

SAFETY BULLITEN

Silo Safety on Aran ASR 200 and ASR 280B Mobile Pugmill

Caution: prevent free fall of silo while being lowered.

Two cases of uncontrolled silo lowering on Aran plants manufactured between 1977 and 1990 have occurred during the operational history of these plants.

Assess the safety of your plant, particularly if it has been standing in the same position for many years.

What may happen.



The silo is designed so that it can be lowered in preparation for moving the pugmill using a prime mover of a semitrailer.

Whilst the silo is lowered there is a risk of free fall onto the discharge conveyor.

How it may happen



Typical pugmill set up

The silo is raised and lowered using two single acting telescoping hydraulic cylinders.

The cylinders, cradled in the chassis of the plant chassis are attached to gussets that are welded to the frame of the silo.

The silo is hydraulically elevated and then lowered under gravity. The silo pivot is offset such that it will fall forward if there was no restraint.

Most ASR series plants have a reported capacity of 50 tonne.

Investigations of failures

Investigations of failure suggest silos were loaded with up to 18 tonne of cement at the time of lowering the silo. This is in contradiction to the operating procedures published by the operator.

On both occasions there was also an additional volume of cement spillage hardened the top of the silo.

Other possible cause may be air present in the final stage of the cylinders.

After both front and rear support legs are been removed, the silo may transition into lowering compressing the hydraulic fluid or air in the cylinders. As the silo lowers, the weight of the cement laden silo it applied to the cylinder.

There is potential shock loading of the hydraulic system which can cause the silo to bounce. This action may rupture the hose connected to the cylinder, cause the cylinder glands to fail, or shear the lugs connecting the cylinder to the silo.

Such potential failures will allow the silo to free fall onto the chassis frame. If cylinders do not fail evenly, potential collapse may roll lead the plant to roll in extreme cases.

Recommendations for ALL OWNERS

- Ensure all Aran ASR 200 and ASR 280 mobile pug mills have been fitted with hose burst protection valves.
- Ensure the silo is empty and all material removed from the roof before lowering.
- If it is suspected that air may have entered the hydraulic system, use the bleeder on the cylinder to release any air.
- Access for this task must be risk assessed to ensure all the effective controls are in place.
- Maintain a No-Go zone during raising or lowering the silo.

All modern Aran mobile plants have remotely operated locking pins to restrain the silo whilst mechanical support braces are removed. Upgrading older plants is possible and assessable on individual case basis.

SAFETY FIRST

Comments

Previous failures in 1990 – 2000 were followed by with Safety Bulletin issued to all known plant owners, to install hose burst protection valves and reminder to empty silos and remove spillage prior to lowering the silo.

The order in which the silo is prepared for transport is detailed in operation manuals of the plants:

- Remove silo legs front and back.
- Push front legs out and remove packing
- Pull legs inside frame and connect together.

This may place workers underneath the silo only supported by a hydraulic system.

This safety bulletin has been issued by Aran 1 Pty Ltd as a service to historical Aran equipment owners and operators.

This bulletin acts only to caution owners and operators to assess the condition of their plant, ensure correct operational procedures are in place and followed and actions are taken to ensure the safety of all site personnel and equipment. parts@aranplant.com July 2020