

School Bus Maintenance for Administrators and Fleet Manager

The cost of a well equipped diesel or gasoline powered school bus has risen in the past few years to well over \$100,000. The cost of a new electric bus can be three to four times more. This is the new reality of bus purchases to which we are adjusting. Less recognized is the price of annual operation of a school bus. With more careful and informed attention to operating costs, new, more expensive buses can be made to last longer.

A 2022 investigation by the *Maryland Coast Dispatch* broke down the annual cost of operating a school bus in the state of Maryland. Here is what they found:

Repairs and maintenance	\$4,500
Fuel (@ \$490/ tank × 18 fuel-ups	\$9,000
Bus insurance	\$1,000
Taxes	\$1,500
Miscellaneous (cleaning supplies, cell phone bills)	\$1,500
Estimated School Bus Operating Cost	\$17,500

Note that the above calculations do not factor in staff hiring costs, salaries and benefits such as medical insurance, nor costs incurred due to unexpected situations such as accidents or weather emergencies. Using the numbers here as merely a ball-park estimate, it is evident that the cost of operating a fleet mounts pretty quickly.

In 2023, a school or school district that runs a modest-sized fleet of, say, 25 buses can expect to spend close to \$450,000* on operating costs alone! Without a doubt, the top-most question on the minds of school transport administrators, fleet managers and school bus contractors is how to bring down the costs of transportation by school bus.

*[\$17,500 × 25 = \$437,500]

A practical, sustainable solution to lowering school bus transportation costs is to optimize bus maintenance. An effective, five-point strategy includes planned

maintenance, preventive maintenance, improving fuel economy, proactive driver-led maintenance, and automation of maintenance.

In this article, Prismatic Services offers a round-up of all the practices essential for an effective five-point maintenance strategy aimed at significantly reducing the costs of operating a fleet of school buses.

This is not a substitute for maintenance advice from automotive professionals; rather, this series of articles provides a set of guidelines for transportation managers, fleet managers, and school administrators, to kick start the planning of their maintenance operations and point it in the right direction.

1. Planning Maintenance Cycles for School Buses

Besides cost savings, a leading reason for improved bus maintenance is safety. In early 2017, the State Superintendent of the Pupil Transportation Division of Alabama's State Board of Education issued a [show cause letter](#) to the administrators of Montgomery Public Schools (MPS). The reason behind the letter was that 45 of the 258 MPS buses (17%) had failed safety inspections in the preceding months, raising alarm over the safety of students.

Check-up and Inspection Timelines

Effective planning of maintenance relies on timely identification of issues that have either cropped up afresh, or that are likely to crop up soon. The critical first step in maintenance, therefore, is a systematic schedule of checks and inspections of all aspects of the vehicle's structure and functionality.

A competent school transportation/ fleet manager typically recognizes the need for planning and executing school bus maintenance on cycles of different durations. One approach widely used by fleet managers is to schedule checks and inspections in three overlapping cycles: daily checks that are executed by drivers, backed up by detailed, monthly and quarterly inspections by maintenance technicians, during which necessary repairs and replacements are carried out.

The table below provides a sample three-part maintenance checklist that can be modified and adapted to suit the needs of your fleet and transportation requirements. Many of these inspections — particularly the quarterly inspections — are more

dependent on mileage than time. If your vehicles are clocking 3,000 miles a month rather than 1,000, it may be necessary to conduct these inspections at more frequent intervals.

Daily Check	Monthly Check	Quarterly Inspection
• Lights ○ headlights ○ directional signals ○ brake lights ○ reverse lights ○ hazard lights ○ daytime running lights ○ fog lamps ○ license plate light	• Fluids ○ fuel ○ radiator fluid ○ engine oil ○ brake fluid ○ transmission fluid ○ coolant (AC) fluid ○ windshield washer	• Brake System ○ drums ○ rotors ○ brake pads ○ brake shoes ○ auxiliary brake
• Tires & Wheels ○ tire air pressure ○ tire tread (wear) ○ cracks, bent rims ○ loose nuts on hubs	• Filters & Spark Plug ○ air filter ○ oil filter ○ spark plug	• Belts ○ fan belt ○ V belt ○ timing belt ○ serpentine belt ○ AC belt
• Stop Signs ○ sign visibility, integrity ○ signal arm functioning	• Exhaust ○ vent pipe ○ muffler	• Hoses & Clamps
• Doors & Windows ○ front & rear door functioning ○ emergency exit functioning ○ window functioning	• Cabin ○ seat integrity, seat adjustment ○ seat belts ○ first aid supplies ○ airbag functioning	• Axles and CV Joints
• Mirror Integrity & Positioning ○ cross-view mirrors ○ side convex mirrors ○ side flat mirrors ○ interior rear-view mirror	• Emergency Equipment ○ triangles & cones ○ flares ○ fire extinguisher ○ safety instruction stickers	• Electrical & Wiring
• Windshield ○ glass integrity ○ glass cleanliness	• Vehicle Integrity ○ chassis damage ○ undercarriage rust	• Suspension & Shocks ○ suspension

	○ corrosion ○ loose parts	- springs ○ dampers (shock absorbers)
● Driver Controls ○ dashboard meters (speed, fuel, engine RPM) ○ headlight, hazard, fog lamp controls ○ directional signal controls ○ horn functioning ○ windshield wiper controls ○ interior cabin light controls ○ air-conditioning controls ○ defroster controls ○ radio		● Engine ○ battery ○ alternator ○ carburetor ○ radiator ○ water pump
● Overall Check ○ fuel tank filler cap ○ visible scratches ○ visible cracks, dents, holes ○ audible, atypical noises (screeching, groaning, whistling, clanking, etc.)		● Transmission ○ gearbox ○ clutches ○ hydraulic pump ○ input shaft ○ drivetrain ○ mounts

Delegation and Accountability

In addition to creating and following a systematic inspection schedule, planned maintenance requires a clear breakdown of tasks, responsibilities and time-lines. Thus, a successful fleet manager must clearly assign the maintenance responsibilities to each member on the school transportation team, set up a system of accountability and deadlines, and log maintenance task data and completion time. Daily checks, also known as pre-trip inspections, will need to be completed by the bus drivers. Trained and supervised bus mechanics should conduct the monthly and quarterly inspections. They should as well promptly fix any defects uncovered by a driver's pre-trip inspection.

2. Prioritizing Preventive Maintenance for School Buses

At approximately \$4.75 a quart, an oil change after every 7,000 miles as [recommended](#) by school bus maintenance experts is likely to cost between \$133 and \$171 in 2023

(since buses typically require between 28 qts. and 36 qts. of oil). Compare this to the cost of replacing a failed school bus [engine](#) – between \$3,500 and \$14,500; the latter scenario is highly probable when neglected oil changes lead to sludge (oil tar) build-up, in turn causing engine overheating and breakdown.

School transportation pros have long known that running a fleet of buses economically requires a preventive maintenance (PM) approach. In the above described Alabama case of a high safety inspection failure rate, more preventive maintenance would have ensured that easy to fix defects, such as tires with worn-out treads, were corrected before they turned into a safety risk. The reasons for the show cause letter should not have happened.

An effective preventive maintenance strategy goes beyond addressing the 'usual suspects' such as low tire pressure, worn-out treads, oil and fluid leaks, clogged or dirty parts (spark plug, carburetor choke plunger) and so on. It also covers maintenance economics by scheduling timely renewal of parts warranties and incorporates judicious replacement of parts. A better PM program ensures a better bus safety inspection record, avoids breakdowns, extends the life of new, expensive buses, and, most importantly, improves safety for student riders.

This is the first essay in a three part series by Prismatic Services on reducing school bus operating costs. If you would like to receive more informative guidance from Prismatic, please leave your email address below.