Elevating and Amusement Devices Safety Division	Ref. No.: 243 / 10	Rev. No.:
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Subject: Hydraulic Elevators with buried hydraulic jacks with single bulkhead cylinders
Applicable to: Owners of single bulkhead buried cylinders
Contractors, Consultants and Elevating Device Mechanics

1 INTRODUCTION & IMPORTANT NOTICE TO OWNERS

Buried cylinders with single bottoms found on older model hydraulic elevators can fail catastrophically and cause injury to riders.

Hydraulic elevators installed prior to the 1977 code requirements could have buried cylinders with single bottoms.

Pending changes to the elevator code will require mitigation for buried cylinders with single bottoms (commonly referred to as single bulkhead cylinders). These code changes are expected to be completed and adopted in Ontario mid to late 2011.

The new code requirements as extracted from B44 Safety Code for Elevators are as follows;

8.6.5.8 Safety Bulkhead.
Hydraulic cylinders installed below ground shall conform to 3.18.3.4, or the elevator shall conform to 8.6.5.8(a) or 8.6.5.8(b):

(a) the elevator shall be provided with car safeties conforming to 3.17.1 and guide rails, guide-rail supports, and fastenings conforming to 3.23.1; or

(b) the elevator shall be provided with a plunger gripper conforming to 3.17.3. The plunger gripper shall grip the plunger when the applicable maximum governor tripping speed in Table 2.18.2.1 is achieved.

1.1 Upcoming Changes

The new requirements mean that hydraulic elevators with buried single bulkhead cylinders will either have to;

a) be equipped with a car safety or
b) be equipped with a plunger gripper or
c) replace the existing single bottom cylinder with a new double bulkhead cylinder complete with a method of corrosion protection.

1.2 Interim & Ongoing Safety Measures

In 1999 TSSA introduced requirements for elevating device contractors to look for effects of corrosion on in-ground hydraulic cylinders with the release of safety alert bulletin 143/99.
A key component of this bulletin was an oil log, intended to flag installations where oil was being added without a viable explanation about where the missing oil went.

Following a hydraulic cylinder failure in Ontario in 2006, TSSA reviewed and heightened the requirements related to oil monitoring and introduced an enhanced oil loss monitoring program with regulatory amendment 212/07.

The heightened requirements forced contractors to account for all oil, lost or added, from an elevators hydraulic system. Contractors must also ensure their oil monitoring programs are documented, and include training records about who received training and when.

With respect to safety, owners and contractors play an important part, and in this regard owners need to be aware of the importance of oil loss monitoring. As part of their due diligence, owners should be asking contractors for documentation that verifies oil loss monitoring is being conducted. On installations known to have single bottom cylinders, oil loss monitoring activities shall occur monthly.

Note: Oil loss monitoring applies to **all** hydraulic elevator installation with **buried** piping or **buried** cylinders.
Only those locations with single bottom cylinders require that the monitoring activity be conducted monthly.

2 PREPARING FOR UPCOMING CHANGES IN THE CODE - NOTICE TO OWNERS

With the adoption of the upcoming code requirements, owners of hydraulic elevators with single bottom cylinders will need to begin planning for necessary changes to their elevator equipment.

It is advisable that owners begin researching options on how best to deal with single bottom cylinders in order to determine the costs associated with the various options and to determine which is the preferred approach for a given building.

While the timelines for equipment compliance are not yet established, it may be beneficial to know that the new code requirements will publish late 2010, early 2011 and their requirements will likely be adopted in Ontario by mid to late 2011. It is expected that compliance to the requirements will span a few years with an eventual full compliance target in 2013.

3 BACKGROUND

Design requirements for buried cylinders have evolved over time.

Hydraulic elevators installed prior to the 1977 code did not require cylinders with double bottoms. Cylinder corrosion tends to be more aggressive where the cylinder has been welded. This corrosion can lead to a catastrophic failure at the bottom of the cylinder that can result in the elevator dropping into the pit at a high rate of speed.

TSSA is not aware of any single bulkhead cylinder that failed catastrophically without prior signs of unexplained loss of oil.

TSSA issued Elevating Devices Code Adoption Document Amendment 212/ 07 requiring oil loss monitoring for all hydraulic elevators as a means to recognize early warning signs of potential failure. For elevators with buried single bottom cylinders, this monitoring must be done on a monthly basis.

During periodic inspections of hydraulic elevators with buried single bottom cylinders, TSSA inspectors are finding cases where the oil loss monitoring required by 212 / 07 is not being done on a monthly basis.

Roland Hadaller, P. Eng.
Director, Ontario Regulation 209/01 (Elevating Devices) made under the Technical Standards and Safety Act, 2000

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