

# New life for old conveyor pulleys

Pulleys are designed to last, but can suffer damage from wear over time. Thomas Greaves, General Manager of Dyna Engineering, discusses when you should refurb rather than replace.

## **PULLEYS ARE A HEAVY DUTY,**

consistently running piece of machinery designed to last. But after many years of consistent use, wear and tear eventually occurs and the pulley can become worn or damaged.

Regular maintenance of conveyor equipment, including pulleys, is essential to reducing wear rate and prolonging service life. Reconditioning or refurbishing the pulley will help avoid the excessive cost of a complete pulley replacement.

### **Visibly worn lagging**

Pulley lagging is the layer of material which is bonded to the shell of a conveyor pulley. Its function is to protect the shell from damage, to increase friction with the conveyor belt and dispense water off the pulley.

There are several distinct types of pulley lagging, such as plain rubber, grooved rubber and ceramic lagging. Each type of pulley lagging has different variations, specifications, and is optimally suited to certain types of materials being conveyed and relative conditions.

Lagging that has been worn down is a sure sign that a refurbishment is needed. If the lagging is worn, which is to be expected over time, the pulley will become susceptible to abrasive damage. If the lagging has worn down to the point



*Thomas Greaves, DYNA Engineering's General Manager, inspecting a DYNA pulley.*

where the pulley shell is exposed, it is critical that the pulley be refurbished with new lagging. Damage to the pulley shell may have already occurred.

### **Lagging coming loose from the pulley**

Lagging that has come loose from the pulley and is flapping about is a sign the bonding adhesive has deteriorated. The sections that have come off will need to be reapplied to prevent further damage to the pulley and to the belt. If this isn't attended to, rapid escalation of further sections of lagging coming loose from the

pulley shell will occur. This can also cause significant damage to the belt and other conveyor elements.

### **Seized bearings**

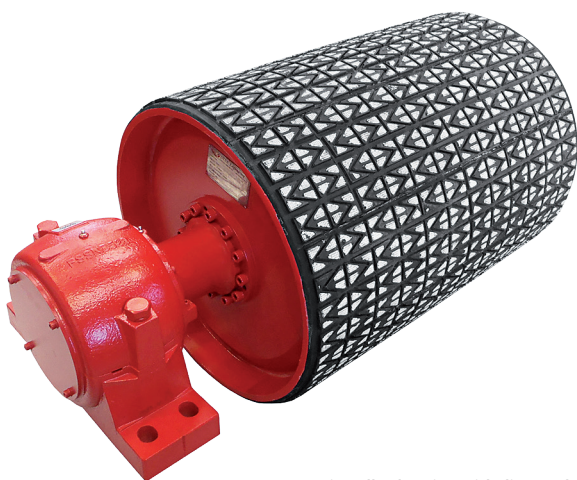
Seized bearings can be caused by lack of grease, old age, fatigue, product build-up and other factors. They will cause the rotation of the pulley to malfunction. This can lead to a multitude of issues for your entire conveyor operation. Proper maintenance procedures and inspections leading to refurbishments will help avoid further serious and expensive consequences.

### **Extreme rusting or corrosion of elements**

Over time, pulley housings and bearings will naturally rust or corrode. While slight rusting or fading is not necessarily a huge concern, badly degraded pulley elements may indicate the need for complete replacement. Heavily worn bearings and housings can lead to seizures and breakdowns. Preventative maintenance and regular inspections will assist in avoiding such problems.



*Pulley before and after DYNA's refurbishment.*



*DYNA ceramic pulley lagging with diamond grooves.*

### **Abnormal noises**

Strange noises coming from your pulley might be another sign that it requires refurbishment. A safe and proper investigation of the source of the noise will determine what solution is required. Lagging that has come loose, or bearings that have cracked or seized will probably make a noise, alerting you to a pulley in need of attention. The objective of locating the source of such abnormal noises is to help avoid the expensive and time-consuming process of a complete replacement of the pulley.

It makes a lot of sense to conduct regular preventative maintenance than perhaps having to shut down and pay big dollars for a new pulley replacement.

### **Types of pulley lagging**

Different lagging materials can be used, normally selected in relation to the operating conditions, life requirements and economics.

Grooves or patterns are typically applied to the surface of the lagging to assist with increasing the co-efficient of friction of the pulley to belt. Grooves also assist with dispersing water and mud from the surface of the pulley.

Choosing the best lagging for your particular conveyor system and operating conditions will help ensure the conveyor belt operates efficiently and lasts as long as possible.

### **Rubber lagging**

The most common specification is rubber lagging, which can be applied as hot vulcanised or cold bonded. It is a relatively 'soft' material which offers good traction and is quite resilient to wear. Other benefits include protection for the pulley shell and more friction for conveyor belts. Rubber lagging can be grooved and shaped to offer greater flexibility depending on your application.

Rubber is one of the most affordable types of pulley lagging. Depending on your application, different properties such as thickness and hardness can be utilised to achieve the best outcomes.

Dyna Engineering has developed a range of highly wear-resistant rubber compounds to maximise the lagging life under diverse or arduous conditions.

Hot vulcanised rubber lagging is applied as a continuous un-joined layer around the pulley shell, and then steam cured



to significantly reduce the risk of the lagging separating from the shell. Lagging is then machined to a smooth, blemish free surface. It is typically grooved with a 120-degree diamond pattern to assist with the dispersion of mud and water.

Cold-bonded lagging is available in a range of thicknesses and patterns including straight, diamond groove and more. Dyna Engineering typically uses Flexco or Kolag, however, other brands are available upon request.

### Ceramic lagging

Another common type of pulley lagging is ceramic. Harsh conditions and abrasive material are the two usual reasons why ceramic lagging is considered. The most common types of ceramic lagging are 'smooth' and 'dimple'. Both of these products offer a significant increase in friction, grip and tracking of the belt, and elimination or reduction of belt slippage.

Ceramic lagging can be applied to the pulley shell as a rubber backed ceramic strip or sheet. The rubber backing is bonded to the pulley shell. The other method is to directly bond the ceramic tiles to the pulley shell.

Ceramic lagging is a more expensive option than rubber lagging, but has a greater service life and reduced lagging wear. It can also be used to increase wear resistance depending on specific needs and budgets.

Drive pulleys are usually lagged with dimple ceramic lagging because the increased friction and grip assists in



A seized pulley bearing.

driving the conveyor belt. The coverage of ceramic on the surface of the lagging can be customised depending on the application and is used to increase or decrease friction and grip.

Non-drive pulleys can be lagged with smooth ceramic lagging. However, this is less common than on drive pulleys as ceramic lagging is more expensive and only used when necessary.

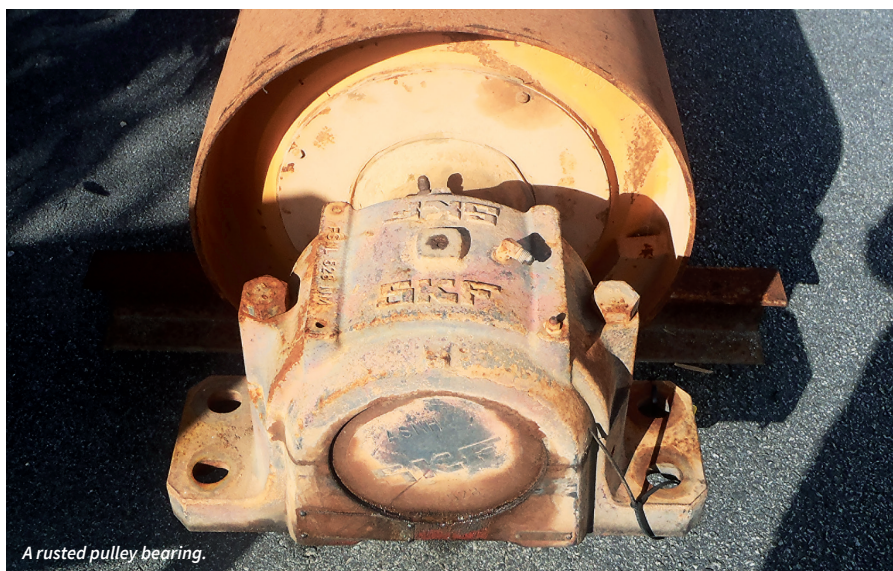
There are some issues with ceramic lagging that need to be considered before making the decision to go with ceramic. It can be fragile and prone

to cracking. Falling material and hard objects caught between the lagging and belt are the usual cause of this issue. Furthermore, conveyor design, transition distances and drive traction should all be carefully taken into account.

### Other lagging options

Another type of pulley lagging is polyurethane or plastic lagging. Polyurethane lagging can be applied as a sheet or strip. The method of bonding is usually rubber backed polyurethane or cast the polyurethane directly on to the pulley shell. Although not as common as rubber and ceramic, polyurethane lagging is gaining popularity in some applications and can provide good service life. Cast polyurethane lagging can be very expensive to apply and extremely difficult to remove for repair. It is generally only used when rubber and ceramic lagging has proved less serviceable.

A less common option is to leave the pulley shell bare and apply no lagging. This option offers the lowest friction because the conveyor belt is in direct contact with the pulley shell. The disadvantage of not utilising any lagging is that the pulley shell has no protection to wear, which will often result in total replacement of the pulley shell. **B**



A rusted pulley bearing.