Conveyor Pulley Maintenance And Spares Reduction Plan

Performing maintenance on a conveyor can be simple or it can be very challenging depending on the application and the location of the components to be maintained. Often times cranes, high lift equipment, etc. are required to perform the most basic maintenance procedures such as changing a bearing, a coupling or replacing an old pulley assembly or idlers. Frequently, these simple, basic maintenance procedures become very dangerous and difficult to perform and the down time required to complete them is increased all because of the location of these pulleys or the nature of the application. See Figure 1. Some maintenance professionals when working on some of these conveyors may feel like the person who just bought a new vehicle of which when it comes time to change the oil, he is left scratching his head, wondering why the designers of the vehicle didn't make it a little easier to maintain. This idea is even more apparent with conveyors. Some conveyors do not have good cat walks, others have been piecemealed together from used parts, some have vertical ladders rather than a good set of stairs. Most often times the things that can make maintaining a conveyor easier are left out of the conveyor design due to budgetary reasons. All too often, maintenance friendly designs are sacrificed in the name of competitiveness. The plain and simple truth of it is that this drives up the cost to maintain a conveyor. So what is a foreman or maintenance planner to do, especially in a time when maintenance crews have been reduced down to the bare minimum?

Figure 1

Technological improvements and advancements in conveyor pulley designs offer some solutions given such conditions. Within the past ten years there have been several advances in conveyor pulleys and idlers which bring to the table, true maintenance free operation and which provide several options or choices to best suit a given application. Specifically, within the conveyor pulley realm, two technologically advanced pulley designs are now available.

One of these designs is known as the EZ-Mount pulley assembly. See Figure 2. This type of pulley uses stub shafts that bolt to the pulley hub, eliminating the need for bushings and making it an attractive choice for those applications that require special, costly equipment to perform basic maintenance procedures. This pulley can pay for itself time and again if you have an application where the cost to setup for a bearing change or pulley change is high. This pulley does not have a through shaft, but rather heavy end discs and stub shafts that bolt to the hubs welded into the end disc of the pulley. This type of pulley can perform as both a drive pulley transmitting torque or as a non-drive idler pulley. If a bearing on the elevated end of a stacker conveyor needs to be replaced, with this pulley you would simply chain the pulley in place, unbolt the bearing block from the steel structure and then unbolt the stub shaft from the pulley. Next, you would remove the stub shaft and bearing to ground level, replace the bearing in the shop and then re-install the stub shaft to the pulley without ever moving the pulley out of its place. In areas where a crane is rented to perform this type of maintenance, the crane rental, in most cases, can be eliminated for there is not a need to remove the pulley even if the bearing seizes on the shaft. The stub shaft can be removed and replaced if damaged. This also applies if it is a drive pulley with a coupling failure, etc. This type pulley offers a lot of advantages depending on the application. This pulley assembly can also be a good tool for spares reduction and pulley standardization. One pulley with several different stub shafts can be used to spare for several pulley assemblies in different locations on the same conveyor or different conveyors. It is available in both drum and wing pulley options.

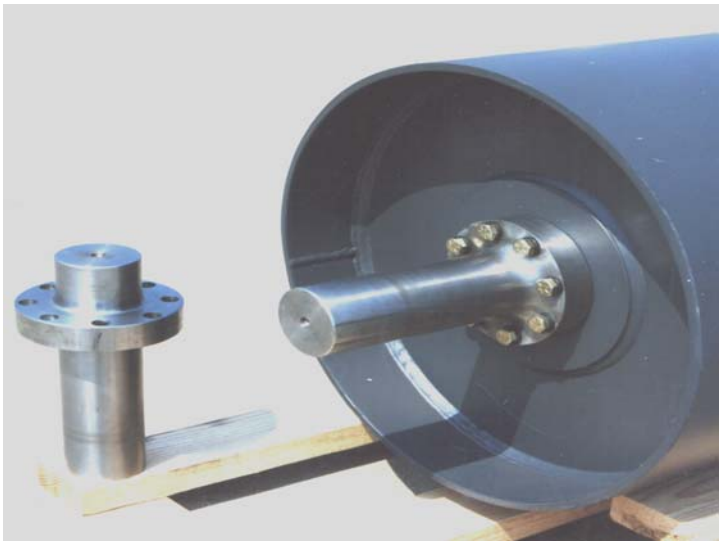

Figure 2

Also available in today's market is the static shaft pulley (SSP), which is available in both reqreasable and maintenance free assemblies. This type assembly has the bearings mounted inside the pulley, eliminating the need for bushings and also the need for cast iron pillow blocks. See Figure 3. This style pulley has several engineering advantages over the live shaft pulley because the pulley acts like a big idler in the sense that it rotates around the shaft. The shaft doesn't rotate, thus the dynamic fatigue of the shaft has been eliminated. Consequently, this type pulley currently can only be used as a non-drive pulley. Nevertheless, this type pulley has the bearing mounted inboard under the shell of the pulley where the bushings typically would be in a traditional live shaft pulley. The bearings are much better protected from

Figure 3

contamination, thus providing an increase in bearing life. This increase in bearing life can be substantial depending upon the degree of contamination of the application. This pulley design gives the end user several other advantages such as pulley standardization of the non-driven pulleys, required on-hand spares reduction, maintenance free options available in shaft sizes 3&15/16 diameter and below, regreasable options available for 3&15/16 inch diameter and above, elimination of outboard live shaft pillow blocks replaced with compatible fabricated steel mounting blocks, easy installation, etc. Like the EZ-Mount pulley design it is also available in both drum and wing pulley options.

Another advantage that these different pulley designs offer is the capability for optimum pulley standardization. It doesn't make a difference whether you have a new plant or an existing one to activate a pulley standardization process. This process usually begins with a conveyor survey in order to produce a spares reduction plan. The conveyor survey usually involves an on-site visit to obtain conveyor and pulley information. This information, once obtained, is put into a spreadsheet and organized by conveyor number. Usually, all of the pulleys for a respective conveyor will be listed in the spreadsheet with all of the pertinent information. i.e. pulley diameter, face width, shaft size, bearing size, bearing centers, etc. Once this step is completed, all similar pulleys can be grouped together and a spares reduction plan created.

In today's market neither manufacturers nor distributors are enthusiastic about putting certain items on the shelf. Especially items that do not turn monthly, like conveyor pulleys. It cost the manufacturers and the distributors money to have pulleys setting on the shelf, especially when they remain on the shelf for several months at a time, not to mention the space required to store them. In addition, there are so many different pulley diameter, face width and shaft size combinations throughout a given industry, the distributors and manufacturers have a difficult time trying to determine what sizes should be put on the shelf. Manufacturers and distributors alike can look at their sales numbers to determine what sizes are most commonly sold, which is what most do, who are stocking product. Nevertheless, conveyor pulley stocks do not turn very quickly and the chances of a distributor or manufacturer having a duplicate of your pulley on the shelf is about 50 / 50. In cases where they do not have an exact duplicate, an end user may be offered a similar pulley, maybe with a larger hub size or slightly larger diameter, etc. The end user then must decide if he wants to put an atypical pulley into his system just so that he can get back in operation again.

The above scenario is very real and happens quite often. One way to get away from the stress of having to locate a pulley in a breakdown situation and the cost associated with the breakdown is to have a spares reduction plan created and have spares on hand. In the past, end users have kept a huge stock of pulleys to keep them out of trouble. However, many of these pulleys have set on-site for years and end up getting scraped for reasons like the following:

1.) Unsure where they can be utilized
2.) They are old, rusted and corroded
3.) The lagging has dry-rotted.

Therefore, the end users are reluctant to have to stock pulleys for the very same

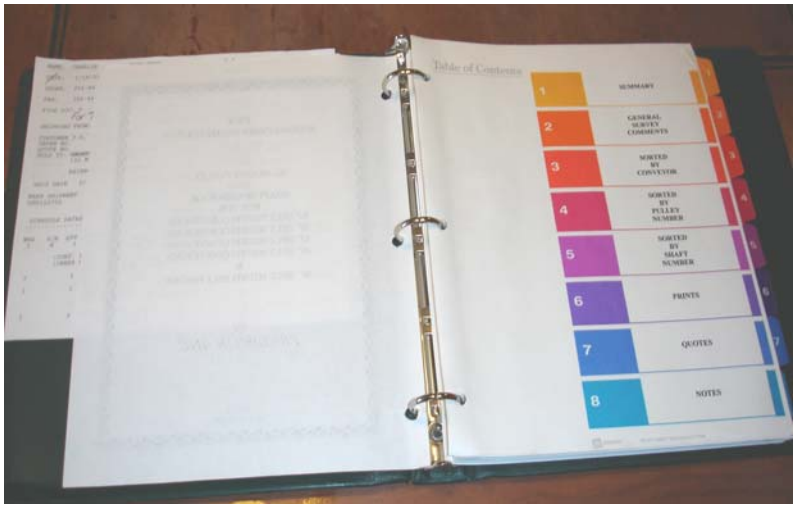

Figure 4

reasons as the manufacturers and distributors. However, there is an answer to this method of madness and that answer lies in a pulley survey and spares reduction plan. Using all of the pulley designs available today, an end user can have a spares reduction plan created and have a minimum number of spares on site with maximum spares coverage throughout the facility. When a plan of this sort has been implemented, the end user no longer needs to worry or be concerned with whether or not a spare that they have on site will be used. The on hand spare would work in several different pulley positions and would most certainly be utilized. In addition, the spares reduction plan will indicate all relative pulley positions that a certain spare pulley can be used in. It is organized, easy to follow and an excellent way to keep track of existing conveyor components. See Figure 4.

In conclusion, both pulley designs mentioned above can dramatically reduce the number of spares required to cover all the conveyor pulley positions on-site. This type of coverage serves both the end user and the manufacturer / distributor well. With this type plan in place, the end users can stock the minimum number of pulleys with shafts to cover their conveyor responsibilities. They do not have to rely on a distributor or manufacturer to try and turn around a pulley assembly in hours and get it to them. The end user's down time is reduced considerably and at a minimum cost. The manufacturers can then have time to produce an identical spare and ship it without being rushed and having to pass along overtime charges to get the pulley out immediately.

A plan of this nature will work better for some end users than others, simply because of different degrees of dedication. When a conveyor pulley survey is completed, oftentimes it is presented to the end user in a binder neatly organized and arranged by conveyor number. As time passes and things change the survey will require updates as changes are made. This type of dedication is required to keep a spares reduction plan in place and up to date. If any end users have ever had a pulley fail and a spare unavailable, then they are familiar with the 30% to 50% overtime cost that you have to pay to get a pulley ASAP, not to mention the lost production time. The long and short of it is that with a minimum number of spares on hand, a end user will save down time and money. The cost to purchase several spare pulley assemblies and the room required to store them is minimal when compared to the overtime charges and lost production time from not having a spare readily available.

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