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ABSTRACT

Several studies have documented the condition of U.S. school facilities from the early 80s to the present. This report provides an overview of these major studies, presenting data that assess school construction over the decades, the levels of deferred maintenance and proportion of local school budgets devoted to maintenance, the condition and adequacy of school facilities, and the average cost of construction and replacement costs of school buildings. Each study indicates that many school buildings are either inadequate to house current student populations, are inadequate for current modes of instruction, or require major repair or renovation. Among the other findings are that the average building was built in 1946 and that deferred maintenance on this average building approached $300,000. It also indicates that nearly 5 million children attend school in substandard buildings and that the funds available for correcting these conditions are often absorbed by non-deferrable expenses such as utility bills. (Contains 15 references). (GR)

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The Condition of America's Schools

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The physical condition of America's school buildings is questionable at best. While publicly supported breakfast and lunch programs signal acknowledgment that hunger can inhibit a child's ability to learn we should also acknowledge that being too warm or too cold, wet or scared may also diminish the effectiveness of even the best teacher.

Several studies have documented the condition of school facilities in the US. In the early 1980s the condition of public primary and secondary educational facilities became an area of concern. In January 1983, a joint report undertaken by the American Association of School Administrators (AASA), the Council of Great City Schools and the National School Boards Association first described the poor condition of America's school buildings. Honeyman and others studied the condition of rural school facilities in 1987, and the Education Writers Association issued Wolves at the Schoolhouse Door in 1988. In 1992, the Texas Education Agency conducted an extensive study of its educational faciities, and in 1993 the American Association of School Administrators issue the results of a follow-up to their 1983 study entitled Schoolhouse in the Red. Currently the US General Accounting Office is conducting a study of school facilities the results of which will be released in 1995.

Each completed study indicates that many school buildings are either inadequate to house current student populations, inadequate to house current modes of instruction or require major repair or renovation. In several cases, the reports document facilities that are unsafe for occupancy by students and teachers and many school buildings are inadequate across all criteria.

The studies document old school facilities, billions of dollars of necessary repairs to existing structures that have not been made -- deferred maintenance, lack of capital improvement funding to implement new instructional programs and lack of compliance with federal and state special needs, health and safety requirements. Just this year twelve Washington DC school buildings were prevented from opening for failing to pass fire code inspection.

Other recent publications have looked at the condition of school facilities in individual instances. Jonathan Kozol's 1991 work, Savage Inequalities, graphically documents substandard facilities in East St. Louis, Chicago, New York City, and Camden, New Jersey, among others. Betsy Wagner and Stephen Hedges wrote of crumbing schools in Cincinnati in the September 12, 1994 US News and World Report, article "Education in decay," citing statistics regarding deteriorating school buildings in New Orleans.

Overview of the Major Studies

School Facilities and State Mechanisms That Support School Construction: A Report from the Fifty States, David S. Honeyman

This study, undertaken in 1988 and updated in 1990,. compiled data on school facilities in rural and small school districts in all fifty states as well as the capital outlay mechanisms available to those districts. The sample was drawn from school districts with an enrollment of less than eight hundred students that are not part of a standard metropolitan statistical area. Data provided included information about the district,

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descriptive and financial, as well as information on individual buildings. The states were divided into eight geographic regions. The regional data will be introduced when each aspect of facility condition is discussed.

The average building reported in this study was built in 1946 for a cost of $745,213. Deferred maintenance on this average building approached $300,000. One-half the districts considered their buildings inadequate for various reasons. Extrapolating the characteristics of the average building, the total cost of deferred maintenance for rural school, nationwide, was estimated at $2.6 billion. Another $18 billion would be required to replace the 50 percent of buildings considered to be inadequate, unsafe, inaccessible or approaching the end of their useful life.

The extent to which districts have already utilized capital outlay capacity substantially inhibits, if not prohibits, a response to these identified facilities needs. The majority of responding districts had already exercised over half of allowable limits for capital outlay and 27 percent of the districts had reached the maximum limit.

Wolves at the Schoolhouse Door, Educational Writers Association, 1989

Thirty-eight states participated in a 1988 survey of school facilities conducted by the Educational Writers Association. The result was Wolves at the Schoolhouse Door, a comprehensive look at the condition of school facilities.

This study defined five ages, or phases, in the life cycle of a school building. Phase One encompasses the first twenty years in which necessary maintenance and changes to the building are minor. In Phase Two, the next ten years, buildings require increasing annual maintenance including more frequent replacement of broken equipment. From years thirty to forty, Phase Three, the need for general maintenance accelerates rapidly. Replacement of major fixtures and building systems are part of the natural course of this phase. The original equipment will generally have been completely replaced. The next to last phase encompasses the next decade, from years forty to fifty. Not only has the building significantly deteriorated by this time, unless well-constructed and well maintained in previous phases, more importantly, teaching methods and residency patterns of the community may have changed; rendering the building functionally obsolete even if it is not structurally decrepit. Phase Five is the final phase during which the building has exceeded its useful life and must be completely renovated or abandoned.

1992 Report on School Facilities, Texas Education Agency, 1992

In 1991, in five million dollar project involving over 100 individuals, the state of Texas inventoried its school facilities. The inventory included 29,000 buildings at 6,000 sites located in an area of over 200,000 square miles. The information collected included description of the site, architecture, major systems and detail of each room including its use, size and utility attributes. A condition rating was assigned based on visual inspection.

This study found that Texas school facilities have an effective age of 19 years. School facilities in core urban neighborhoods had a significantly higher effective ages than facilities in suburban and non-metro fast growth districts. Statewide, the condition of slightly less than 40% of total space was rated fair or lower.

The study made some estimates on the cost of bringing Texas's public primary and secondary educational facilities up to snuff. The estimated cost of: renovating space rated as fair and below; relieving classroom overcrowding; replacing excess portable space, and providing adequate library space and science labs was

nearly $1.9 billion. Add to that another $1 billion to provide sufficient gymnasium space, and nearly $3 billion would be needed to improve the quality of Texas's school facilities.

Schoolhouse in the Red, American Association of School Administrators, 1993

This report compiles all available data on public school facilities and finance, including structural condition, energy and environmental quality concerns. The data shows that nearly five million children attend school in substandard buildings. In addition to the age and maintenance issues raised in the other reports, this report extensively examines issues of indoor air quality and the effect of energy costs. Public schools expended $7.4 billion on utilities in school year 1991-92. Utility bills represent costs that cannot be deferred and increases in usage and rates must be absorbed, in most cases, from the same pool of funds provided for maintenance and instruction.

Summary of the Main Issues

The combination of these studies covers a significant portion of America's primary and secondary educational facilities. Each study agrees that while there is inadequate data on the condition of school facilities, the data which has been analyzed show significant problems. These studies indicate three broad areas of concern regarding school facilities: 1. the condition of existing school facilities; 2. the adequacy of educational facilities; and, 3. the cost of repair and replacement of existing buildings.

Condition relates to the age, maintenance and compliance with health, safety and special needs regulations. While age is usually positively associated with the level of deterioration of a facility, a well constructed, well maintained old building may be in good condition. Deferring maintenance, poor initial construction or both compound and accelerate the natural deterioration of the aging process resulting in structural conditions inadequate for the expected uses of the building. Adequacy relates to enrollment and instructional use. Is a facility of sufficient size and configuration to properly accommodate the students enrolled and to support the types of instruction undertaken? Replacement costs indices model the relationship between the original cost and the future replacement cost of school facilities to indicate present and future problem areas.

Age of School Facilities

Although proportions of old buildings vary greatly from state to state and between school districts within states, almost 30% of all school buildings are approaching the end of their useful life at 50 years. See Table 1. In addition, over 50% of the buildings in each national study were built before 1960 and are now nearly three-quarters through the estimated 50-year useful life of a well constructed and maintained building.

Table 1

PERCENT OF FACILITIES CONSTRUCTED BY YEAR

Prior to 1950

1950 - 1959

1960 - 1969

1970- 1979

1980 - present

Wolves 28% 26% 25% 16% 6% Schoolhouse 30% 21% 22% 14% 11% Prior to 1946 1947 - present Rural Schools 50% 50%

The average date of construction for school buildings in the various regions in the Honeyman report (1990) from the fifty states are shown in Table 2. The findings indicate that buildings are aging as a group and carry the burden of many years of utilization. As expected, the New England Region showed the greatest mean age (1939), and the newest mean year) were found in the Mideast Region (1955) and Southeast (1952.)

Table 2

AVERAGE DATE OF CONSTRUCTION OF SCHOOL BUILDINGS - 1989

Region	Average Date of Construction
New England	1939
Mideast	1955
Southeast	1952
Great Lakes	1947
Plains	1945
Southwest	1946
Rocky Mountains	1947
Far West	1941

Although age is frequently a sign of the condition of a building, construction quality and the amount of regular maintenance are important influences on building condition. The Educational Writers Association (EWA) study showed that many buildings constructed in the 1950s and 1960s have deteriorated more rapidly than most older buildings.

The Problem of Deferred Maintenance

All buildings need to be maintained. In the course of the useful life of any building many structural systems and sub-systems must be monitored and repaired in a timely fashion to prevent the development of more extensive, often irreparable damage The joint report of the American Association of School Administrators, Council of Great City Schools and National School Boards Association (AASA, 1983)

first documented the maintenance gap. One hundred school systems were surveyed demonstrating billions of dollars of deferred maintenance, capital improvement needs and violations of federal and state health and safety requirements. Each of the other major studies have indicated increases in the level of deferred maintenance attributable to school facilities. See Figure 1.

Figure 1

LEVELS OF DEFERRED MAINTENANCE

(Dollars in billions)

Data sources: 1. The Maintenance Gap; 2. The Rural Schools Study; 3. Wolves; 4. School House in the Red.

As shown by the graph, it is evident that the costs of deferring maintenance increase exponentially. The rapid increase over the last eight years may be attributable to the aging of the buildings constructed in the fifties and sixties. These buildings are entering high maintenance phases of their useful life. The growing dollar amounts for deferred maintenance are also be attributable to secondary and, sometimes, tertiary effects of the initial deferred repair, for example, the carpet that must be replaced and wall that must be replastered because the roof leaked.

It is also no surprise that the percent of budget devoted to maintenance by school districts in the US shows an inverse relationship to deferred maintenance levels. See Figure 2. From a high of 14% in 1920, the proportion of budget expended for maintenance has declined steadily to 9.6% in 1960 to 6.7% in 1982 and to 3% in 1992. The increasing levels of deferred maintenance can be partially explained by diminished maintenance budgets.

Figure 2

PROPORTION OF LOCAL SCHOOL BUDGETS DEVOTED TO MAINTENANCE 1920 - 1992

Data for the period 1920 to 1982 from The Maintenance Gap. Data for the period 1992 from School House in the Red

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The Condition of Educational Facilities

The magnitude of the problem of deteriorating and inadequate schools is enormous and the condition of school facilities is rapidly becoming the educational issue of the 1990s. As Honeyman (1990) observed, educational districts throughout the country operate with school buildings that are often unsafe, inadequate for enrollment, and inaccessible to special populations of students. There are serious needs for repairs and renovations that include roofing, air quality, removal of asbestos, and other structural improvements. In addition, state mandates related to reduction in class size, new programs for pre-school

and high risk students, technology and new developments in science lab requirements all continue to increase demands for new and varying types of classroom space. This has resulted in a large proportion of the country's school buildings being in need of repair, renovation, or replacement.

The reported condition of school facilities varies with each of the major studies. See Table 3. However, there are several consistencies in the reported data. Almost 25% of the buildings in each study are inadequate and as the rural study indicated in 1986 7% of the buildings were rated unsafe. The closing of the 12 Washington, DC. schools in September 1994 shows that rural schools are not alone in this area.

Table 3.

THE CONDITION AND ADEQUACY OF SCHOOL FACILITIES

(Data derived from multiple studies)

The Rural School Study - 1986

16% of buildings are inadequate

7% are unsafe - OSHA

34% are not accessible to special populations

48% are acceptable

Wolves at the School House Door - 1988

23,433 buildings (42%) are excellent

18,400 buildings (33%) are adequate

14,259 buildings (25%) are inadequate

School House in the Red - 1993

1 in 8 buildings (13%) are "indignant"

5 million students are in substandard buildings

Students in "poor" buildings are 5.5 percentage points low achievement score Washington, DC Schools

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Replacement Cost

Across the country there is a need for new construction and renovation of many existing structures. The decisions on whether to replace, renovate, or just repair a school facility often depends on many factors such as the current condition of the structure, the increase or decrease in student enrollment, the

condition of the structure, and the economic climate of the community.

In general and as stated above, the local districts are responsible for raising the revenue to fund school construction, and nineteen states have no provision for assisting the local districts in these efforts. Once again, the rural and small schools are at a disadvantage as lower students enrollments, inadequacy of the tax base, and limits that are generally placed on debt inhibit these districts from generating the revenues required to build school facilities.

In Honeyman study (1990), a Replacement Cost Index (RCI) for each building included in the study was calculated. When compared to the sources of contribution to capital outlay, the RCI indicated a relationship between a district's ability to generate the revenues for construction and the condition of those school buildings. The districts that were least able to raise funds were the districts that were in greatest need of funds for construction.

There is a clear indication that the current dollar estimates for replacement of buildings, maintenance, and needed modernization will continue to rise from an already high level, since the study reported the average age of the buildings exceeded forty years with an average building cost of $745,213. School district administrators face difficulties in their financing plans, regardless of the mechanisms used to address the construction and deferred maintenance needs.

Five variables were included in the study for the rural school districts including the relative age of facilities, original cost, insured values, replacement cost, and the Replacement Cost Index (RCI). These provided opportunities for greater insight into age risk factors, inflation, and construction replacement costs

Findings regarding the original cost of buildings, shown in Table 4, indicate that even though a substantial investment was made for the facilities in earlier years, districts have had many years of economical service from these structures.

Table 4

AVERAGE COST OF CONSTRUCTION OF SCHOOL BUILDINGS -1990

Region	Average Cost
New England	$613,852
Mideast	$1,440,000
Southeast	$1,400,000
Great Lakes	$676,649
Plains	$507,048
Southwest	$256,238

Rocky Mountain $913,385

Far West $360,269

The values for replacement cost for facilities are shown in Table 5. The estimates vary from a low of $1.3 million per building in the Southwest to a high of $5.5 million in the Mideast. The mean replacement costs represent large percentage increases. If renovations or replacement on a large-scale were required, the needed funding would produce a heavy tax burden. (Honeyman, 1990)

Table 5.

ESTIMATED REPLACEMENT COST OF SCHOOL BUILDINGS -1990

Region Replacement Cost

New England $2.5 million

Mideast $5.5 million

Southeast $3.7 million

Great Lakes $2.9 million

Plains $2.3 million

Southwest $1.3 million

Rocky Mountain $2.3 million

Far West $1.9 million

The analysis of the data indicates that, in some cases, the mean value of additions and improvements are greater than one-third of the replacement cost of the building. This analysis further indicates that many buildings had been enhanced through the years, which could affect the overall condition of the building.

Using the RCI, it has been shown (Honeyman 1985,1990, Burns,1989, Lopez,1992) that the condition of a facility worsened as the indexed value decreased, and this meant that the possible burden to the district for future repair and/or replacement also increased. The potential range of RCI values went from zero to greater than one, with a low index value indicating both need and potential cost. A value greater than one would indicate a building where improvement and repair costs have exceeded the cost to replace the facility. In Table 6 the computed mean values by region show midrange to low ratios, data that would be

consistent with findings for age and the condition of buildings in the study.

Table 6

AVERAGE REPLACEMENT COST INDEX FOR SCHOOL BUILDINGS

Region	Cost Index
New England	0.33
Mideast	0.39
Southeast	0.51
Great Lakes	0.40
Plains	0.40
Southwest	0.51
Rocky Mountain	0.42
Far West	0.39

Analysis of the results demonstrate the difficulty and size of the problem. Many school facilities throughout the country are in need of repair, renovation, or replacement. However, there is also a significant inability of these communities to generate the funds necessary for school construction (Wood, 1986.) While there are many contributing factors to this funding issue, states must constantly examine the issues surrounding school facility and capital outlay equity.

In order to approximate the costs of replacing school buildings in the United States information from several studies were combined to indicate the magnitude of the problem. (The reader is warned that the results of this analysis only approximate the true situation, i.e., they are approximations.) To estimate the replacement costs for school buildings, states were divided into regions used in the Honeyman study (1990). The estimate of the replacement cost for each region was applied to the states in that region and multiplied by the number of school buildings in each state and the percentage of buildings reported (Wolves) as "inadequate," and the number of buildings defined as "less than good" (estimated from the results of both the Wolves and Honeyman studies.) These values were summed by region and totals calculated for the entire country. Where data were missing regional and national averages were applied to make the calculation. The results of this calculation are reported in Table 7.

Table 7

ESTIMATED REPLACEMENT COSTS FOR BUILDINGS DESCRIBED AS LESS THAN

ADEQUATE* AND LESS THAN GOOD**.

As the results reported in this table indicate the is an estimated need for $71 billion for "inadequate" school facilities in the United States. Inadequate may describe school buildings which need immediate replacement since they are too old, too small, unsafe, or do not support contemporary instruction (Wolves.) For the buildings reported as "not good" the total cost of replacement exceeds $148 billion. These buildings include the inadequate buildings and those that will need replacement in the near future. These buildings could be described as being in poor condition, inaccessible to disabled populations and detractors to effective instructional delivery (Honeyman and Wolves.)

Conclusions and Equity

The condition of facilities of rural schools are a major concern, because the communities are faced with extraordinarily high costs of facilities in comparison to other educational expenditures the lack of state assistance for school facilities in many states . Many school districts are facing great opposition to providing the needed adequate and exemplary facilities, are often confronted by patrons that do not understand the facility needs, and subsequently have had to face reduced great reductions in funding for capital outlay and interest. While school finance literature regularly discusses adequacy and equity issues, there is a small but increasing amount of research that is addressing a fiscal neutrality as applied to school facilities

As the literature indicates that there is a growing need for modernizing renovation and replacement, there is also cumulative research analysis that indicates the direct relationship between wealth and facilities, that equity may be applied to funds for capital outlay, and that rural communities may be distressed in districts with school buildings older than 40 years that were built with funding from areas with a declining tax base. There is also a growing interest by the courts in the direction of mandating that the replacement or renovation of outmoded physical plants be incorporated into school finance systems. While these are issues that impact all states, they are of even greater significance to those nineteen mostly rural states in which there is no state funding for capital outlay. These states are listed in Table 8 (Honeyman, 1990)

Table 8

STATES WITH NO PROVISIONS FOR CAPITAL OUTLAY - 1990

Arizona Michigan North Dakota

Colorado Missouri Oklahoma

Connecticut Montana Oregon

Illinois Nebraska South Dakota

Iowa Nevada Texas

Kansas New Hampshire Wyoming

Louisiana

The evidence gathered in all major studies including the Texas analysis of facility needs suggests an inverse relationship between a school district's ability to generate funds for facilities and the condition of those school buildings. The school districts with the lower taxing abilities were the districts with the greatest levels of deferred maintenance. Therefore, the districts with the greater needs are the ones least able to pay for needed repairs or replacements.

The methods used by the states for funding of facilities are very diverse, but reliance on traditional revenue sources of local taxing authority and bonding predominates, with lesser funding support systems in use, such as equalized funds and matching grants (Thompson, Wood, and Honeyman, 1994.) But the evidence suggests that facilities continue to be predominately a local concern. The methods used to fund these projects contribute to a greater and continued dependence on local wealth, this also means high levels of unmet facility needs when the district cannot financially support the needed facility development.

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