



Elevating and Amusement Devices Safety Division	Ref. No.: 220/07	Rev. No.:
DIRECTOR'S SAFETY ORDER	Date: June 22, 2007	Date:

IN THE MATTER OF:

**THE *TECHNICAL STANDARDS AND SAFETY ACT 2000*,
S.O. 2000, c. 16**

- and -

**ONTARIO REGULATION 209/01(Elevating Devices)
made under the *Technical Standards and Safety Act 2000***

Subject: MONTGOMERY HR ESCALATOR DC BRAKE ADJUSTMENT ALERT
Sent to: All Elevating devices Contractors, Consultants and Owners

The Director, Elevating Devices Regulation (O.Reg.209/01) pursuant to his authority under section 14.(1) of the *Technical Standards & Safety Act, 2000* hereby orders the following:

1. ORDER

- 1.1 On every maintenance visit, to all Montgomery HR Escalators having a DC shoe-type brake, that is maintained by your company, contractors shall perform the brake slide test set out in Box 1 of Kone Escalator Instruction 2007-04 (see attached). Should an HR escalator take more than half a step to stop when running in the down direction under no load, the contractor shall carry out the torque test and check the wear reserve as set out in Boxes 2 and 3 prior to returning the escalator to service.
- 1.2 No later than 90 days from the effective date of this order, contractors shall have completed a brake slide test, a brake torque test and a brake wear reserve check as set out in Boxes 1, 2, and 3 of KONE ESCALATOR INSTRUCTION 2007-04. (see attached)
- 1.3 If oil is found on the brake pad, the brake pad shall be replaced before the escalator is returned to service, and an oil drip guard shall be installed over the brake shoes to prevent future oil contamination.
- 1.4 Every action in 1.1, 1.2 and 1.3 above shall be noted in the log book, together with mechanic's name, signature and date, and, in addition:
 - a) the empty down slide distance shall be noted every visit .
 - b) the brake wear reserve gap shall be noted if adjustments are made.
- 1.5 This order is effective immediately

Roland Hadaller, P.Eng., Director, Elevating Devices Regulation appointed under the *Technical Standards & Safety Act, 2000*

2. NOTES:

- 2.1 If replacement brake pads or complete shoes are installed, the linings must be burnished to achieve full contact with the pulley. Since burnishing may generate excessive heat, ensure brakes cool to ambient temperature before making adjustments per Boxes 2 and 3 of KONE Escalator Instruction 2007-04.
- 2.2 If adjustments are required to the brake, the brake wear reserve as set by the brass adjusting screw (referred to in box 3) shall be checked. The head of this screw may have to be ground down to get the required clearance (min. 0.060" air gap) when the brake is applied
- 2.3 Check that there is equal clearance between upper and lower brake shoes and the brake drum to ensure the brake is not dragging. This clearance can be adjusted using bolts of Stop A and then Stop B, as shown in the drawing of the Montgomery DC Brake.
- 2.4 If adjustments are required to the brake, the brake lifting micro-switch shall be checked and if necessary properly adjusted. The micro-switch operates just as the upper shoe fully opens, in order to reduce the coil voltage and prevent coil overheating. It also holds in the motor contactors. If the switch operates too soon the voltage will drop before the brake is fully lifted. This may cause the pads to drag and excessively wear. If the switch operates too late (or not at all), the run circuit will not latch causing it not to start or shut down.

3. BACKGROUND

Investigations following a recent accident raised concerns that Montgomery DC shoe type brakes may not be able to stop their rated load if not properly set up and maintained. Accordingly, KONE Inc. has issued enhanced maintenance procedures as Escalator Instruction 2007-04, and TSSA has issued this Director's Safety Order.

This Order has been developed in consultation with the Elevating Devices Advisory Council

Head Office Engineering



April 5, 2007

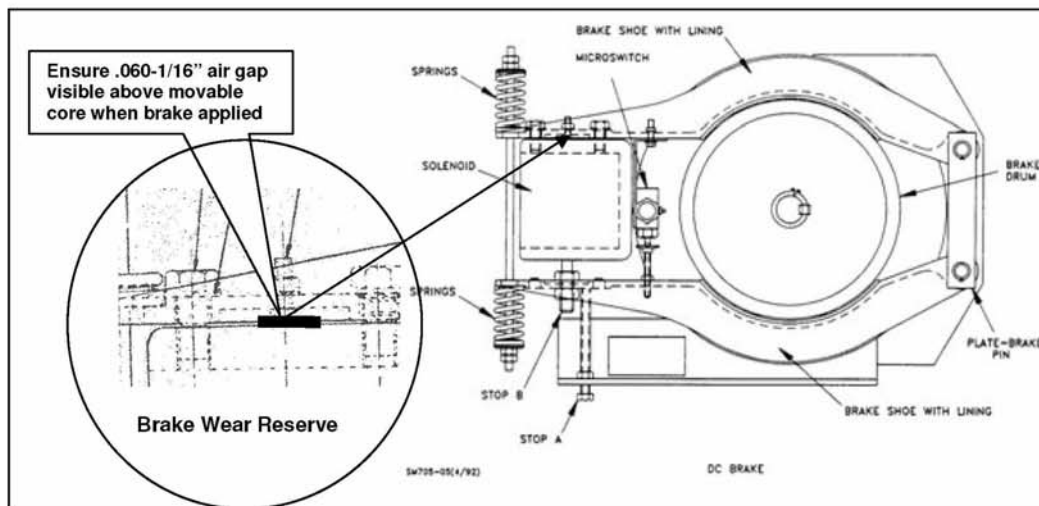
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ESCALATOR INSTRUCTION 2007-04

RE: MONTGOMERY HR ESCALATOR DC SHOE BRAKES INSPECTION AND TEST PROCEDURES

Investigations following a recent occurrence indicate that it would be useful to issue enhanced brake inspection and test procedures for MONTGOMERY HR ESCALATORS with DC SHOE BRAKES, to ensure stopping ability as the linings wear.

MONTGOMERY HR ESCALATOR DC SHOE BRAKE CHARACTERISTICS



End View of DC Shoe Brake

The Montgomery HR escalator DC shoe brake has a single push solenoid. Upon energization, its plunger pushes down on Stop B, opening the bottom shoe until it reaches stop A, then continues to open the top shoe. A micro-switch operates just as this upper shoe is fully open, to reduce the coil voltage and prevent coil overheating. It also holds in the motor contactors.

The empty down stopping slide distance always indicates the holding ability of this brake. The rated empty down stopping distance for this brake is 4-6 inches for 20 ft rise at 90 fpm at room temperature. Under no circumstances may this empty down stopping slide exceed half a step or 8 inches.

1. BRAKE SLIDE - VISUAL CHECK REQUIRED EVERY VISIT

- a) On every maintenance visit to every MONTGOMERY HR ESCALATOR with DC SHOE BRAKES, the maintainer must press the stop pushbutton and visually **verify that the empty escalator running in the down direction at 90 fpm appears to stop within half a step or 8 inches.**
- b) If the observed slide exceeds half a step or 8 inches, the unit must be immediately removed from service, and barricaded to prevent passenger from using it as a staircase, until the brake meets the torque, slide, and wear reserve requirements in boxes 2) and 3) below.
- c) This stop pushbutton check is required by the B44 Safety Code Appendix J.

2. BRAKE TORQUE - TORQUE TEST REQUIRED ANNUALLY

- a) Annually the maintainer must use a calibrated torque wrench to verify that each Montgomery HR escalator DC shoe brake has **45-55 lb-ft torque** as follows:
 1. To access the brake, remove 1 or 2 steps, and then move the step gap over the motor.
 2. Turn off power to the escalator at the disconnect switch on the controller and lock it out.
 3. Ensure that any newly installed pads are properly burnished..
 4. Measure the amount of torque required to turn the brake drum through the closed shoes.
 5. Tighten or loosen both torque springs equally to set torque to 45-55 lb-ft (60-75 n-m).
 6. Lock the spring settings by placing two nuts on both ends of the spring rod.
 7. (This is a good opportunity to also apply a few drops of oil to the holes of the brake shoe castings to lubricate the brake shoe pins and prevent the shoe from locking up on the pin.)
 8. Restore power to escalator at disconnect switch and run the escalator.
 9. Visually verify that empty down stopping slide distance of a standard escalator is 4-6 inches. Re-adjust springs, replace linings, or re-burnish brakes if necessary.
- b) Note this examination in the Log Book, together with maintainer's name and date.

3. BRAKE WEAR RESERVE - CHECK REQUIRED ANNUALLY

- a) Annually the maintainer must ensure that whenever the escalator is stopped and the brake is applied, **the DC brake solenoid core has at least .060" space above it. This is to ensure a space into which the core can move as the brake lining wears.** Using a flashlight if necessary, ensure that at least a 0.060" air gap is visible above the core (see illustration). While a "60 thou" spark plug gap setting gauge is useful, a visual check is sufficient. Note: Modify brass screw head if necessary to ensure gap.
- b) Note this examination in the Log Book, together with maintainer's name and date.

KONE Inc.,

A. D. Brown, P.Eng.,
Vice President Engineering