

SINGLE BOTTOM HYDRAULIC CYLINDER REPLACEMENTS

The Technical Standards & Safety Authority (TSSA) has issued Information Bulletin 243/10 to all elevating device owners in Ontario. This Bulletin addresses the potential for catastrophic failures in single bottom hydraulic cylinders.

TSSA Information Bulletin (See attached)

This Information Bulletin (IB) affects all original installations from 1977 or earlier that have not had a buried single bottom hydraulic cylinder replaced with a double bulkhead cylinder system with PVC protection or that do not have a fall protection system in place.

The IB is expected to become a mandated requirement when an updated Elevator Code is released in mid 2011. The TSSA's expectation is for all subject cylinders in Ontario to have one of the options listed below completed by 2013. Please note that for modernized units, the original cylinder may not have been replaced depending on the scope of work.

The TSSA options are:

1. Remove the existing cylinder and replace with a new cylinder with a PVC liner
 2. Add a fall protection device (e.g. plunger gripper system)
 3. Add a new down direction over-speed safety device (e.g. under car safety system)
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The Issues

The primary issue relates to undetectable corrosion and deterioration of the bottom portion of a buried cylinder. The greatest potential for catastrophic failure comes from the cylinder material corroding and thinning to the point where the cylinder can no longer restrain the internal system pressure. Despite the existing TSSA requirements to maintain an oil-loss monitoring program for all hydraulic buried cylinders, there is still the potential to have no advanced warning of a catastrophic failure of a single bottom cylinder until a rupture occurs. If a cylinder fails in this way, there is no protection in place to prevent the elevator from falling, possibly causing serious personal injury or death to passengers.

The Options

1. *Remove and replace existing buried cylinder (recommended program)*

Advantages

- Extraction removes the potential failure
- Replacement adds the safety of a PVC liner
- New cylinder has required safety bulkhead built into the system
- Elevator down time can be scheduled to meet building requirements
- Direct liability reduction

Disadvantages

- Largest up front cost
- A large contingency amount is required if the existing cylinder hole needs to be re-drilled
- The elevator will be down for 2-6 weeks and will require special planning for building residents or tenants

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2. Add a fall protection device (e.g. plunger gripper)

Advantages

- Provides a custom designed protection device that activates upon detection of an over-speed condition
- Allows relatively quick implementation of the IB

Disadvantages

- **A full replacement will still be necessary in the event of a catastrophic failure or undetermined oil loss**
- Gripper may not fit into restricted space or onto existing cylinder style
- Requires annual TSSA mandated testing and verification of log book
- Does not remove the potential hazard
- No planning is possible if the cylinder is eventually found to be leaking oil
- This device must either be retained when the cylinder is replaced, a line rupture valve installed, or the TSSA must approve a variance to remove it
- The liability to ownership is still considerable

3. Add a down direction over-speed safety device (e.g. under car safety system)

Advantages

- Provides a proven down direction protection that is widely used on traction style elevators

Disadvantages

- **A full replacement will still be necessary in the event of a catastrophic failure or undetermined oil loss**
- May not be practical or available for a large number of hydraulic elevator systems
- Potential high cost due to:
 - Building hoistway may require structural engineering review\
 - Elevator rails may need to be upgraded or additional rail supports added
 - Car platform and sling assembly may require alteration
 - Pit clearances and buffer systems may need alteration or replacement

Delta Elevator Co Ltd has significant background in cylinder replacements. Our in-house Engineering Department has designed special hydraulic cylinder extraction equipment to expediently remove buried cylinders from elevator pits. As well, Delta's EDM-A licensed mechanics have experience removing and replacing hydraulic cylinder systems for most Original Equipment Manufacturers.

For over 40 years, **Delta Elevator Co Ltd** has been a leading full-service elevator company in Ontario. As we represent our clients' elevating needs, they take confidence in our long industry experience, expert skills, complete in-house engineering capabilities, and full manufacturing facility.

Delta Elevator Co Ltd looks forward to having the opportunity to provide information, design consultation, and project solutions for your building ownership and management to evaluate. Contact our Service & Modernization Team at 1- 800-265-6348 with your inquires or visit us at:

www.delta-elevator.com