

DIRECTIVE: SEALED BEARINGS IN SHEAVES LOCATED IN A HOISTWAY**Date of Issue: March 05, 2024****Directive No: D-ED 2024-01****Part 1: Background**

In response to a catastrophic failure occurring in a counterweight assembly with 2:1 roping due to sealed bearings failing in the counterweight sheave, this directive is being issued to owners and licensed elevating device contractors to clarify requirements in respect to maintenance of sealed bearings on counterweight sheaves.

During the above noted incident, failure of the counterweight sheave sealed bearings led to the sheave skewing out of plumb, resulting in horizontal force being applied to the sheave retainer which caused the sheave retainer to eventually fail. The retainer failing caused the sheave to detach from the counterweight assembly which resulted in the ropes coming off the sheave, the car stopping on its safeties, the counterweight descending uncontrolled, and the counterweight sheave falling down the hoistway. The falling sheave struck the elevator roof, pierced through the elevator roof, and landed inside the elevator car.

TK Elevator released a field bulletin on January 3, 2023, with details on the incident along with an optional retrofit kit to improve safety on applicable Dover-Turnbull counterweight sheaves.

ASME A17.1-2016/CSA B44-16 section 8.6 lists elevator equipment that requires regular maintenance. When the safety of elevator passengers is dependent on a device that is not specifically covered in section 8.6, clause 8.6.1.7.5 requires the device to be inspected and tested in accordance with the requirements of the manufacturer's or the altering company's procedures.

Part 2: General Details

Sealed bearings in sheaves located in a hoistway cannot be maintained in the field. Manufacturers of sealed bearings provide a service life for these bearings based on the number of hours in use. At the end of their service life, sealed bearings need to be replaced.

The life span of sealed bearings is based on the number of hours in use, however elevator use can vary widely and tracking of service hours on sealed bearings in sheaves located in a hoistway of older elevators is not feasible. As such, it is critical to monitor sealed bearings in sheaves located in a hoistway on an on-going basis and replace them when they have signs of failure.

This directive clarifies the provisions of ASME A17.1-2016/CSA B44-16 and the Elevating Devices Safety Regulation (EDSR) with respect to the inspection, replacement, maintenance, and documentation requirements for sealed bearings in sheaves located in the hoistway.

Inspection requirements for sealed bearings in sheaves located in a hoistway:

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In accordance with ASME A17.1-2016/CSA B44-16 clause 8.6.1.7.5, maintenance personnel are required to perform a detailed examination of sealed bearings in sheaves located in a hoistway. Inspection of sealed bearings in sheaves located in a hoistway is required on each maintenance visit, focusing on early detection of any signs of wear, vibration, or noise.

Regulatory requirements for replacing sealed bearings:

Where early signs of sealed bearing failure are found during maintenance, the affected bearings must be replaced as soon as possible. Where sealed bearings in sheaves located in a hoistway are suspected to have already failed during maintenance, the elevator is required to be taken out of service until the bearings are replaced, as required by EDSR 21(5).

Regulatory requirements for setting maintenance frequency:

In accordance with ASME A17.1-2016/CSA B44-16 clause 8.6.1.2.1(e)(1) and [Directive D-L4 101125 4: Mandatory maintenance](#), elevator maintenance intervals are determined by age, quality, usage, and the original manufacturer's recommendations or a professional engineer's recommendations. Where the age, quality or usage of sealed bearings in sheaves located in a hoistway necessitates more frequent inspections, owners and maintenance contractors are responsible for increasing the maintenance frequency of the equipment. In no case shall maintenance intervals of sealed bearings in sheaves located in a hoistway exceed the lesser of three months and the manufacturer's specified limit.

Part 3: Documentation

ASME A17.1-2016/CSA B44-16 section 8.6.1.4.1, as amended in the EDSR, requires all maintenance tasks to be documented in the elevator's Maintenance Control Program (MCP) records. The inspection of sealed bearings in sheaves located in a hoistway must be included in the MCP records for all elevators with applicable sheaves.

This directive is being issued by a provincial safety manager pursuant to section 30 of the Safety Standards Act.

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Nav Chahal
Provincial Safety Manager – Elevating Devices

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References:

Safety Standards Act

Elevating Devices Safety Regulation

Safety Standards General Regulation

ASME A17.1-2016/CSA B44-16

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