ATTACHMENT 2

PREVENTIVE MAINTENANCE GUIDELINES

Electric and Hydraulic Elevators

1. Preventive Maintenance Site-Visit Frequency:

   1.1 The contractor must perform a preventive maintenance site visit at the frequency stated on the Pricing Page.

2. On each visit, the contractor must:

   2.1 Contact responsible University personnel regarding covered unit complaints.
   2.2 Ride all cars, checking for any unusual noise or operation.
   2.3 Correct all malfunctions and/or complaints noted.

3. As directed by the University, the contractor must perform the following services:

   3.1 Controller
      3.1.1 Observe dispatching, timers, and relays for proper operation.
      3.1.2 Check all controller and supervisory relays and contacts. Replace where necessary.

   3.2 Hoist Machine
      3.2.1 Check sleeve bearing oil.
      3.2.2 Clean dirt and dust from exterior surface of machines.
      3.2.3 Check all sheaves and pulleys in host way including drive sheaves, and rope sheaves for wear and lubricate per manufactures recommendations and replace as necessary.

   3.3 MG Sets
      3.3.1 Renew or reseat brushes as required.
      3.3.2 Clean dirt and dust from exterior surface of MG sets.

   3.4 Signal and Dispatching
      3.4.1 Replace any burned out lamps in the starters control indicator panel, car operating panel, or car, etc.
      3.4.2 Observe dispatching, dispatching intervals, high and low call reversal circuits. Make corrections where necessary.
      3.4.3 Observe operation of car arrival lanterns and gongs. Correct any malfunctions noted.

   3.5 Car
      3.5.1 Check photo cells and safety edges for door retraction and obstruction timing. Replace when requested.
      3.5.2 Inspect car door operator. Clean, adjust, or replace pulleys, shafts, key ways, belts, cams, motor bushes. Lubricate where required.
      3.5.3 Clean door guide channels.
3.6 Pit
   3.6.1 Clean pit and iron work located within the pit.
   3.6.2 Empty drip pan in pit.
   3.6.3 Check operation of sump pump and level switches for proper operation.

3.7 Hydraulic Machines - Pumping Units
   3.7.1 Wipe up any oil residue around machine.
   3.7.2 Maintain oil at proper level in tank.
   3.7.3 Check for excessive leakage around valves and pumps.
   3.7.4 Check oil heater operation and adjust or replace as needed.

3.8 Selector
   3.8.1 Adjust and/or replace selector brushes and contacts.

3.9 Hoistway
   3.9.1 Check hall button operation.

3.10 Jack Assembly
   3.10.1 Checking packing gland for excessive oil leakage. Tighten or repack, if necessary.
   3.10.2 Check plunger for signs of leakage or deterioration. Clean packing gland.

4. As directed by the University, the contractor must perform the following services:

4.1 Selector
   4.1.1 Lubricate selector cable sheaves.

4.2 Hoist Machine
   4.2.1 Observe worms and gears for end play, back lash, thrust, and any bearing wear in machine.
   4.2.2 Renew or reseat brushes as required.
   4.2.3 Clean and/or turn and undercut commutator.

4.3 MG Sets
   4.3.1 Clean and/or turn and under cut commutators.

4.4 Car
   4.4.1 Check alarm bell and communication system.
   4.4.2 Check leveling units.
   4.4.3 Check retiring cam device, chain, dash pots, pivots, fastenings, etc.
   4.4.4 Inspect and clean car door or gate and related parts.
ATTACHMENT 2 (cont.)

4.5 Hoistway
   4.5.1 Check leveling switches and leveling operation.
   4.5.2 Lubricate cup oil type sheave bearings.
   4.5.3 Check hoistway lighting. Replace bulbs where necessary.

4.6 Emergency Operation
   4.6.1 Test car emergency lights.

4.7 Ropes
   4.7.1 Check all ropes, grooves, and hitches and equalize tension.
   4.7.2 Lubricate where necessary.
   4.7.3 Check rope, clamps, sheaves and shackles.
   4.7.4 Check compensating chain or rope and hitches.
   4.7.5 Advise University if ropes or sheaves should be shortened or replaced. Replace as necessary.

4.8 Hydraulic Machines - Pumping Units
   4.8.1 Check tension and wear of “V” belts.
   4.8.2 Inspect flexible hoses and connections.

4.9 Jack Assembly
   4.9.1 Check platen bolts for cracks and tightness.

5. As directed by the University, the contractor must perform the following services:

5.1 Controller
   5.1.1 Check settings and operations of overloads.
   5.1.2 Check controller voltages.
   5.1.3 Check resistor tubes, grids, condensers, etc.

5.2 Selector
   5.2.1 Clean and lubricate selector chains, guides, drives, and drums.

5.3 Hoist Machine
   5.3.1 Check motor connections.

5.4 Car
   5.4.1 Replace non-rechargeable emergency light batteries.
   5.4.2 Check load weighing device.
   5.4.3 Clean car tops and related hardware.
   5.4.4 Check and adjust car door upthrusts.
   5.4.5 Inspect guide shoes and roller guides. Lubricate if required.
   5.4.6 Inspect broken tape or cable switches.
   5.4.7 Check and test all safety devices.
   5.4.8 Check clearance for car safety shoes.
   5.4.9 Check stile channels for bends and cracks. Also, check car frame and support.
   5.4.10 Check car operating panel, controls, and switches. Clean and lubricate when necessary.
ATTACHMENT 2 (cont.)

5.5 Hoistway
   5.5.1 Inspect reed switches.
   5.5.2 Inspect limit switches, contacts, cam alignment.
   5.5.3 Check sheave fastenings, grooves, lubricate grease type bearings.
   5.5.4 Check stiles for cracks, bends, loose nuts, etc.
   5.5.5 Inspect hoistway door guides and door closers.
   5.5.6 Clean door hangers, tracks, and rollers. Adjust upthrust where necessary.

5.6 Pit
   5.6.1 Clean and lubricate governor tail sheave.
   5.6.2 Check oil levels in buffers.
   5.6.3 Clean and lubricate compensating sheave, selector tail sheave.

5.7 Emergency Operation
   5.7.1 Activate fireman’s recall system.
   5.7.2 Test each covered unit’s emergency service.
   5.7.3 Activate emergency hospital service system.
   5.7.4 Test emergency power system.

5.8 Governors
   5.8.1 Clean, lubricate, and test for free movement of all governors. Manually extend governor weights to make sure there is no restriction in motion.

5.9 Hydraulic Machines - Pumping Units
   5.9.1 Lubricate motor bearings.

6. As directed by the University, the contractor must perform the following services. The contractor must perform the initial annual services within 30 days of the beginning of the contract period:

6.1 Controller
   6.1.1 Clean and check fuses and fuses holders, replace when required.
   6.1.2 Inspect dampening motor.

6.2 Hoist Machine
   6.2.1 Inspect brake, brake drum, and drive sheave. Remove, clean, and lubricate DC brake cores. Clean or replace brake shoes if necessary. Check pivot pins for free movement.
   6.2.2 Change sleeve bearing oil.
   6.2.3 Blow out machine with air pressure.
   6.2.4 Check armature or rotor clearance.

6.3 MG Sets
   6.3.1 Blow out machine with air pressure.
   6.3.2 Check armature or rotor clearance.
   6.3.3 Grease roller bearing.
   6.3.4 Change oil in sleeve bearing.
   6.3.5 Check MG set connections.
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6.4 Car
   6.4.1 Check car enclosure steadying device.

6.5 Hoistway
   6.5.1 Check wear and insulation on traveling cables. Check junction box connection.
   6.5.2 Clean hoistway, separator beams, guide rails, door guide channels, etc.