

Author <i>Auteur</i>	Release date <i>Date émission</i>	Doc. no. <i>No. de doc.</i>	
SLC/GSM	12-31-2006	SA-06-022	

SAFETY ALERT BULLETIN / BULLETIN DE SÉCURITÉ

Lift manufacturer / <i>Fabricant</i> :	THIOKOL, STADELI, HALL, VON ROLL, CTEC, GARAVENTA CTEC, DOPPELMAYR, DOPPELMAYR CTEC	Fab. Group / <i>Groupe de fabrication</i> :	025 – TOWERS
Lift type / <i>Type de remontée</i> :	CHAIRLIFT	Effective date / <i>Date en vigueur</i> :	December 31, 2006
Supersedes / <i>Remplace</i> :	N/A		

Title / Titre : **Tower failure due to water intrusion**

1. Generalities / Généralités

1.1 Abstract of issue (summary) / *Résumé*

Accumulated water within tower tubes can have catastrophic effects upon structural integrity.

1.2 Reason for release (summary) / *But*

Recently, accumulated water within a tower tube froze and resulted in a complete failure of the tower tube. The failure occurred on a closed, unloaded lift at night after daily operations were complete.

2. Scope / Objet

2.1 Generalities / *Généralités*

The affected tower design had an open center splice ring connecting a larger diameter lower tube to a smaller diameter upper tube. The design of the splice ring had connecting bolts passing through the upper ring and threading into the lower ring. The threaded holes for the connecting bolts in the lower ring were inside the lower tube diameter. Typical assembly instructions for this type splice connections call for the use of mastic or caulking to inhibit water intrusion.

2.2 Affected model, type, parts / *Modèle, type, pièces affectées*

While the noted failure involved a 1992 Von Roll two-piece tower on a fixed grip double chair, any tower design that has a sealed base could be similarly affected if there is a pathway for water intrusion.

3. Action to be taken and completion date / Actions à entreprendre et délais de réalisation

(Inspection, modification, remplacement, NDT, part, manual revision, procedural change)

(*Inspection, modification, remplacement, END, révision du manuel, changement de procédure*)

Routine annual maintenance activities must include a close visual inspection of all tower components including the tower base. Signs of fatigue due to freeze / thaw cycles or cyclic loading may present themselves as indications (cracks) during the early stages, therefore, all welds,

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gussets and tower tubes should be subject to close visual inspection annually. Any suspected indication noted visually should be confirmed by magnetic particle examination. The presence of any confirmed indication must be reported to Doppelmayr CTEC Engineering Department for review and recommended repair procedures.

Signs of weeping may indicate the presence of additional water within a tower. When struck with a dead-blow hammer in several ascending points from the base, a change in the resonating tone of the tower may indicate the presence of water (a tower with water tends to exhibit a solid “dead” sound compared to a more normal bell-like tone). Some tone differences may be noted due to proximity to base gussets and will not necessarily indicate the presence of water. Care should be taken to eliminate or minimize any obvious source of water intrusion.

Unless water is suspected to be collecting inside the tower, it is neither necessary nor recommended to provide a drain hole. Sealed towers have historically exhibited very little internal corrosion.

- If water is suspected to be present, a small hole ($\frac{3}{8}$ " ~ $\frac{1}{2}$ ") may be drilled near the tower base at the side of the tower (90° to the haul rope) to provide a pathway for water to escape. This is a recommended action only where the presence of water is suspected. Holes should not be installed purely as a preventative measure or in lieu of annual inspection. Periodic cleaning of drain holes may be required to maintain their functionality.

Required action

If tower base inspections have not routinely been included and documented in annual maintenance activities, a visual inspection of each tower base for signs of fatigue must be completed within the next 30 days. Any suspected indication noted visually should be confirmed by magnetic particle examination. The presence of any confirmed indication must be reported to Doppelmayr CTEC Engineering Department for review and recommended repair procedures.

Any confirmed indication greater than 1 inch (25 mm) in length shall be cause for immediate and continued closure of the lift to public transportation until repairs are authorized by Doppelmayr CTEC and implemented.

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4. Detail of issue / *Details*
Text, drawings, schematics
Textes, dessins, schémas



Tower: 6S/4S; 46' tall; 30' of 20" tube spliced to 16' of 16" tube. Ice filled to 30' position.

Weather conditions at failure:
Night; ~-5° F.; Wind ~ 57 mph.

Tower split vertically from base then hinged at approx. 18-1/2' and fell toward heavy side (uphill) line in the direction of prevailing wind.

Haul rope was trapped on both HS & LS assemblies.

Horizontal tower base crack 10-1/2" long, 14" up from base.

