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ABSTRACT

Because of structural or financial limitations, many existing school buildings cannot be rebuilt to accommodate the flexible space requirements of such innovations as open plan teaching, individualized instruction, or modular scheduling. Schools with such buildings can keep pace with educational change by using relocatables. At the present time, there are few documents on relocatable units; more can be expected as educators explore the possibilities such units suggest for solving temporary space needs. The literature reviewed here reflects the contemporary emphasis on variable learning spaces and suggests a number of creative uses for temporary structures. To gather the documents in this review, Research in Education and Current Index to Journals in Education monthly catalogs were searched from January 1968 through September 1972. (Author)

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Relocatable Classrooms

Alan M. Baas

Educators need no longer consider the relocatable classroom a necessary evil forced on them by pressures of overcrowding and restrictions on capital expenditures. Recent technical and aesthetic improvements make the modern relocatable an attractive and valuable resource for school district planning. In addition to providing space for unexpected enrollment surges, the relocatable suggests a range of solutions to innovative and experimental program needs.

Because of structural or financial limitations, many existing school buildings cannot be rebuilt to accommodate the flexible space requirements of such innovations as open plan teaching, individualized instruction, or modular scheduling. Schools with such buildings can keep pace with educational change by using relocatables. Even where funds are available for new construction, principals may find it more cost-effective to house experimental programs in temporary structures until the programs have been evaluated and their special design needs ascertained.

At the present time, there are few documents on relocatable units; more can be expected as educators explore the possibilities such units suggest for solving temporary space needs. The literature reviewed here reflects the contemporary emphasis on variable learning spaces and suggests a number of creative uses for temporary structures.

TEMPORARY SPACE AND RELOCATABLES

Toronto's Study of Educational Facilities (SEF) staff has made a substantive analysis of the problem of short-term space needs and the use of temporary school facilities as an effective solution to those needs (Metropolitan Toronto School Board 1970). SEF represents a significant effort by urban educators to explore the nature and direction of contemporary educational change and to assess the impact of such change on school facilities. The SEF evaluation of short-term accommodations and relocatable buildings reflects current trends toward incorporating facilities design and construction in a comprehensive approach encompassing all aspects of educational planning.

The document first discusses the nature of short-term accommodations and the various ways in which temporary space needs are met. It describes how to predict that space needs will be temporary rather than permanent, discusses principles of building growth and economies as they relate to short-term accommodations, and identifies how temporary spaces may facilitate planning and programming flexibilities.

Temporary space needs can be resolved in four basic ways:

- temporary increase in space utilization of existing facilities
- temporary allocation of pupils to other schools (usually in connection with an effort to achieve desegregation)
- temporary use of space in permanent structures (through leasing arrangements)
- use of temporary structures (relocatables) in conjunction with existing facilities

In the opinion of the SEF staff, relocatables provide the best response to temporary space needs because modern units can give

TYPES OF RELOCATABLE STRUCTURES

Portables: units that may be moved from one site to another without complete dismantling.

Mobiles: modified trailers, suitable for auxiliary facilities such as demonstration centers, rolling laboratories, and visiting libraries; their "bowling alley" proportions make them inadequate for normal teaching/learning situations.

Demountables: buildings that may be disassembled and moved with a minimal loss of building components; such structures offer complete freedom of design and space accommodation because there are no limits to height, length, or width, except those imposed by the engineering scheme.

Divisibles: structures that are planned to fit together and come apart as large modular building components; they offer the greatest potential for creating the flexible spaces required by modern educational practices.

Ontario Department of Education (1970)

students accommodations equivalent to those offered in conventional buildings without interrupting normal learning processes.

It is suggested that in addition to relieving overcrowded classrooms, the relocatable can serve many vital educational functions. These include expediting the introduction of new programs and policy changes with a minimum of time lost and moneys expended, cost-effective exploring of experimental and temporary programs, accommodating periods of study and research without forcing hasty construction of new buildings or crowded use of existing structures, and updating existing facilities with a minimum of interruption to normal school operations.

A more unconventional use of relocatables involves their participation in what the SEF staff calls "local change in the educational resource mix." The "educational resource mix" refers to a basic principle of the Metropolitan Toronto School Board that all pupils have equal access to available educational resources, including teachers, equipment, built space, and land. Because teachers and equipment are funded through operating budgets, while built space and land are financed through capital expenditures, trade-offs between operating and capital resources are difficult. Funds could be distributed to schools on a per-pupil basis, with the schools determining how to use the moneys. For example, a school, seeing that it could save some money by not hiring another teacher (perhaps through the use of paraprofessional help for less money), could rent a relocatable unit for use in an experimental program. The following year, the school could choose to reverse the process; no longer renting a relocatable, it could take those funds for hiring another teacher or purchasing new equipment.

A survey of principals and teachers within the Toronto area revealed that while relocatables are basically successful as solutions to overcrowding, their real potentials have yet to be adequately explored. This is partly because the majority of existing relocatables are of inferior quality and are ill-suited to meet modern educational needs. Teacher recommendations for interior improvements centered on facilities for water and lavatories, changing and storing of clothes, and general storage. Insulation from outside noise and provisions for air cooling were also considered high priorities.

Both advantages and disadvantages of temporary units relate primarily to their location on the school site. Some teachers prefer the relative isolation of a relocatable because it permits classes to make noise without disturbing others and develops strong class identity. That same isolation, however, demands special solutions to such problems as time lost in travelling, weather conditions, and transporting audiovisual equipment. The separation of teachers from assistants and from other teachers, and certain kinds of supervisory and discipline problems may also make the relocatable a less than ideal solution.

The study notes that as technical and aesthetic improvements make the quality of the modern temporary facility more comparable to that of a permanent school building, site location will continue to be a limiting factor on the overall usefulness of such structures. Although relocatables can be helpful in programming flexibility, the trend toward more frequent and more complex movement between parts of the school suggests that some programs simply cannot be sustained in the isolated environments

produced by the relocatable. On this point, the SEF staff notes:

> The special advantages offered by the portable should be re-examined in the context of this trend towards greater integration within the school. Most of the benefits suggested by teachers and principals involved such concepts as privacy, independence, personal territory, and strong group identity. However, the physical isolation inherent in the portable may not be the best way of achieving these social qualities; it also hinders the intensive interaction among teachers and among pupils that will be an important part of new school programs. Instead, these benefits could be obtained in a number of other ways. A private place could be set aside in the school plant for each teacher and each pupil, to compensate for the security once offered by the classroom. The social atmosphere of the school could encourage experimentation and informality and thereby make the seclusion of the portable unnecessary.

Concluding chapters of the SEF study focus on characteristics of an ideal relocatable that would integrate the benefits of both permanent and temporary structures. Design features of such a facility should include relocatability, internal flexibility, complete integration with permanent buildings, and internal environments of the same quality as those of permanent buildings. Detailed information is given concerning basic design and performance requirements of an ideal relocatable unit. Diagrams show the relationship between permanent and relocatable facilities and the use of relocatable linkage units to facilitate access to main buildings.

An *AIA Journal* article by Haviland (1972) gives relevant information regarding the nature and use of temporary structures. Haviland directs his attention to college and university space needs, but many of his observations apply equally well to the temporary space needs of secondary and elementary schools.

Haviland stresses the need to reevaluate traditional attitudes about building use and temporary space. He identifies four different situations in which temporary facilities are employed:

> **Initial space:** used sometimes to start a school or while waiting to build or renovate more permanent facilities.
>
> **Interim space:** used for new or growing programs while waiting for more permanently assigned facilities.
>
> **Buffer space:** used to house programs that are temporarily growing, contracting, shifting emphasis, or in experimental phases. In these cases, permanent facilities are sought after the program has been evaluated and a permanent commitment made.
>
> **Crisis space:** used where enrollments exceed estimates or when other facilities are suddenly taken from service.

In many cases, he notes, it is the use and not the construction of a building that makes it "temporary." Many so-called temporary facilities have life expectancies of between five and fifty years, and many will never be moved from their original location.

A better understanding of temporary buildings and their uses will result as steps are taken to improve their public image and to evaluate their site location and performance capabilities. As attitudes toward buildings and their uses change, Haviland sees a shift in focus from "*building* new physical resources to *managing* (getting the most out of) what we now have." He predicts the result will be a growing market for incremental or temporary space facilities.

EVALUATIONS AND SOLUTIONS

A publication by the Educational Facilities Laboratories, Inc. (EFL) reviews uses of

relocatables throughout the nation (1964). The EFL document is the result of two years of field research on the temporary facility as an answer to problems of overcrowding, double-sessions, and fluctuating enrollments. The survey scans the problems of relocatables historically, analyzes conditions prevailing at the beginning of the 1960s, and makes projections concerning future use of relocatables. As of 1964, the consensus of school districts was that such units did not yet meet minimum functional, cost, and aesthetic requirements. Appearances and space were too often sacrificed to meet low-cost targets.

A detailed chart displays statistics about twenty-three districts using relocatables. The chart, which identifies types of relocatables, space, foundations, and various cost figures, is keyed to photographs and case studies within the document. Because the design and location of temporary units may vary widely according to local needs, EFL's detailed treatment of individual solutions provides many thought-provoking alternatives to consider.

Also included in the document are guides for calculating costs and dealing with transportation problems of relocatable buildings. A treatment of new unit designs and a discussion of industry's effective use of mobile units supplements the survey. Sketches and plans for a "convertible classroom/commons core" present a solution for linking relocatables to a permanent structure. Design of the core building permits its use for multiple purposes.

Gibson and Eatough (1968) attribute the inferior quality of many existing temporary classrooms to hasty planning by educators and fierce competition among manufacturers. Competition based on price alone tends to prevent major design innovations and propagate a generally low-quality product. The author's discussion of relocatables in California gives reasons for their purchase, public attitudes toward them, possible limitations, and policies regarding their use. They point out that evidence suggests most relocatables are never moved and that actual long-term expenses of such units may be higher than the costs of building permanent structures.

An Ontario Department of Education (1970) document calls for a reevaluation of relocatable facilities in terms of quality, function, aesthetics, and life expectancy. A study of relocatables throughout Ontario reveals that the possibilities for design improvement have not been fully realized, despite widespread use of temporary school facilities. To assist in the design of future units, the authors give diagrams and structural descriptions of basic relocatable types (portable, mobile, divisible, and demountable), and make detailed recommendations for the design of divisible units. Details include surfacing materials and colors, windows, lighting, heating, ventilation, and minimum structural standards. Additional diagrams clarify site placement and arrangement of single and multiple unit relocatables.

American School & University devoted an entire issue (May 1970) to relocatable facilities, including the use of inflatable structures. In that issue, the article, "Relocatables Meet New Challenges," describes portable steel units that serve a variety of instructional purposes, including arts and crafts, libraries, sciences, and vocational education. The article notes that contemporary relocatables have the look and quality of permanent construction.

In another article in the same issue, O'Grince (1970) describes Baltimore's suc-

cess with relocatable units. Many innovations serve to increase the quality of such units. Breezeways to the main building and intercom systems integrate isolated units with the school complex. Interior and exterior porcelain paneling, shatterproof glass, carpeting, and air conditioning provide learning environments equivalent to that of permanent structures. O'Grince notes that Baltimore employs a full-time architectural consultant to coordinate the design and placement of its portables. To alleviate the disadvantage of occupying valuable space, work is now underway on two-story units.

A more recent *American School & University* article, "Planning for Relocatable Buildings" (September 1972), discusses advantages, arrangements, costs, and specifications of contemporary relocatable units. Sites for temporary structures should be planned when designing the permanent school building, thereby providing an optimum relationship between the main buildings and relocatables that might be used in the future. Instead of the usual arrangement of relocatables in a straight row along an existing paved area, several alternative arrangements are suggested. Units might be arranged in clusters to provide natural opportunities for social intercourse as students and faculty pass one another. Another possible variation consists of combining several standard-sized units to form open-plan teaching areas. This alternative can be of particular value where existing permanent buildings do not allow for such flexibility.

Additional information in the article includes recommendations for the writing of performance specifications and a discussion of unit costs. Desired life expectancy, level of maintenance, and relocation costs are the major determinants of total unit costs, which may vary from $4.50 to $30.00 per square foot. The planner is cautioned that utility costs alone may account for as much as half the cost of moving a relocatable.

Two brief articles in *Modern Schools* provide further information regarding temporary structures. One, "Relocatable Classroom Technology" (1971), describes how such units are solving space needs for school officials. The other, "Relocatable School Buildings Have Lost the 'Ugly Duckling' Status" (1970), discusses portable and relocatable buildings ranging in size from one room to an entire school complex.

The most recent information concerning specifications for relocatables must be obtained from their manufacturers. A "Product Information Directory" in *School Management* (September 1972) lists major suppliers of relocatables, together with suppliers of all types of construction materials, equipment, and services of use to education.

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To gather the documents in this review, *Research in Education* and *Current Index to Journals in Education* monthly catalogs were searched from January 1968 through September 1972, using as search terms these descriptors: **Mobile Classrooms** and **Flexible Facilities**. The concept of relocatable buildings is much broader that that of mobile classrooms and narrower than that of flexible facilities. Descriptors are being prepared at this time that will better identify various types of relocatables.

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RESEARCH HIGHLIGHTS

Of the four types of relocatables (portable, mobile, divisible, and demountable), divisible units offer the greatest potential for creating the flexible spaces required by modern educational practices. *Ontario Department of Education (1970)*

Relocatables can expedite the introduction of new programs and policy changes with a minimum of time lost and moneys expended. *Metropolitan Toronto School Board (1970)*

Future relocatables should include provisions for water and lavatories, changing and storing of clothes, and general storage. *Metropolitan Toronto School Board (1970)*

Prices of relocatable units may range from $4.50 to $30.00 per square foot. *"Planning for Relocatable Buildings" (1972)*

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