

A photograph of an elevator shaft in motion. The elevator car is blurred, indicating it is moving up or down. The shaft is supported by a metal frame with visible bolts and rivets. The background shows a brick wall and a window.

Preventative Maintenance of Elevator Motors: A Cost Analysis

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Introduction

Today's economy, with tighter budgets and narrowing profit margins, means that efficient and reliable operation is crucial to a healthy bottom line, and reductions of downtime and potential liabilities makes smart business sense. For passenger elevators, the ability to deliver intended results in a consistent and predictable manner directly affects planned and unplanned maintenance costs.

When equipment fails, not only is the primary function of the equipment compromised, but other psychological effects have impacts as well, such as the perception of unreliability which can threaten an institution's reputation and call into question their overall integrity.

In the commercial world, however, the most pragmatic argument for preventative maintenance is that of cost savings. Although the exact economic value of preventative maintenance is difficult to determine, one financial statistic is truly staggering. Second only to immediate overhead, (fixed operating costs such as mortgage, taxes, and utilities, etc.) **repair and maintenance costs represent the highest expenditures (as much as 30–50%) within the average business.** In the absence of a consistent preventative maintenance program, overall maintenance and repair costs on mechanical equipment can increase this amount dramatically.

Furthermore, large-scale malfunctions or catastrophic failures are not only dangerous and costly, but most often occur shortly following the repair, replacement, or installation of mechanical equipment. Waiting for a motor to fail before servicing it is simply not a practical option.

Typically, significantly less time and money is invested in preventative maintenance than is recommended by a manufacturer. Unfortunately, in the quest to limit costs, most property managers overlook the fact that preventative maintenance adds years to the operational life of any piece of equipment and drives down long-term costs.

An elevator motor has a standard life expectancy of 25-30 years (with some lasting as long as 50 years). Providing proper preventative maintenance depends largely on the working environment and usage of the equipment. If over this time, the electric motor is not maintained it will most likely fail and need to be replaced at least once (or more times if the same process is followed).

To truly understand the costs, one must compare the expense of a qualified preventative maintenance plan over the motors lifetime, with that of the emergency costs of a replacement motor(s) and any other consequences of its failing. Over the expected life of the motor, if the preventative maintenance is less than the replacement costs and risks of a catastrophic failure, then it makes sound financial sense to implement the preventative maintenance plan. Especially, since a large percentage of electric motor failures are due to highly preventable issues such as lack of proper airflow or misalignment.



An elevator motor's standard life expectancy is about 25-30 years. Proper preventative maintenance depends largely on the working environment and usage of the equipment.

Benefits of Preventative Maintenance

To get a better understanding of the cost benefits of preventative maintenance, some assumptions must be made. Let us assume that over the 25-year life expectancy of a properly maintained motor it will require a major emergency repair every five years, costing \$750 in parts and \$1,200 in labor. With the first repair taking place in year five, and the last one during year twenty, with the motor needing replacement on year 25. In addition, a preventative maintenance contract will cost about \$275 a year for every five-year contract period of the lifetime of the motor, not counting for inflation.

To sum up, over the 25-year lifetime of the motor, the preventative maintenance contract will cost \$6,875; the four emergency repairs will total \$7,800. The initial cost of the motor and its installation is being left out, as it is equal in both of these scenarios.



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HYPOTHETICAL 25-YEAR MAINTENANCE SCENARIO

ITEM	COST / UNIT	TOTAL
Preventative Maintenance	\$275.00/ Year (25 years)	\$6,875.00
Motor Repairs	\$1950.00/ ea. (4 breakdowns)	\$7,800.00
Motor Replacement	\$0.00	\$0.00
		\$14,675.00

\$14,675.00 divided by 25 years is an annual cost, with preventative maintenance, of \$587.00.

Costs without Preventative Maintenance

Without regular preventative maintenance, the elevator motor would most likely need to be replaced at least one time during the 25-year period. Factoring in the cost of a replacement motor in the 25-year period, let us assume that a new motor costs \$5,000, purchase price alone. Installation of the motor will take two mechanics roughly two days of work, costing \$1,600 per day per mechanic, or a total of \$6,400.00. When a motor is not maintained properly it not only tends to fail prematurely, but it also breaks down more frequently.

Let us assume that the unattended motors tend to breakdown every 4 years instead of 5, or 20% quicker. This means that even with a new motor in the mix, there are still four major emergency repairs over the same 25-year period, costing \$750 in parts and \$1,200 in labor. To sum up, over the 25 year standard lifetime period, there will be the installation of a new motor costing \$11,400 and the four emergency repairs totaling \$7,800. However, in this case there is no contractual cost for preventative maintenance.

“Foregoing a maintenance schedule for elevator motors has an impact on tenant profitability, patron satisfaction, and the overall marketability of a commercial building.”

HYPOTHETICAL SCENARIO WITHOUT PREVENTIVE MAINTENANCE

ITEM	COST / UNIT	TOTAL
Motor Repairs	\$19,50.00 / ea. (4 breakdowns)	\$7,800.00
New Motor	\$5,000 / ea.	\$5,000.00
Installation Labor	\$6,400 / ea.	\$6,400.00
		\$19,200.00

\$19,200 divided by 25 years is an annual cost, without preventative maintenance, of \$768.00

Although the net difference in annual cost of \$181 (30%) may seem small, the value becomes significant when considering multiple systems that cost hundreds of thousands or millions of dollars. Not only are there increased intrinsic costs incurred by failing to perform preventative maintenance, but there are also additional less obvious negative ramifications.

Additional Benefits of Preventative Maintenance

Foregoing a maintenance schedule for elevator motors has an impact on tenant profitability, patron satisfaction, and the overall marketability of a commercial building. A building with questionable elevator integrity is going to be less attractive to firms relying on foot traffic, delivery, and other walk-in business. This could have enormous financial implications for a building owner or facilities manager and send financial ripples through many levels of a business.

In addition to primary budgetary considerations from a business standpoint, such as replacement expenses and the extension of operational life expectancy, other noteworthy concerns from a logistical perspective for implementing preventative maintenance are

- Improved passenger safety
- Enhanced energy efficiency
- decreased downtime
- Increased tenant satisfaction
- mitigation of other hazards and expenses

Additional Benefits of Preventative Maintenance



Decreased Downtime

Downtime is dangerous to any business. When tenants and employees have limited or no access to their work areas, their product is not being finished as quickly or completely as it needs to be. A strong-performing motor is critical to minimize damage to the business' bottom line.



Passenger Safety

Regular, preventative maintenance of motors improves overall elevator reliability and safety. As elevator reliability increases, safety increases, which can result in lower insurance costs and legal expenses. In turn, an increase in elevator safety contributes to the reliability of facilities reducing downtime and inconvenience, and enhancing overall tenant satisfaction.



Increasing Tenant Satisfaction

Businesses have a much better chance of thriving when their customers are comfortable, secure, and can move about easily. An increased expectation of safety and smoothly operating elevators responsive to the demands of commerce improve the likelihood of success. Imagine the department store whose customers had to climb up and down flights of stairs with their purchases. Happy customers make happy tenants who are more likely to last longer and renew leases or expand operations. They are also less likely to challenge management, maintenance, or tertiary utility fees.

“Regular preventative maintenance and electric elevator motor efficiency have a direct relationship—the better maintained a unit is, the better it will perform, thus reducing long-term costs.”



Enhancing Energy Efficiency

All mechanical and electrical equipment has an energy efficiency degradation factor. This factor is the amount of energy a machine uses when operating under variable conditions. An electric elevator motor will utilize less energy while providing more output if it is properly maintained. There will be an ultimate reduction of maintenance time and materials, reducing costs further. A regularly maintained electric elevator motor will exhibit less leakage of fluids, have reduced emanations of noise and fumes, and have cooler running temperatures.

Regular preventative maintenance and electric elevator motor efficiency have a direct relationship—the better maintained a unit is, the better it will perform, thus reducing long-term costs. Conversely, an inverse relationship exists between a properly maintained motor and its environmental impact—as motor efficiency increases due to regular preventative maintenance, harmful impacts on the environment will decrease due to a reduction of emissions like vibrations, vapors, sound, and heat.

Additionally, with motor systems consuming 20% of all energy produced in the US alone, it is not only cost effective to maintain

Additional Benefits of Preventative Maintenance

them, but also very prudent. According to The Consortium for Energy Efficiency, energy consumption represents 97% of the total cost to operate a motor. Any reduction in power usage immediately translates to cost reduction.



Mitigation of Other Hazards & Expenses

Preventative maintenance programs provide a reduction in potential failure, reducing the likelihood of other unexpected costs such structural repair and remodel expenditures to facilities.

Should an elevator fail to operate properly, passengers could become stranded and require rescue. If emergency services were to respond to such a situation there could be costly damage to the building or supporting structure. Regularly performed and documented preventative maintenance could help reduce insurance costs and vastly reduce potential unforeseen liabilities in the event of a catastrophic breakdown.

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Conclusion

Ultimately, all discussion for regular preventative maintenance of electric elevator motors points to cost savings. Even a 10% decrease in a multimillion dollar building operations cost can equate to massive savings. Benefits to manufacturers, building owners, property managers, maintenance engineers and tenants can be realized and appreciated at all levels. Increased efficiency, reduced downtime, and improved safety translate to a bottom line with fewer extraneous, avoidable expenses.

Reminder: this guide offers general guidance to preventative motor maintenance. It is by no means a complete analysis of the costs and repairs associated with all elevator motors. If you would like to speak with an expert about the best methods for protecting and prolonging the life of your motor, contact Renown Electric today.

About Renown Electric

About Renown Electric

Renown Electric is a privately-owned company based out of Concord, Ontario specializing in motor management and supply. Founded in 1984, all aspects of electric motor repair, re-manufacture, overhaul, field service, and engineering support are provided by experts 24 hours a day, 7 days a week, 365 day a year.

Renown is an authorized dealer and service representative of most major manufacturers, and can re-manufacture all major AC and DC motors up to 5000 hp. Renown has CSA qualification for the repair and service of motors and generators in hazardous locations as well as ISO 9001 certification. All repairs use the latest computerized testing techniques, and the service offerings include predictive maintenance, vibration analysis, laser infrared thermography, oil analysis, laser alignment and non-destructive testing.

Visit our website at www.renown-electric.com, or [contact us](#) with any questions or for more information any time.



**ENGINEERING SUPPORT PROVIDED 24
HOURS A DAY, 7 DAYS A WEEK,
365 DAY A YEAR**



**CSA QUALIFIED
ISO 9001**



**ALL REPAIRS USE THE LATEST
COMPUTERIZED TESTING TECHNIQUES**