NATIONAL ASSOCIATION OF
STATE DIRECTORS OF
PUPIL TRANSPORTATION SERVICES

Information Report

School Bus Replacement Considerations

Background:

School buses represent the largest bus operation in the country, and provide more trips to passengers than transit buses. There are nearly 450,000 school buses operating in the United States. These buses safely and efficiently transport nearly 25 million children to and from school and school-related activities. In an average school year, school buses provide approximately 10 billion student trips and have the best safety record of any vehicle on the road. School buses come in various designs and capacities. Some are constructed on van chassis and carry less than 20 passengers. Others are built on unique school bus chassis and can carry nearly 90 passengers. Additionally, school buses across the country have numerous differences in terms of their standard and optional equipment. The school bus fleet is composed of buses of various ages with different mileage accumulations. It is a remarkable fleet of vehicles.

Question:

Are there factors that should be considered when developing and implementing policies for determining how long a school bus should be used for school transportation purposes?

Discussion:

This Information Report is <u>not</u> intended to dictate precise school bus replacement policies, since there are multiple issues at state and local levels that are involved in such decisions. However, the National Association of State Directors for Pupil Transportation Services believes the timely replacement of school buses must be a planned process. The information contained in this report is intended to provide insight into the factors (safety, efficiency, environmental, maintenance, operational conditions, etc.) that are involved in making decisions concerning school bus replacement policies.

Available funding is likely the single most important consideration in determining when school buses are replaced. That being said, there appear to be at least two scenarios that should have an impact on decisions concerning school bus replacement.

First, whenever there is a <u>significant</u> improvement in the federal standards for the safety, fuel efficiency or exhaust emission requirements of school buses, it appears reasonable to establish a policy with respect to timely replacement of the older buses with newer school buses. A good example of this occurred in April 1977 when the

National Highway Traffic Safety Administration issued a set of stringent Federal Motor Vehicle Safety Standards for school buses. Since then, the federal government has maintained a policy that pre-1977 school buses should be replaced at the earliest possible time. Fortunately, most states and local school districts no longer operate pre-1977 school buses, and the few that remain typically are used as "reserve" or "back-up" school buses. Other examples include the diesel emission requirements implemented in 1988 and the substantial changes to the school bus emergency exit and exterior mirror requirements made in the early 1990s.

The determination of what constitutes a "significant" improvement is something that must be defined by those that choose to incorporate this concept into their logic for determining when to replace a school bus. For some improvements, it is likely that a consensus of what constitutes "significant" could be achieved easily. For other items, it may be impossible to get everyone to agree on the importance of the improvement.

It is reasonable to assume that there will be continued improvements in the Federal Motor Vehicle Safety Standards that apply to school buses. Some of those improvements will likely apply to passenger safety, while others may be directed at avoiding crashes, and still others to driver safety. At the same time, federal requirements and recommendations with respect to fuel efficiency and vehicle emissions will likely continue. Unless school bus replacement plans are developed and implemented, these improvements in safety, efficiency and cleaner air will not reach their desired goals in a timely manner.

Second, whenever the operating and maintenance expenses on a school bus, or group of school buses, reaches a certain level, it appears that the better economic decision would be to purchase a new bus rather than continue to maintain the older school bus. This is the classical cost/benefit analysis. Do the benefits of buying a new school bus offset the costs?

It is widely accepted that it is more costly to operate and maintain older school buses than newer school buses. However, the vehicle age at which the total operating costs of an older bus versus a newer bus becomes intolerable is not an exact science. In the mid-1980s, independent studies of annual school bus operating costs were conducted in California and Washington. Both studies reached the same conclusion – after 12 years of use, the annual operating costs of Type C and D school buses began to increase significantly and continued an annual increase each year thereafter.

A January 2000 study of life cycle costs for Type D school buses in South Carolina indicated that 15 years should be adopted as the cycle for school bus replacement. The study also noted that school buses that accumulate mileage more quickly, such as the special needs school buses in South Carolina, should have their life cycle cost analyses based on mileage accumulation not age.

No studies of life cycle costs for Type "A" and "B" school buses were found. Since these types of school buses are of a lighter duty design, it appears likely that they would have slightly shorter anticipated lifetimes than Type "C" and "D" school buses.

While those studies suggested a "rule-of-thumb" for large school buses in general, it is clear that maintenance and operating cost data on individual school buses may provide the information needed to better define when individual or groups of school buses should be replaced. For example, reviews of individual school bus maintenance costs may identify buses that can be operated longer or which should be replaced sooner.

It is commonly accepted that good preventive maintenance reduces the frequency and costs of breakdowns and the resulting corrective maintenance. Likewise, the terrain and road conditions over which school buses operate can have an impact on the frequency and cost of maintenance. Additionally, the climatic conditions in the area can impact maintenance costs. The environmental conditions of how and where school buses are stored can directly impact the useful life of various components; especially those made of plastic, rubber or vinyl.

School bus breakdowns result in several problems. First is the cost of towing and repairing the school bus. Second, breakdowns on the home-to-school trip result in loss of classroom time for students, a particularly important point for school administrators. Third, a breakdown could increase the risks to children while they wait in or near the broken down school bus for a replacement bus.

Like any cost/benefit analysis there may be discretion in terms of defining all of the items that fall under the "benefits" category. Clearly reduced maintenance and operating costs are benefits. But what other items are included and how are they calculated? For example, what is the value of having a school bus that has the latest safety or emission features? Does the cost of insurance on the school bus reflect that it complies with the latest federal and state safety requirements? How much does risk management figure into the calculations?

Conclusions

Unfortunately, there is no "silver bullet" answer to these and other questions. However, accurate and thorough records on the operating and maintenance costs (both preventive and corrective maintenance) of all school buses in a fleet will provide the data necessary to analyze and understand costs. Information from insurance companies and risk managers can be obtained that are specific to your state or school district. With solid data and information, it is easier to make informed recommendations and decisions.

Establishing school bus replacement policies is an important activity, since it directly impacts the timeliness of introducing the latest safety, efficiency and emissions improvements into the fleet. The elimination of school buses that do not meet the latest standards or requirements must be planned for within a realistic number of years. Policy makers must realize that school buses will not last forever, regardless of how they are equipped when purchased or maintained during their lives.

Improvements in state school bus specifications must be developed with the objective of improving safety and efficiency, reducing emissions and reducing the operating cost of the bus over the anticipated lifetime. The pupil transportation industry is responsible for the safe and efficient transportation of our children. Accordingly, the timely inclusion of new school bus safety features and new means of improving efficiency or reducing emissions are in the best interest of everyone.

With the previous discussion in mind, the following anticipated lifetimes under normal operating conditions for different types of school buses are suggested:

Type "C" and "D" school buses – 12 to 15 years

Type "A" and "B" school buses – 8 to 10 years

Mileage Considerations:

As previously discussed, the life cycle cost study in South Carolina noted that school buses that accumulate mileage more quickly should have replacement decisions based on mileage accumulation rather than age.

According to data published by the Federal Highway Administration, the average annual mileage for all school buses is approximately 8,000 miles. This average is consistent with the data published by the school bus industry – 450,000 school buses traveling 4 billion miles per year. However, based on discussions with individual state directors and local transportation directors it appears that many individual school buses accumulate much higher annual mileage. For example, school buses in South Carolina average more than 15,000 miles per year. This difference in average annual mileage is likely influenced by the inclusion of spare and substitute school buses in the national averages. Based on average mileage accumulations by school buses in South Carolina, the state believes school buses should be replaced on a 15-year or 250,000 mile cycle.

While higher annual mileage accumulation may be used as a criterion to shorten lifetimes of individual buses, lower than average annual mileage accumulation is not necessarily a criterion to use buses for an extended number of years.

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