MAINTENANCE AND TROUBLESHOOTING MANUAL

Concrete admixture dosing units.

Purpose of the manual: to give plant technicians and maintenance staff a quick, clear and decisive intervention guide for resolving the most frequent faults recorded in admixture dosing units, in order to minimise downtime (MTTR) and maximise equipment availability.

S-C-S-P methodology (symptom – root cause – solution – prevention), based on real incident reports.

1. HYDRAULICS AND DISCHARGE SYSTEM (TUBES AND HOPPERS)

1.1. Blockage, clogging and plugging of the admixture outlet tube

Symptom	The admixture does not flow to the truck or the mixer; material builds up, the T-connections come apart or product overflows through the vent.
Root cause	• Direct impact of aggregates and cement/water splashes from the mixer on the discharge mouth of the tube, creating a mound of dust and wet aggregate that plugs the outlet. • Use of narrow tubes or T-pieces that create dead spots where material is held and builds up.
Step-by-step solution	1. Disconnect the equipment safely and apply the LOTO (lockout/tagout) procedure at the electrical panel. 2. Manually remove the block of hardened material (dust + wet aggregate) from the discharge area and clean the nozzle. 3. Modify the outlet tube: shorten it so that it does not interfere with the aggregates and remove the T-connections, replacing them with direct elbows or wider tubes. 4. Make sure the tube discharges directly and vertically into the clean or protected flow of the truck/mixer.
Prevention	Inspect the cleanliness of the outlet nozzle weekly. Install a second gate to stop vapour and aggregate splashes coming in from the mixer mouth.

1.2. Moisture and caking of the powder admixture inside the hopper

Symptom	The product inside the hopper gets damp, forms lumps or hardens, losing flowability and jamming the screw conveyor.
Root cause	Rainwater leaks or condensation through the top lid frame or the unprotected opening mechanism.
Step-by-step solution	1. Open the hopper and completely remove the block of damp, caked material. 2. Thoroughly clean and dry the inside of the hopper and the frame walls. 3. Fit perimeter sealing gaskets to the lid frame and the opening mechanism. 4. Seal any unprotected top opening or cable entry with insulating foam or technical sealant.
Prevention	Check the condition of the lid's rubber gaskets every three months, with closer inspection before rainy periods.

2. MECHANICAL AND ELECTROMECHANICAL SYSTEM (MOTORS, GEARBOXES AND SCREW CONVEYOR)

2.1. Thermal overload trip on the bridge-breaker motor / mechanical jam

Symptom	The bridge-breaker motor stops, the thermal relay in the electrical panel trips or the teeth of the internal gearbox break.
Root cause	• Extreme compaction of the powder admixture, exerting excessive mechanical torque on the paddles. • Thermal relay sized at the limit, with no starting margin. • Material getting into the shaft bearings and seals because the nylon bushing is worn or fitted the wrong way round.
Step-by-step solution	1. Check the motor's actual current draw with a clamp meter (a jammed motor exceeds its rated current, e.g. more than 1.5 A). 2. Empty the admixture hopper completely to release the mechanical pressure on the shaft. 3. Free the internal shaft by hand. If the gearbox has broken internal teeth, replace it with a new one. 4. Adjust the thermal relay range in the electrical panel to the verified actual current draw (1 A – 1.5 A). 5. Turn round or replace the nylon bushing and the bridge-breaker shaft seal to stop dust getting into the gearbox.

Prevention	Check shaft play periodically and verify the tightness and condition of the seals every 6 months.

2.2. Bending or deflection of the equipment's support structure

Symptom	Progressive deformation of the dosing unit's bed or base due to static weight and operating vibrations.
Root cause	Insufficient section of the original base profiles for the dynamic loads and the combined weight of the hopper and motors.
Step-by-step solution	1. Align the mechanical assembly and level the affected structure. 2. Weld structural reinforcements using additional steel plates or reinforcing flat bars on the base to stiffen the frame.
Prevention	Visually inspect the structure, joints and main welds during the monthly maintenance stops.

3. PNEUMATICS AND GATES (SLIDE GATES)

3.1. Jams and misalignment in slide gates

Symptom	The slide gate jams in the first opening/closing cycle or comes off its guide rail, blocking the weighing or emptying process.
Root cause	• Build-up of compacted admixture dust in the mechanical sliding guides. • Insufficient pneumatic pressure or cylinder misalignment due to excess material around the seal. • Misaligned guides and bolts.
Step-by-step solution	1. Thoroughly clean the side guides of the slide gate, removing dry or caked product residue. 2. Check the alignment of the pneumatic cylinder and make sure the air circuit pressure is stable (minimum 6 bar). 3. In critical locations prone to jamming, consider installing a double slide gate system with a reinforced piston.
Prevention	Clean the gate guides every two weeks.

4. CONTROL, SENSORS AND ELECTRICAL SYSTEM

4.1. Level sensor detection failure (false full / false empty)

Symptom	The system shows the hopper as full when it has no material, or does not detect a low level during dosing.
Root cause	• Caked product building up on the rotating paddles or the capacitive body of the sensor. • Sensitivity out of adjustment or signal wiring damaged by continuous vibration.
Step-by-step solution	1. Disconnect the sensor's power supply at the control panel. 2. Remove the sensor/rotating paddle, clean off the product crust and check that it turns freely. 3. Check the connections in the terminal box and test signal continuity to the PLC (electrical panel). 4. Replace the sensor if it shows an electronic fault or wear of the internal paddle motor.
Prevention	Preventive cleaning of the level probe every month at plants with high ambient humidity or hygroscopic products.

5. PERIODIC PREVENTIVE MAINTENANCE PLAN

Recommended frequencies and preventive operations to ensure maximum operational availability

Frequency	Element / component	Preventive maintenance task
Daily / weekly	Discharge mouth and tubes	Visual inspection for aggregate or cement build-up and cleaning of the discharge nozzle.
Every two weeks	Slide gate guides / gates	Cleaning of the sliding rails.
Monthly	Level probe / sensor	Cleaning of the paddles and sensor body to avoid false readings caused by build-up.
Every three months	Hopper lid and gaskets	Check of the watertightness of the perimeter rubber gaskets and sealing against water ingress.
Every six months	Motor, gearbox and shaft	Check of current draw (amperage), tightening of thermal relay terminals, condition of seals and lubrication of the gearbox.