Geared Passenger Elevators

Minimum Equipment Performance Standards and Preventive Maintenance Required Under The Contract

Frequency of inspection shall be as follows: Monthly (or as listed below)

1. Specific equipment performance standards:

    a) Call Backs: Nominally four (4) to possibly six (6), excluding nuisance calls, per year average

2. Minimum expected periodic service - check, oil, or adjust:

    a) Monthly: Ride each car, check operation and correct problems found.

    b) Monthly: Observe operation of control, selector, machine, brake, motor, mg set, clean and adjust as needed. Check lubrication of machine, motor, mg set, and overhead sheaves.

    c) Every four (4) weeks: Check lubrication of door operators and selectors.

    d) Every thirteen (13) weeks: Check waiting times on corridor calls, test and record rectifier voltages of control supply, check car doors and door operator adjustment and check hoistway doors. Check all hoist ropes, lubricate and adjust as required. Lubricate selector tapes or steel air cords and clean as needed.

    e) Every twenty-six (26) weeks: Lubricate (graphite/slipit) pushbutton guides, check overload relays and mark tripping time and date on tag and fasten to relay. Clean and examine Saf-T-Edge, roller guide shoes, lubricate, adjust and replace worn or damaged ones.

    f) Every fifty-two (52) weeks: Clean and check all control stations, car and corridor, clean and check hoistway switches, controllers selectors including all electrical connections for tightness, burning or oxidation. Check all safety equipment to see that it operates freely and lubricate if needed. Full brake check, oil, and adjustment, check worm and gear clearance.

    g) Other: Machine bearings should be drained, flushed, and refilled each year and half, and the door operator gear case every four (4) years.

3. Door and door operation: Frequency of inspection and adjustment shall be covered hereafter.

    a) Car and hoistway doors: Clean and lubricate track and hangers as needed. Check backplate and hanger to door fastenings, and relating devices, to ensure tightness. Check up-thrust adjustment and fastening (normal 0.010" to track), should clearance exceed 0.035" it should be readjusted. Check and lubricate the door closing device, check fastening, set closing adjustment to permit the doors to close without power during door reversal. Door interlock adjustment should be set to permit the latch to drop within 3/8" but preferably less if full closure can be obtained. Check contact setting for pressure and contact wipe. Bottom door guides should be fastened tight and replaced when the panel may be moved in and out by 1/4" or more. Check and tighten non-vision wings or sight guards at each inspection. Car door contact should prevent movement of the car unless the car door is 2" or less from being fully closed.

b) Door operator: check, lubricate, and adjust quarterly. Where gear operators are used, gear oil level should be checked and the unit cleaned and flushed and refilled within five (5) years. Opening motion should be at designed speed with smooth start, slowdown and stop, with particular care being taken to avoid drag in the opening action as the door reaches full open position. Closing time should be adjusted to limit kinetic energy to that specified by the current code, permit reversal within travel and to avoid drift after the electronic door detector, test nudging speed to confirm to code requirements has been activated.

4. Control:

a) Regular inspection and adjustment as outlined herein before. The effects of control fault can be most easily detected for individual car operation by riding the unit and observing operation. At each scheduled control inspection the operation of the relays in the panel in normal service can suggest trouble areas, erratic relay operation or contact sparking. If the control includes solid-state modules or cards these should be checked periodically for loose clips, cold solder joints and open circuits. Touch-up adjustment suggested by these observations can frequently avoid drift off of adjustment and a major tune up, or failure of a more serious nature. Mechanical check of relay operation can best be done with power off testing contact pressure and wipe, as well as friction where relays appear sluggish. At first power cut off check frequent operating relays for overheating by touch. This should be done particularly for relays in the circuit where undue sparking is apparent. At the same time transformers and rectifiers should be checked for heat. The rectifier voltage should be periodically checked and compared to posted values, confirming periodic check and recording variation, if any. Contacts should be found to be clean if contact wipe is sufficient and they should only be dressed if they have developed ridges, blisters, or if they are excessively pitted. Should the condition be beyond correction they should be replaced. On occasion pins or relay fulcrum points may give rough or sluggish relay action and may need slight lubrication or dressing. Proper values of timing relays should be posted on the control cabinet or panel and checked at control inspection schedule. Particular attention should be paid to all overloads and phase failure relays where they are used checking adjustment and freedom of movement. A log of corrections and adjustments of each controller, studied at each scheduled inspection can be a time saver in clearing troubles and preventive maintenance adjustment. Contractor is advised that any burnout and/or fire damage to the elevator equipment due to normal equipment malfunctions or negligence in service or repair is the Contractor's responsibility.

b) Selector: Operation should be observed monthly, lubricating the traveling nut carriage bearings, cams, and shafts as needed, and the ball bearings, hinge pins and lever pins, and the leveling switch magnet cores every six (6) months, with the leveling switch rollers to be lubricated every two (2) months. Tapes should be lubricated every three (3) months and cleaned as required.

5. Machine motors, and motor generator sets:

a) Machine bearings should be checked monthly for oil leakage, throwing away the oil which has dripped from the worm gland (some oil leakage at the gland prevents galding the worm shaft) check the worm gear clearance at the time the brake is dismantled by turning the brake drum to see how far it may be moved before drive sheave moves. On machines which can be reset, gear or worm may have to be recalibrated which should be done on those machines where the movement is 1/2 to 1", i.e. When clearance between worm and gear (normally 0.005") exceeds 0.075". Gear rock is virtually impossible to take out by recalibration and can only get worse. Also note when clearance can no longer be taken up, as we can no longer lower the gear, gear rock cannot be eliminated, and the replacement is inevitable. (worms and gears are not shelf

items and require three (3) to six (6) months lead time). Clean, flush, and replace worm gear oil every 1-1/2 years, examine oil wiper between drive sheave and gear inside the machine to reduce oil seepage to drive sheave. Drive sheaves may be re-grooved but never so deep that the metal below the groove is less than 1/2". If there is any chance that cutting the groove might be getting close to the 1/2" minimum the sheave should be replaced.

b) Machine brake: Should be thoroughly cleaned, lubricated, and checked for freedom of operation, at least once a year. Since this requires dismantling for thorough inspection and lubrication, counterweights should be landed. The brake should be set to handle one hundred twenty-five percent (125%) of full load and was so set at initial adjustment. To retain this setting, compressed length of the brake springs should be measured before dismantling and restored in reassembly. This length should be checked periodically and the spring/springs readjusted as the shoes are brought closer to the brake pulley to compensate for brake lining wear. Lining should be replaced before wear reaches a point where the drum could be scored. Check operating armature and its guide for excessive wear to avoid erratic brake operation.

c) Motor mg set: Check bearings for heating and lubrication monthly, check brushes and commutators for wear and color. Care should be exercised in brush wear, brush pressure and the type brushes used. Using the wrong brushes, the wrong pressure and allowing brushes to get too short will cause excessive wear on the commutator bars and eventually require turning and undercutting. Blow out yearly, check insulation of coils and apply insulating paint every three (3) years. Dry and brittle insulation can result in a burn out and fire. It must be remembered that coils in stock can get brittle and their insulation should be examined and restored as needed.

6. Hoistway equipment:

a) Car and corridor stations: Should be opened up each year for cleaning and the switches each examined for positive action, contact pressure, wear and wipe. All connections should be checked to see that they are tight.

b) Hoistway switches: Should be checked for contact pressure, wear, and wipe, quarterly where involved in the landing of the elevator, annually for all safety equipment, slowdown and limits.

c) Safety equipment: Should be checked for freedom of movement yearly and lubricated as required, with governor and its tension sheave lubricated each quarter, oil buffers should be checked for oil level yearly. Note: should water level in pit rise above buffer reservoir, buffers should be drained, flushed, and refilled.

d) Overhead deflector sheaves: Check lubrication and grooves annually, same stipulation to regrooving and groove depth as for drive sheaves.

e) Guide rails and roller guides: Should be cleaned annually, roller guides adjusted to rail where this is applicable, check guide oilers and refill as required where they are used. Should a safety have set for any reason, rail should be examined carefully for possible scoring and filed as needed.

f) Cables: Should be examined every thirteen (13) weeks. Control cables for cover deterioration which may be corrected by retaping unless the individual wire insulation is affected or major portions of the cover are brittle. If wires are exposed the traveling conductors or control cables should be replaced. When retaping a portion of a control cable, it should be done in such a manner that the ends of the tape do not become loose and hang down where they may become

caught on an object in the hoistway. Guards or pads may be required to cover points which may cause traveling conductor abrasion. If this precaution is taken after your original survey an expensive replacement and time consuming repair might be avoided. Governor and hoist cables (hoist ropes) should be examined for breaks, particularly in the valley of the cable or rope which could indicate internal breakage and ultimate strand separation. Hoist cables (hoist ropes) may need cleaning and on occasion dressing with rope lubricant. Governor cables (governor ropes) should not be lubricated so as to ensure consistent setting of the governor trip. If there is any sign of deterioration of the governor rope, a new rope should be installed and the safety device tested to be certain that the new rope functions properly.