

Overhaul boosts elevator safety

A Muller Beltex overhaul has improved the safety of a 50-metre elevator in the Port of Brest in France. The elevator, owned by Bunge, has been given new drive and return pulleys, and has undergone a major improvement to its safety systems.

A specialist in agricultural seeds, Bunge processes some two million tonnes of soy bean and rapeseed into edible vegetable oils in Europe each year. When it acquired the Cargill oil plant in Brest, Bunge decided to undertake its thorough renovation – including preserving the 50-metre-high elevator. Muller Beltex joined forces with its service partner and the firm Ilchmann to carry out the work. This included a thorough inspection of the 600 T/hr and 1000 mm wide elevator belt with its double row of polyurethane Maxi-Lift Tiger-Tuff elevator buckets.

Inspection

It quickly became apparent in the inspection that both the drive and return (lower) pulleys needed to be renewed. Both were worn from the heavy loads and the product's abrasive properties. Their crowns had become flattened, increasing the risk of the elevator belt running out of alignment. The inspection also highlighted mounting problems with the misalignment monitoring system.

Return pulley

A decision was taken to replace the existing return pulley with a cage pulley, fitted with a discharge cone. This cone ensures that any product caught between the belt and the pulley flows back easily into the product stream through the sides of the cage pulley. Several obstacles at the foot of the elevator had to be cleared before the worn pulley could be removed. The cage pulley was fitted with new bearings and was remounted in the installation using tackles.

Drive pulley

The new 2.5 tonne drive pulley has a replaceable lagging (slide lag). The strips covered with NBR rubber are highly resistant to oils and grease, and ensure optimal friction between the drive pulley and the Polysur elevator belt. The elevator head's casing had to be disassembled for hoisting to replace the drive pulley. Steps were also taken to ensure that the installation had been set to safe mode. The belt fastener of the 9-tonne elevator belt was turned to the top of the drive pulley, and the belt was then secured with specially-manufactured belt clamps. Next the fastener was disassembled and the belt was folded open, enabling the drive pulley to be removed. The hoisting operations were completed successfully with a 220 tonne telescopic crane, despite strong winds. The new drive pulley, with its new bearings, was mounted safely and smoothly.



Fig. 1 The Bunge plant in the Port of Brest



Fig. 2 The top of the elevator rises far above the plant



Fig. 3a and 3b The cage pulley is hoisted into the installation

Misalignment monitoring

The elevator has a Rub-Block misalignment monitoring system to minimise the risks of fire or explosion. This system works on the basis of friction heat. Brass blocks with PT100 heat sensors are installed at the sides of the elevator belt at both the bottom and top of the elevator. If the belt runs against one of these blocks it creates friction heat which the sensor detects, emitting a signal which causes a PLC to activate a preliminary alarm. Preventive maintenance is still possible at this stage. Once the temperature rises to a pre-set stop value, the installation shuts down automatically to prevent fire or a dust explosion.

Bearing monitoring

The new bearings in the installation have PT100 V3C sensors to measure the temperature inside the bearing block. Just as with misalignment monitoring, an alarm is activated if the temperature starts rising. The installation can also be halted at a specific bearing temperature to prevent more serious problems. The main causes worldwide of fires and dust explosions in processing combustible bulk goods, are overheating bearings and misaligned elevator belts.

Customer satisfaction

Work on the elevator ran to schedule, and to the full satisfaction of the parties involved. The expertly-renovated installation and the safety measures implemented fully justified the client's confidence in a problem-free operation. ■



Fig. 4 The drive pulley is mounted in the head of the elevator