POLICY BRIEF

Save a Penny, Lose a School:

The Real Cost of Deferred Maintenance

By Barbara Kent Lawrence, Ed.D.

June 2003

Rural Trust Policy Brief Series on Rural Education

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The Rural School and Community Trust (Rural Trust) is the premier national nonprofit organization addressing the crucial relationship between good schools and thriving rural communities. Working in some of the poorest, most challenging rural places, the Rural Trust involves young people in learning linked to their communities, improves the quality of teaching and school leadership, advocates for appropriate state educational policies, and addresses the critical issue of funding for rural schools.


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Introduction

The adage "penny wise and pound foolish" is apt in this case. Routine maintenance often gets shortchanged, as funds are allocated to items that directly impact education. As a result, what should be routine becomes deferred and results in an emergency situation. (Ennis & Khawaja, 2001, p. 1)

When your roof leaks, you fix it if you can afford to because you know that if you don't the consequences will be serious. Unfortunately, many schools in rural districts have leaking roofs, but little or no money for repairs or even proper maintenance. Only a few states support routine school maintenance, and local funds for maintenance and operations are frequently allocated to other uses when money is tight—so the roof continues to leak. Being "penny wise and pound foolish," which is already common practice, becomes especially tempting when funds are restricted.

Proper maintenance is an important issue because deferring maintenance affects the health, safety and morale of everyone who uses the facility, as well as the cost of operations. If the building requires extensive repairs, renovation, or replacement, deferred maintenance may even force its closure in states with facilities policy that sets requirements the existing school or site can't meet.

This policy brief describes the problem of deferred maintenance for school facilities, especially from the perspective of small rural districts. It examines the extent, causes, and consequences of deferred maintenance. The last section suggests recommendations for policy, practice, and funding that can help correct this national problem.

Deferred Maintenance: A National Problem

In 1989, *Wolves at the Schoolhouse Door* exposed the deplorable condition of many public school facilities. Since then other reports have confirmed that too many American schools are unfit places for students, staff, and teachers.[1] The National Center for Educational Statistics (NCES) summed up the situation as follows: "Three-quarters of schools reported needing to spend some money on repairs, renovations, and modernizations to put the school's onsite buildings into good overall condition" (NCES, 2000a, p. iii). Though the methodologies of individual reports and data vary, the cumulative message is undeniable: there are fine school facilities throughout the country, but too many others are in such bad condition that the health and safety of everyone who uses them is affected.

Deferred maintenance is a national problem for many reasons: there are more students than at any time in the nation's history and the population is changing rapidly in many districts; school facilities are aging; and districts are spending less on maintenance than they should and than they have in the past. Many rural districts also are experiencing rapidly changing student enrollment,

School Facilities Get a Grade of D–

In 2001, the American Society of Civil Engineers (ASCE) reported that 36 states list school facilities in their top three areas of concern about state infrastructure. In 2002, ASCE gave schools a D– rating:

> Schools improved slightly, to a D–, from the F they received in 1998, but still post the lowest score of any category. In truth, the improved grade in this category is more for effort than for actual improvement. Communities throughout the nation collectively spend more than 20 billion dollars each year to improve the condition of America's school facilities. Unfortunately, since 1998 the total need has increased from 112 billion dollars to 127 billion, a 14 percent increase (ASCE, 2002).

Introducing the 2001 report on infrastructure, ASCE president Robert W. Bein stated, "When you've got kids in Kansas City attending class in a former boys' restroom, something is desperately wrong….America has been seriously under-investing in its infrastructure for decades and this report card reflects that" (ASCE, 2001, p. 1).

have older schools in need of repair and lack the financial resources to invest in maintenance.

Deferred Maintenance: A Rural Problem

Many rural places are experiencing either a surge in school population or conversely, a dramatic loss of student enrollment. Both conditions put pressure on local districts and affect rural school facilities. Rapid population expansion may be a particularly difficult problem for rural areas close to urban centers. In 1989, Lewis noted that "much of the [student] growth is occurring in formerly rural jurisdictions on the fringes of metropolitan areas. They often do not have the forecasting experience…for rapid expansion of school facilities" (p. 5).

Rural areas experiencing significant population decline face difficulties as well. According to the National Center for Education Statistics, "schools in rural areas or small towns were more likely than schools in other areas to be severely under-enrolled [under-enrolled by more than 25 percent]" (2000a, p. 58). Communities losing students may also be losing revenue under the state aid formula and in a lagging local economy may be reluctant to fund bonds for necessary repairs or new construction.

Changing Places: The Flow of People in Rural America

Between 1994–95 and 1999–2000:

- 22.4% of rural districts had declines in enrollment of 10% or more
- 8.8% of rural districts had declines in enrollment of 20% or more
- 20.9% of rural districts had increases of 10% or more
- 9.7% of rural districts had increases of 20% or more

Source: *U.S. Department of Education, National Center for Education Statistics*, Common Core of Data, Agency Survey, 1994–95 and 1999–2000.

Housing more students increases the cost of maintenance and operations, while a decreased student population generates less revenue. Because funding for maintenance and operations is often one of the few discretionary items in the school budget, administrators may use it to meet other pressing needs. Therefore, deferred maintenance is likely to be a consequence of rapid enrollment change in rural districts.

The Condition of Rural Schools

Reports indicate that rural school facilities are in urgent need of attention.

- In 1996, the General Accounting Office (GAO) reported that "poor conditions exist in many rural areas; one out of every two rural schools had at least one inadequate structural or mechanical feature" and in 1999 NCES confirmed that this was true for 52% of rural schools (NCES, 2000a, pp. 2, 14). Schools in rural areas and small towns were also more likely than schools in urban fringe areas and large towns to report that at least one of their environmental conditions was unsatisfactory (47% compared with 37% (NCES, 2000a, p. v).

- Seventy-eight percent of rural schools reported a need to spend money on repairs, renovation, and modernization to bring their schools into good overall condition. (NCES, 2000a, p. 17).

- Even though a large percentage of rural schools reported the *need* to make repairs, fewer schools in small towns and rural areas than those in central cities reported *planning* for this work (36% versus 48%), "suggesting that the physical condition of those schools may deteriorate even further in the near future" (NCES, 2000a, p. 33).

- Rural schools tend to be older than schools in towns or the urban fringe. Thirty-two percent of rural schools were built before 1950, 38% between 1950 and 1969, 17% between 1970 and 1984, and only 12% between 1985 and 1994–96, the years for which these data are available (NCES, 2000b, p. 168). Thirteen percent of rural schools have a functional age that exceeds 35 years (NCES, 2000a, p. 40). [See the next page for definition of functional age].

• Older schools tend to be located in poorer communities and to have a higher percentage of students who receive free or reduced-cost lunch than newer schools. According to Rowand, only 20 % of schools in which 20% or fewer students received free or reduced-cost lunch were built before 1952. In comparison, "schools with larger percentages of children eligible for free and reduced-price lunch were more likely to have been built before 1950 (29% of schools with 20% to 49% of children eligible, and 34 percent of schools with 50% or more of children eligible) (1999, p.2).

Rural schools also tend to be smaller than urban and suburban schools. During the 1998–99 academic year, the average enrollment of rural public schools in the U.S. was 273 students[2] , while suburban schools averaged 655 students, and central city schools averaged 680 students (NCES, 2003). These data suggest that many students in rural areas attend school in smaller and older facilities in which deferred maintenance has created serious problems. This situation is of serous concern because such schools are vulnerable to being closed when their condition deteriorates to the point that the district must apply for state funds for a construction project.

The Importance of Functional Age

When calculating the value of a school facility instead of chronological age, one must consider *functional* age, defined as the maintenance record and the "age of the school based on the year of the most recent renovation or the year of construction of the main instructional buildings if no renovation has occurred" (NCES, 2000a, p. vi). This is an important issue for rural communities because the NCES reports that smaller schools, on average, tend to have a higher functional age than medium or large schools (NCES, 2000a, p. 50).

Many schools built before World War I were intended as centers of community, built with pride to endure and to offer amenities of natural light and architectural grace. Schools built after 1950 to accommodate a surge in the number of students were often built of inferior materials and not expected to serve for more than a short time as educators expected the tide to ebb.[3] Unfortunately, much of the repair and renovation done during the middle of the twentieth century was also insensitive to the original design of older schools and also poorly constructed with inferior materials (R.Yeater, personal communication, July 9, 2002).[4]

Some characteristics of older rural school facilities should be seen as strengths, not liabilities. First, they tend to be smaller (40% of schools with enrollment below 300 were built before 1950 [Rowand, 1999, p.2]) and voluminous research supports the efficacy of small schools, particularly when they serve economically poorer communities. Second, schools built before the 1950s were often better constructed than those built hastily in the 1950s and 1960s to accommodate what was expected to be the temporary need to provide school facilities for the Baby Boomers. It may, therefore, be wiser to invest in maintaining and renovating older structures than rehabilitating newer facilities that were mediocre from the start. But if the existing facility is in such poor condition that it cannot be renovated, it is usually advisable to build one about the same size on the same site, so that the relationship between a small school and its community is preserved, and expensive infrastructure does not need to be extended to an outlying site. (For more about the value of small schools and the importance of schools as centers of community see the Rural Trust's Web site (www.ruraledu.org).

Maintenance in Decline

Preventive routine maintenance can extend the life of any facility and is, therefore, a good investment. Unfortunately, school districts on average have decreased their investment in maintaining facilities.

> As the nation's school buildings grow older and physical conditions continue to deteriorate, the logical solution would be for school districts to concentrate more resources to improve the situation. However, this is not the case for most elementary and secondary institutions. School districts across the nation are dedicating a smaller percentage of available funds to maintaining and operating the facilities that house America's youth (Agron, 2001, p.1).

In 2002, American School and University (AS&U) reported that for the fifth consecutive year "M&O (maintenance and operations) spending as a percentage of district net expenditures (NCE) continued its slide…sinking to 7.8 percent compared to 8.5 percent the year before" (Agron, 2002, p. 26). In 2002–2003 school year, spending for maintenance and operations sank further, to 7.4 percent of district net current expenditure (NCE) (Agron, 2003, p. 1). The AS&U report is even more discouraging when we consider that allocations for maintenance have been declining steadily for decades, even in times of prosperity, and are particularly vulnerable in times of budgetary constraints.

Deferred Maintenance: A Vicious Cycle

Problems resulting from deferred maintenance don't go away—they just become more costly to repair. In 1995, the GAO "found that district officials attributed declining conditions primarily to insufficient funds, resulting from decisions to defer maintenance and repair expenditures from year to year" (GAO, 1996, p. 3). In 1989, Lewis stated that "while poor construction is the chief malady of post World War II school facilities, the inability to modernize or maintain standards plagues school districts with older buildings primarily in the major cities and more isolated rural areas" (p.16).

Regrettably, this situation is likely to get worse. State and federal mandates for health and safety as well as requirements to meet Elementary and Secondary Education Act (ESEA) standards have absorbed money that might have funded maintenance and renovation projects. At the same time, costs of maintenance and operations are increasing. Lewis (1989) pointed out that "eating up maintenance budgets are the costs of fuel oil in schools where heating systems have not been replaced, higher overall usage in the building, and changing health and safety requirements, among many reasons" (p.16).

States that are stressed in times of deficits will likely reduce outlays for school facility maintenance. In Arkansas, for example, an official projected that "the biggest effect, facility wise, [of the money cut from public education] will be the reduction of funds allocated for maintenance projects. I anticipate that in the majority of the districts the only maintenance projects funded will be those that have to be done in order to continue with normal activities. Preventative maintenance will be cut to the bare minimum if not eliminated all together" (D. Floyd, personal communication, December 1, 2001).[5]

Table 1.

Maintenance and Operations Expenditures Over the Decade: Spending on Maintenance and Operations As a Percentage of Net Current Expenditures

Year Ending	Percentage
1993	9.0%
1994	9.2%
1995	9.1%
1996	9.6%
1997	9.6%
1998	9.4%
1999	9.1%
2000	9.0%
2001	8.5%
2002	7.8%
2003	7.4%

Source: Agron, 2002, 2003.

A Result of Deferred Maintenance

In 1998, water flooded across the floor of the six-year-old gym and into the main building of the school. Why? A gasket costing $12.00 had failed:

> …the one that sealed the 40,000 gallon backup water tank that lay adjacent to the gym. With proper preventive maintenance, the event might likely never have occurred. Without it, school was cancelled for two days, emergency response cost $26,000, and the gymnasium was closed to school and community users alike for five weeks while $160,000 worth of repair work was performed (School Facility Maintenance Task Force, 2002, p. 9).

Deferring maintenance is very expensive. Torres notes that "deferring repair or equipment maintenance accelerates deterioration of the capital investment and in most instances will cost orders of magnitude more to repair when the repair is finally performed than if it were repaired when first detected" (2000, p. 11). Because the money for repairs is rarely included in the operating budget, schools must find other sources to fund such projects, which is usually difficult and often impossible.

Reduced funding affects the quality of maintenance in many ways. Schools may be reluctant to follow manufacturers' recommendations if equipment seems to be functioning properly, but neglecting routine maintenance may reduce the life of the machinery and systems, increase the cost of operating them, and decrease their level of performance (Torres, 2000, p. 11). Maintenance personnel may receive less training both before and during their employment, and fewer people are responsible for more work. For example, the average number of square feet maintained by custodians in public schools across the country increased from 22,222 to 23,985 in school year 2000–2001, and to 24,167 for 2001–2002. The square feet maintained per maintenance worker escalated from 82,349 to 89,000 from 2000–2001 to 2001–2002, and to 95,120 square feet in 2002–2003 (Agron, 2002, p. 32; Agron, 2003, p. 3). Roughly half of the states do not require regular and independent assessment of school facilities. With reduced funds, districts may be unable to hire outside professionals to evaluate the condition of their facilities and will rely on assessments by state health and safety inspectors, which may be infrequent and superficial.

The connection between good maintenance and reduction of the cost of operations is clear when one considers energy consumption. Money to pay utility bills usually comes from the maintenance and operations budget so high costs for energy usage drain money intended for routine and preventive maintenance and repairs, which, if completed, would reduce consumption. Investing in routine maintenance (such as cleaning filters, retrofitting and other conservation practices) would save money that is now literally "going up in smoke."

In 1992, *Schoolhouse in the Red* reported that small districts were less likely than larger districts to have an audit of energy use or a program in place that would save energy. When utility costs exceeded the amount in the budget, 40% of the nation's districts covered utility bills with money from the maintenance allocation, which further reduced performance of routine and preventive maintenance tasks. High energy bills and implementation of unfunded government mandates such as asbestos abatement also absorb money from the maintenance budget, creating a vicious cycle. Deferring maintenance reduces air quality, causes breakdowns in infrastructure and mechanics, and higher energy

A Third World School Facility in a First-World Community: Lund High School in Nevada

An article entitled "Rural Schools Are Crumbling," which appeared in the *Las Vegas Sun* in April 1999 describes the condition of a rural school that parallels conditions in the third world.

> Lund. The building resembles something straight out of the Dust Bowl. The roof sags like an old man's shoulders. Large scabs of cracked paint flake off the sides. The floor, its wood arthritic and worn, groans underfoot. A gust of wind brings a hoarse cough from the walls, a rasp of structural emphysema.
>
> But of course, this isn't the Dust Bowl. This is rural Nevada, and the haggard, decades-old building is not an abandoned lean-to, but the science classroom at Lund High School….
>
> "The state for years has ignored what's been going on with rural schools," Lund Principal Hugh Qualls said. "Because of that, you have kids here who are receiving a Third World education as far as the kind of structure they're in. I've been to Central America, Honduras, Guatemala—and I'm, telling you, they have better school facilities than you see here" (Kuz, 1999, pp. 1–2).

consumption, which of course leaves even less money available for maintenance (Hansen, 1992, p. 19). This cycle can only be broken when energy costs come down as a result of good maintenance and conservation practices, retrofitting, or a change in fuel prices.

Schools at Risk

As noted earlier, schools built during the 1950s and 1960s were often poorly constructed. These buildings are particularly susceptible to water damage, which can result in build-up of molds producing spores, mycotoxins, and other "volatile organic compounds" (VOCs). Mycotoxins and VOCs are the allergens most toxic to human beings, and so tiny that they are easily transported by the HVAC system (Torres, 2000, p. 11). Molds can spread quickly and damage not only the occupants of the facility, but the facility itself.

Impact of Poorly Maintained Facilities

The condition of poorly maintained facilities can affect the health and safety of children and adults who use them, as well as their morale and academic performance.

Health and Safety Impacts

Conditions in too many schools are simply dangerous. Schools that have oiled-wood floors, no fire-breaks within the studded walls, faulty wiring, rickety stairs, leaky roofs, rotten ceilings or sills and other structural defects are hazardous to the health and safety of everyone who must use them: students, teachers, administrators, parents, and community members. However, many problems can be addressed with renovation and preventive maintenance—they need not condemn an older school facility to the landfill.

Environmental conditions within schools such as molds, mildew, poor ventilation, and build-up of toxins affect health. Children are particularly vulnerable to health problems because their bodies are growing and they breathe in more air per pound of body weight than adults. Inadequate, poorly maintained systems that fail to provide pure air may cause asthma attacks, drowsiness, inability to concentrate, and lethargy. The U.S. Environmental Protection Agency (EPA) states that "asthma is the leading cause of school absenteeism due to a chronic illness, accounting for over 10 million missed school days per year," and the American Lung Association concurs (Lyons, 2001, pp. 1–2).[6]

Schools are more densely occupied than offices and contain many sources of pollutants such as laboratory chemicals, cleaning supplies, chalk dust, molds, building materials and even furnishings. The GAO reported in 1995 that, "more than half of U.S. Schools have deficiencies that adversely affect indoor air quality (IAQ)" (GAO, 1995; Lyons, 2001). Schools have been closed temporarily and even permanently because of poor ventilation, which is not just the result of blocking windows to save on energy bills, but of an inadequate system for cleaning and transferring air effectively. Heating-ventilating-air conditioning (HVAC) systems that

A Result of Deferred Maintenance: Mold

A 2001 *Education Week* article describes moldy conditions in Maine:

> A school in Portland, Maine was closed forever last month. The Romeo, Michigan, district started the school year four days late. And students from a high school in St. Charles, Illinois, now are forced to take their classes at a middle school. The culprit in each case was mold, literally a growing problem in the nation's schools. At least a dozen schools recently have been closed for days or weeks and in three cases permanently, to fight mold. …
>
> Mold in schools is no accident, experts say. It's the legacy, they explain, of cheap construction materials, poor ventilation, and sloppy maintenance that allow leaks to go unchecked or be improperly repaired. "When budgets get tight, the last priority is maintenance, and virtually all of these cases are related to water damage," said Dr. Linda D. Stetzenbach, a research microbiologist at the University of Nevada, Los Vegas (Sticherz, 2001, p.1).

are poorly maintained are often at risk of doing an inadequate job in maintaining good air quality. This obvious connection was confirmed in 1992 by Armstrong Laboratories, which found that one of the two leading causes of poor IAQ was inadequate maintenance of heating, ventilating, and air conditioning systems (Schneider, 2002, p. 3).

Impacts on Staff and Student Morale

In 1988, a study reported "physical conditions have direct positive and negative effects on teacher morale, sense of personal safety, feelings of effectiveness in the classrooms, and on the general learning environment" (Corcoran et al, 1988, p. 12). Other research reports that deferred maintenance that results in conditions such as "peeling paint, crumbling plaster, nonfunctioning toilets, poor lighting, inadequate ventilation, and inoperative heating and cooling systems… affects both the health and morale of staff and students (Frazier, 1993, p.1). "The most frequently cited negative effects [of poor working conditions] were absenteeism, reduced levels of effort, lowered effectiveness in the classroom, low morale, and reduced job satisfaction" (Corcoran et al., 1988, pp. 113–114). Conversely, teachers in a newly renovated facility reported "a renewed sense of hope, of commitment, a belief that the district cared about what went on in that building" (p.12).

For good reason, teachers, students, staff and parents believe that the "depressed physical environment of many schools …reflect[s] society's lack of priority for these children and their education," which undermines their ability to teach and learn (Poplin and Weeres, 1992, p. 16).

The Effect of Poor Conditions on Morale

A study in Maine reported "parallels between an elementary school's steadily deteriorating condition, the teachers' dwindling morale, and the students' drop in achievement" (Black, 2001, p. 2). The report illuminated this through a teacher's perspective:

> "This is what teachers and students in this school contend with every day," the teacher said as she showed pictures of shattered windows, tattered shades, filthy hallways, broken water fountains, splintered classroom doors, and light bulbs dangling on raw wiring. One videotape shows kids ducking leaking water pipes and teachers carrying brooms and buckets.…A third grade teacher shares this experience: "in the middle of a lesson, I had to run for a mop. By the time I cleaned up the room, the kids had lost all interest in their writing journals. I've tried to be cheerful for the kids, but today I broke down and wept" (Black, 2001, p. 2).

Impacts on Student Learning

There is a growing body of research that strongly suggests a correlation between the condition of the school facility and student academic performance. Studies in urban, suburban and rural communities have demonstrated what intuitively one might suspect: the condition of the facility students attend affects their academic achievement (Lewis, 1989; Duke et al.; 1998; Frazier, 1993; Giesen, 1998; Lyons, 2001; Uline, 2000; Schneider, 2002). Students whose schools are comfortable and well-maintained are likely to focus more fully on academic challenges than those who are distracted or depressed by the facility in which they spend a large part of their day. Students dodging leaks from ceilings, using unsanitary and inadequate bathrooms, attending classes in converted storerooms, and breathing unhealthy air cannot accomplish as much as their peers who attend well-lighted, clean, attractive and well-furnished schools.

The Effect of Poor Conditions on Student Achievement

Students attending schools in poor condition in Washington, DC "had achievement that was 6% below schools in fair condition and 11% below schools in excellent condition (Edwards, 1991). …Students in a small rural Virginia high school scored as much as five points below students of similar socio-economic status who attended schools that were in good condition (Cash, 1993)," (U.S. Department of Education, 2001, pp. 1–2).

Conditions students noticed (such as poor air quality, lockers, classroom furniture, noise, air conditioning and substandard science facilities) were

more important to them than structural elements simply because they were more obvious. However, underlying problems such as leaks that create mold may have even more detrimental effects on their health and safety.

Research indicates that the quality of air inside public school facilities may significantly affect students' ability to concentrate. The evidence suggests that youth, especially those under ten years of age, are more vulnerable than adults to the types of contaminants (asbestos, radon, and formaldehyde) found in some school facilities (Frazier, 1993; pp. 1–2; Torres, 2000, p. 5). If you can't focus, you can't learn, so students who can't concentrate due to environmental conditions in their schools are at a disadvantage. A study of a high school in North Dakota also found a positive correlation between school condition and both student achievement and behavior (Earthman, 1996). In substandard buildings "there was a higher incidence of suspensions, expulsions and violence/substandard abuse" (American Federation of Teachers, 1997, p.1).

Clearly, the condition of the school facility affects the ability of students, teachers, staff, parents, and community people to enjoy opportunities for teaching and learning that the schools should offer to all. It seems no coincidence that schools in poor condition tend to be in poor districts, which is a reminder that lack of adequate funding for school facilities is also an equity issue.

Losing the School by Deferring Maintenance

Not only does deferring maintenance affect the health and safety of those who use the facility as well as the performance of teachers and students, it also threatens the school itself. Deferring maintenance year after year may cause the building to deteriorate to the point that the district will have to invest in costly repairs or renovation, or even construct a new facility. When this happens the project may have to meet specific requirements in order to qualify for state funding. State policies that may seem removed from maintenance are actually connected because they can force the closing of a poorly maintained school that is not able to meet the requirements they set.

State Facilities Policies

Outdated beliefs about "economies of scale" and cost-effectiveness often shape state and local policies on maintenance, renovation, the minimum number of students per school, and requirements for minimum acreage. Policies and regulation (including zoning laws and building codes) that reflect a bias toward large schools may restrict state funding for facilities projects in small schools. If projects proposed for small schools don't meet the criteria set by these policies, they may not qualify for funding. Without state funding, few small rural districts will be able to proceed with work on their school facilities, and may even have to close.

Maintenance Policy

Few states fund routine maintenance of school facilities, and instead assign this essential responsibility to the local district. Few states even support bonds for maintenance, leaving poor rural communities with limited resources and few alternatives. In fact, policies in many states promote new construction over investing in maintenance or renovation of school facilities simply because states will often provide at least partial support for new construction, but nothing for maintenance (Beaumont & Pianca, 2001). The New York State Comptroller noted:

> There is a built-in fiscal incentive for school districts to avoid prudent maintenance expenditures, and instead let physical structures deteriorate until replacement is the only real option. State aid reimbursement is provided explicitly for capital expenditures at a generous rate, whereas it is not for routine maintenance….Unfortunately, as long as state and local funding policies encourage construction of new buildings rather than appropriate maintenance and renovation of older ones, school districts will not be motivated to explore these solutions (Rubman, 2000, p. 2).

A report from Massachusetts suggests that such policies actually reward districts that defer maintenance with state funding for new buildings (Beaumont & Pianca 2000).

Renovation Policy

Although there is impressive evidence to the contrary, many educators and policymakers still think that bigger and newer are better than smaller and older in terms of school facilities.[7] Some states appreciate the value of their older schools, but policy in many others discourages renovation and even makes it impossible if the cost of a renovation project is estimated to exceed a specific percentage relative to the cost of new construction.

In Ohio if the cost of renovating a school is greater than two-thirds of the cost of building a new one, the district must construct a new facility to qualify for state funding. In Massachusetts the level is 50%, in Minnesota it is 60% and in Washington it is 80% (Beaumont & Pianca, 2000, p.18). In Arkansas, as a "rule of thumb," if the cost of renovation exceeds 50% of new construction and the existing building is older than 50 years, state officials recommend building a new facility (D. Floyd, personal communication, December 1, 2001). Other states (Arizona and Georgia for example) permit renovation of any building only once, and in Pennsylvania "reimbursement for alterations or renovations to an existing building is limited to once every 20 years at a minimum, unless a request for a variance is approved by the Department" (Pennsylvania Department of Education, 2001, p. 1). As recently as 1997, "historic schools in Georgia were ineligible for state funds because they were presumed to be obsolete" (Beaumont & Pianca, 2000, p. 44).

Unfortunately, communities can misjudge the viability of renovating their school facility if they do not have accurate information on which to base a decision. Relatively few architects and planners of school facilities work with older or historic schools, so their training and bias is toward new construction. The fact that architects and construction managers are usually paid a percentage of the cost of the project may make it even harder for them to be impartial judges of the merits of renovation projects, which are likely to generate smaller fees. Moreover, estimates of cost comparing renovation with new construction may omit or underestimate the expense of busing, the value of existing buildings, grounds, and infrastructure, or the value of a school to its community and may overestimate the cost and difficulty of renovation. Failure to accurately assess the cost or value of each of these components biases the equation in favor of new construction (Rubman, 2000, pp. 7–8).

Minimum Number of Students

Some states require that schools meet a minimum enrollment in order to qualify for state aid for construction projects. For example, a K–6 school in Alabama must have at least seven teachers and 140 students and a high school with grades 9–12 must have eight teachers and 240 students in order to be designated as an "approved center" and qualify for state funding. An elementary school in Kentucky must have 300 students, a middle school must have 400 students, and a high school must have 500 students to be eligible for full participation by the School Facilities Commission. In Ohio, a school building must serve no fewer than 350 students and in West Virginia elementary schools must have 300 or more students, middle and junior high schools 450 or more, and high schools 800 (or 200 students per grade) (Lawrence, 2001).

Such minimums discriminate against small schools and discourage investment in maintaining or building them in favor of constructing larger, consolidated schools. As a result, a poorly maintained small rural school may not get funds for repair or renovation of a facility that doesn't meet the minimum number of students required by state law and be forced to close.

Requirement for Large Amount of Acreage

In the same way, requirements for large amounts of acreage for new schools may encourage locating new larger and consolidated schools outside old neighborhoods and existing communities. Many states require or strongly suggest minimum acreage for new schools, which may make it impossible to use an existing site. In South Carolina for example, elementary schools must have a base of 10 acres of land, middle schools a base of 20 acres, and high schools a base of 30 acres, and for each level the state requires an additional one acre for every 100 students.

Availability of land may be assumed in rural places, but it always comes at a price. Providing infrastructure to new sites is expensive and locating new consolidated schools outside of towns may diminish the school-community relationship and promote sprawl. The National Trust for Historic Preservation noted that in the Council of Educational Facilities Planners International (CEFPI) guidelines "expansiveness is taken for granted in most suburban and rural areas, which ignores the fact that small and mid-sized communities might want to keep schools in town for the sake of maintaining vibrant town centers and cohesive neighborhoods." W. Cecil Steward, dean of the College of Architecture at the University of Nebraska, notes that "the public school systems are the 'advance scouts for urban sprawl'" (Beaumont & Pianca, 2000, pp. 17, 19). [8]

Deferred maintenance and loss of a school may seem to be less obviously connected to requirements for large amounts of land than to policies governing minimum school size or prohibitive renovation policy. Lack of land, however, may force closure of a school located in a rural town or village if its facilities need substantial renovation or replacement, and the existing site does not meet state requirements for acreage.

Working with Codes and Facilities Policy

In Ohio, Article 3408 of the Basic Building Code permits a unique opportunity to build an addition to an existing school without constructing a firewall between the two. This is based on the fact that many older schools provide inherent fire protection by the way in which they were originally designed and constructed. Because most school architects are more familiar with requirements for new construction than renovation, few use Article 3408 in evaluating the cost of renovating an older school. In addition, the exception provision in Article 3408 is not widely known and school board members may be unaware of the merits of their older school building. (J. Sandvick, Sandvick Architects, Inc., personal communication, January 31, 2002).

Zoning Regulations and Building Codes

People may assume that older school facilities cannot meet current codes for health and safety, however, often this is not the case. New technology and materials usually make it possible to bring older buildings up to modern codes. In fact, as noted earlier, the original design and quality of construction of older buildings may make them easier to update than facilities built more recently. For instance, older schools are more likely to have basements, which allow access to change plumbing and wiring, while newer schools are more likely to be on slabs that do not (R.Yeater, personal communication, July 9, 2002).

Building codes, though technical and complicated, frequently contain provisions that make renovation of older school facilities possible. The example below shows how one's state's code can be used to the advantage of communities wanting to renovate their schools.

Saving a Penny and Losing the School

As we have seen, when deferred maintenance creates problems that cannot be repaired and instead require extensive renovation of the facility, the project may not qualify for state funding because the estimated cost exceeds the projected price of a new building. In states with policies setting a minimum number of students per building, or a specific amount of acreage, communities will not have the option of building a new school of a similar size in the same location if the facility cannot meet these requirements. In such cases communities will be faced with the tough choice between providing school facilities in poor condition, or closing their small school and building a larger one in a new location. Deferring maintenance can literally make the roof fall in on small rural schools.

Effects of Losing a School

Effects on Students, Parents, and Members of the Community

When a small community school closes, the lives of those who have used it are affected. If students are sent to another school, or a new regional school,

they will have to travel much farther, as will their parents and members of the community who would like to participate in the life of the school. Students dependent on busing may not be able to participate in after-school activities, and neither will it be easy for parents to attend teacher conferences and events at the school.

New consolidated schools are likely to be larger, often much larger, than the existing community schools. A great deal has been written about the problems of large schools—and the benefits of small ones. Interested readers can learn more about this important topic in Rural School and Community Trust publications *Dollars and Sense: The Cost-Effectiveness of Small Schools* and *Lowering the Overhead by Raising the Roof: And Other Rural Trust Strategies to Reduce the Costs of Your Small School* (information available at www.ruraledu.org) and from the National Center for Educational Facilities publications (www.edfacilities.org).

Effects on Communities

Like the roots of a large tree, schools support their communities in deep and extensive ways.

Often overlooked in the debate over consolidation are the many ways in which schools nourish their local communities. Schools contribute significantly to the vitality of local economies and are essential to a community's long-term development potential. Schools foster community cohesion and may increase civic participation. These considerations are especially relevant to small towns weighing the costs and benefits of consolidation (Lawrence et al., 2002, p. 15).

The school is often the major employer in the town and purchases goods and services from local vendors both directly and indirectly. A good small school helps attract newcomers and raises property values in its district. The school is the center of community, anchoring its neighborhood fiscally, socially, historically, and culturally. In 1977, Petkovitch and Ching found that "for rural communities especially, the closure of the local school can leave a gaping void. A case study of Lund, Nevada found that one-third of all community activities took place at the school (Lawrence et al., 2002, p.17). The loss of a school can be devastating to a small town and rural area, eroding the quality of life and people's sense of their own worth, discouraging young people from staying in the area, discouraging investment and thereby hastening decline of the town and area (Lyson, 2002).

The Importance of the School in Sustaining the Community

Research indicates that losing a school decreasing the quality of life in the community:

> In rural North Dakota, researchers (Sell et al., 1996) surveyed residents of eight small towns. Those that had lost their school to consolidation reported declining participation in local organizations and activities. They also rated their quality of life significantly lower than residents of communities that had retained their local schools (Lawrence et al., 2002, p.16).

Recommendations

Deferring maintenance in small rural schools affects the morale, achievement, health and safety of everyone who uses them, and makes the school itself vulnerable to closure. In order to protect people and buildings it is essential to make regular and sufficient investment in maintaining the facility. Unless states and districts address underlying causes of deferred maintenance it is likely that districts will be unable to make maintenance a priority. We make the following recommendations in three areas: policy, practice, and funding.

Policy

The goal of these recommendations is to change legislation and regulations that promote school closings, and to create policies that promote good maintenance of all schools, and renovation of older facilities.

Recommendations for policy changes that directly affect maintenance

1. Require that a percentage of the replacement cost of the facility be spent on maintenance each year or invested in a separate interest-bearing account for the exclusive purpose of maintenance projects. This should be done at both the state and district level.

2. Encourage environmentally friendly policies and practices in building and renovation that promote energy conservation and use of safe materials, which will reduce cost of maintenance and operations. This should be done at both the state and district level.

Recommendations for changing policies that may lead indirectly to the closing of poorly maintained small rural schools

1. Eliminate state policy that requires a minimum number of students per building.

2. Eliminate state policy that disqualifies renovation projects based on an arbitrary formula of cost ratio to new construction.

3. Eliminate unrealistic state requirements for acreage that promote sprawl and make it difficult for schools to stay within the community they serve.

Setting Good Examples

Some states have passed legislation that supports renovation. For example, in August 1997 the Vermont Board of Education adopted a policy stating that "continued use of historic schools is consistent with Vermont's efforts to focus public and private investment in community centers." The policy said the "renovation, including major repairs, and additions to existing school buildings shall be given preference over new school development taking into consideration the educational needs of students and that the costs of rehabilitation do not unreasonably exceed the costs of such new development" (Beaumont & Pianca, 2000, p. 20).

4. Update and simplify state and local building codes and regulations that may be rigid and out-of-date with local needs and modern construction practices. Require that enforcement personnel work with communities in revising, interpreting, and implementing new state and local building codes and regulations.

Practice

The goal of these suggestions is to encourage practices that will give people working in the field of school maintenance specific information and training that will help them do the best job possible, and also to educate the public about the need for good practice in maintenance and operations.

Practice recommendations that directly affect maintenance

1. Create a state training resource and data bank of information for custodians and maintenance workers.

2. Implement regular and ongoing education for custodians and maintenance workers.

3. Promote and support training and education in school maintenance for school board members, educators, architects, contractors and other decision makers.

4. Require regular annual inspection by a certified engineer of conditions in school facilities as they affect health and safety.

5. Require state assessment of facilities by an independent evaluator every five years (or whenever a major change to the facility is proposed).

6. Encourage participation by students under appropriate supervision in maintenance and cleaning.

7. Encourage participation under appropriate supervision of community volunteers in maintenance and repair projects.

Practice recommendations that indirectly affect maintenance

1. Promote renovation of school facilities and conversion of existing buildings as schools. When no alternative to new facilities is feasible, use principles of responsible growth and environmental sensitivity in the setting and design of new schools, as well as non-toxic materials in their construction.

2. Require feasibility studies by independent analysts of the cost of new construction, renovation of existing facilities, and lease or purchase of existing community facilities. Require that these studies be discussed in open community forums before projects are approved.

Funding

Lack of adequate funding is a critical factor in the problem of deferred maintenance, particularly in poor rural districts. Without adequate funding from sources other than local funds, critically important work on school facilities in these communities cannot be accomplished. The state and federal governments must participate in funding maintenance and repair projects particularly in the poorest districts, but without requirements that pressure communities to close small schools. Without sufficient funds, even the best intentions can't be implemented, and many school boards will still be forced to defer maintenance. Schools that are most vulnerable, those in poor rural communities, will continue to be closed unnecessarily.

Funding recommendations that directly affect maintenance

1. Require state contribution to fund maintenance of school facilities, particularly in poor districts.

2. Initiate federal programs to fund preventive regularly scheduled school facility maintenance.

3. Initiate state and federal programs to fund projects that correct deferred maintenance and bring school facilities to an acceptable standard of repair.

Funding recommendations that indirectly affect maintenance

1. Retrofit older facilities to make them energy-efficient.

2. Make energy-efficient use of the facility a priority for staff, teachers, students and members of the community.

Conclusion

Facilities problems in rural schools that aren't addressed may seem to disappear but they don't go away—like molds and mildew they just multiply out of sight. Poor conditions can affect the health and safety of everyone who uses the facility, damage the morale of students and teachers, impair their ability to teach and learn, and threaten the facility itself. Proper maintenance of rural schools is vital not only because facilities are often old, and have suffered deferred maintenance for years or even decades, but because the consequences of improper and inadequate maintenance are so serious.

If a leak in the roof isn't repaired, it can—like the leak in the fabled dike in Holland—wash away the entire structure. If the district doesn't allocate funds to fix such leaks, or do other necessary preventive work and if state policies are predisposed to new construction, deferring maintenance may force the closure of a good rural school. Therefore, a thorough program of preventive maintenance with regularly scheduled inspections is critical.

Though people in many rural communities may want desperately to invest in their schools, often they don't have the financial means to do so. State and federal governments must help. At this time there is little federal aid for repairs and too often state policy is biased toward new construction, which leads to the closing of small schools. We must work for change in these policies, recognizing that for rural communities with limited resources, deferring maintenance on educational facilities, while saving pennies, can result in losing schools.

Endnotes

[1] *Schoolhouse in the Red* by Shirley J. Hansen (1992), *Savage Inequalities* by Jonathan Kozol (1991) and reports by The General Accounting Office (GAO) in 1995–96, the National Center for Educational Statistics (NCES), 2000a, and the National Education Association (NEA), 2000.

[2] Rural is defined here as places with a population less than 2500 outside a metropolitan statistical area (MSA) (NCES, 2003).

[3] In 1989, the author of *Wolves at the Schoolhouse Door* stated that over 50% of schools then in use "were built during the 1950s and 1960s, generally a time of rapid and cheap construction (Lewis, 1989, p. 2). The American Association of School Administrators estimated that "Forty-three percent [of schools] were built during the 1950s-1960s era of cheap energy inefficient construction to meet baby boom needs. Often non-durable, they were not intended to last more than 30 years" (Hansen, 1992, p. 8).

[4] Royce Yeater, Director, Midwest Office, National Trust for Historic Preservation.

[5] Dave Floyd, Coordinator, School Plant Services, Department of Education, Arkansas.

[6] Using non-toxic materials for construction as well as maintenance and cleaning can lower the level of toxicity in the facility, practices the "Green Schools" movement encourages.

[7] Not since 1971 has any education researcher advocated for large schools (Gregory, pp. 1–2, 2000).

[8] Advocates of Smart Growth also point out that schools are an important factor in promoting urban sprawl. "Smart growth is a movement away from sprawl towards growth that uses existing infrastructure more efficiently, is environmentally and fiscally responsible and socially equitable." (www.neighborhoodcoalition.org/).

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