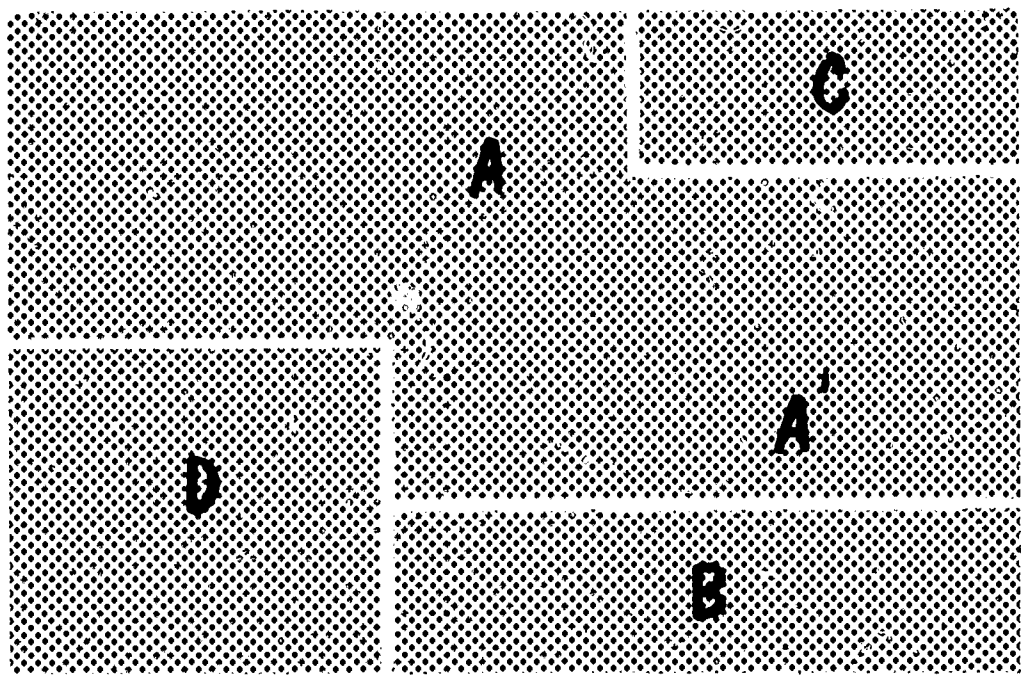
A Three repair stalls, one approximately 16'x60', and two tandem stalls each 16'x48'.

A' A repair stall or a wash stall depending upon district practices (a blacktop outdoor surface would be satisfactory in many localities).

B One paint stall within a fire resistant enclosure, (size dependent upon vehicle specifications).

C A tool storage room and a mobile equipment storage space.

D A space for office, toilet, parts, supplies, records, and driver training activities.



Aluminum uses on and in the structure:

- Rib type roofing and siding
- Flashing
- Nails
- Ridge cap
- Window sash and frame
- Screen framing
- Screen for bus storage office
- Outside and inside corners
- Gable roof edging
- Eave trim
- Reflective foil insulation (optional)
- Gutter or rain carrying system
- Threshold
- Building wire and conduit
- Light reflectors

The data for this study was gathered through five sources: (1) A 200 school district questionnaire; (2) correspondence with 48 state departments (Hawaii and Alaska omitted); (3) an analysis of bus chassis manufacturers' specifications; (4) interviews with school bus supervisors, shop foremen, and transportation company officials; and (5) a survey of the literature.