BELT NOISE

How to Deal with the Squeal

With the exception of brake squeal, nothing gets the customer more irritated than belt squeal. And getting the belt noise out can be a real challenge. Rather than diagnose the condition, many just throw a belt or two at the symptom in a futile effort to eliminate the noise. While you are certain the third belt was the solution, chances are the frustrated customer took his vehicle to another facility where the condition was diagnosed and corrected. A new belt may reduce the noise for a short time, but there is much more to consider than just replacing the belt for a noise related problem. Failure to diagnose the condition may result in the symptoms reoccurring and damage to the new belt.

A HOSTILE ENVIRONMENT

Imagine the pressure and stress a belt is subjected to. First of all, it is positioned in a hostile environment of intense engine heat and is susceptible to chemical contamination. It is generating additional heat from the friction created as it drives a myriad of components, such as the water pump, engine cooling fan, power steering pump, air conditioning compressor, air pump, alternator, idler pulleys and a tensioner. Considering all the different components that rely on a belt for power, it is easy to understand how the belt could make a little noise. A lot of parts must function from the same source of power and stay in the proper alignment to ensure long belt life and quiet performance.

IDENTIFYING BELT NOISE

Belt noises can be elusive. The sounds emitted may vary from a chirping or squealing to a screeching sound. Often the condition results in components getting replaced needlessly, as the noise is much like that of a failed bearing. To isolate belt noise from bearing noise, mist the belt with water from a spray bottle while the engine is at idle. Make certain the customer is not standing in close proximity, as they may get a spray of water in the face when contact is made with the belt and pulleys. If the noise subsides, we have ruled out a bearing as the culprit. The water will provide a temporary lubricant to identify if the belt is the culprit. The water is quickly expelled and evaporates, resulting in no damage to the belt. Belt dressings are not recommended, as they attract grit and foreign material that promote damage to the belt and pulleys. The dressings are a short-term solution, creating long-term problems.

Once you have identified the source of the noise as being belt related, determine if another problem is causing the squeal condition. If not, another belt failure will likely occur. Examine the belt for evidence of a problem with one of the system's pulleys, idlers or tensioner. While a new belt may quiet the noise momentarily, there may be a reason for the belt failure, other than the belt structure. The last thing we need is the customer returning in a few days or weeks with the same noise condition.

Chemical Contamination

Examine the belts and pulleys for evidence of fluid contamination such as antifreeze, engine oil, power steering fluid, etc. The presence of fluids on a belt requires a belt replacement. Make certain the residue is removed from the pulleys with a cleaning solvent, or else the new belt will be contaminated. The fluids promote a softening and separation of the belt construction. Further, they attract debris such as grit and other abrasive particulates, which erode the pulley surfaces, promoting a fraying of the belt.

Belt Cracking

Look for signs of cracking on the top and pulley side of the belt. This can be an indication of a belt that has been in service too long, or a signal of other conditions, such as pulley related problems, too much heat, or tension.

Polished Edges

Improper belt tension will promote belt slippage, resulting in a polished or glazed appearance. When slippage occurs, an overheating and premature belt failure is inevitable.

Frayed Edges

A belt that has shredded or frayed edges is an indication of a rough pulley surface, which grinds away at the shoulders of the belt. Pulley misalignment or shaft damage on a driven component can result in a belt riding on the pulley edges, fraying the belt cords. Many belts encounter this same damage due to improper installation procedures. Consider a serpentine belt and the maze of pulleys that the belt must be threaded around in making the installation. Many of the pulleys are barely visible. It is very easy to overlap the edge of a pulley during the installation. If this condition occurs, within a few miles the edges of the belt are shredded and fiber cords are protruding from the belt. This can promote damage to other components, such as the A/C compressor, when strands of the fiber become entangled in the compressor's clutch assembly. We have seen the electrical wires jerked from the A/C clutch assembly, due to protruding fibers or cords. This can be an expensive encounter. The fraying cords can cause personal injury, so watch your fingers and hands.

Belt Dressings

Examine the belt and pulleys for evidence of any chemical deposits or residue that has been applied in an effort to reduce belt noise. If the deposits are present, the belt must be replaced, following a thorough pulley clean-up, utilizing a suitable solvent. Do not contaminate the new belt by installing it on contaminated pulleys. While belt dressings may temporarily reduce belt noises, the substance attracts debris and abrasives that can erode or crater the pulleys, promoting belt damage and a premature failure.

Pulley Alignment

Proper belt alignment is imperative to increase the life of the belt. Once installed, the relationship of the belt to pulley position should be evaluated to make certain the belt is running true in the pulleys, idler and tensioner. A misaligned pulley is certain to promote belt noise, due to fraying, uneven wear, overheating and glazing of the belt. Belt temperatures increase dramatically in relation to the degrees of misalignment. A misaligned pulley may reduce the life of the belt by one half of its normal life expectancy. The misalignment may be due to pulley damage or a bent shaft on a driven component. Applications that require the power steering pump pulley to be pressed

onto the pump shaft during a pump replacement often present belt alignment problems, due to the pulley not being installed in the proper location.

Many pulley or alignment problems result from damage due to prying on the pulleys during the belt removal or installation. If you cannot install the belt with your hands, with the tensioner compressed or fully loosened, check the application guide to be certain that you have the correct belt for the application. Use the proper tools to make the installation. This may require the use of a pry bar, ratchet, or serpentine belt removal tool. Never pry on a pulley to compress the spring tensioner or tighten the belt, as pulley damage can occur.

CORRECT APPLICATION

Follow the application guide and select the proper belt part number for the vehicle. Altering the belt length affects the automatic tensioner's ability to maintain the proper belt tension, promoting belt noises or component failure due to extreme tension.

PROPER BELT TENSION

Improper belt tensioning will promote belt noises, in addition to uneven and accelerated belt wear. When you look at a belt, think proper tension. The factory specs reflect two belt tensioning ranges — one for a newly installed belt, and a second for a used belt. A used belt is one that has been in service for five minutes. Once the new belt has been installed, run the engine for five minutes and then re-tension according to the specs in the repair or application manual. The five-minute run-in period allows sufficient time and tension for the belt to properly seat in the pulleys, and for any stretching. While improving the life expectancy and quietness of the drive assembly, this procedure is seldom followed, due to the extra time required. Belt tension gauges are available from your tool supplier. Setting the proper tension on the belt when making the installation can save you much frustration and having to replace the second belt, for free.

AUTOMATIC TENSIONERS

Many engines are fitted with automatic belt tensioners. The purpose of this spring-loaded tensioner design is to ensure that the belt will maintain the proper tension throughout its normal life cycle, while compensating for belt stretch or wear. Further, it serves as a damping device to minimize vibrations and noise. With a static tensioner, an improper tension applied during the belt installation is certain to result in slippage or belt noise, especially with age and belt wear. While a belt that has insufficient tension will promote slippage, a belt that has been tensioned too tight promotes premature bearing failure in one of the driven components. The automatic tensioners have a normal operating range and additional travel for belt loading. Most tensioners have indicator marks on the housing, which reflects if the tensioner is operating in its normal tension range. The correct length belt for the application is imperative, as it directly affects the belt tension.

With time and service the automatic tensioners lose their tension, resulting in slippage, promoting premature belt wear and unwanted noises. While the tensioner pulley can be replaced, never try to disassemble one of the automatic tensioners. Doing so may inflict much pain and damage to your person. More bluntly put … the spring can rearrange your facial expression.

TENSIONER FAILURE

Listed are some of the symptoms encountered due to a tensioner failure:

When the belt loses tension: One of the first symptoms of a weakening tensioner is belt noise. Once the condition progresses, one of the driven accessories may fail to turn completely. For example, a weakening tensioner may not provide sufficient tension to turn the power steering pump under a load condition. The result is a loud squealing/screeching sound and a jerk in the steering wheel.

Tensioner noise: With the engine running, listen for any sounds emitted from the tensioner assembly. Any evidence of a clicking noise or any other sound requires further evaluation. If a noise is present, shut the engine down and remove the drive belt. Rotate the tensioner pulley and look for any indication of resistance to turn, or a noise-related condition. The pulley should turn freely and smoothly.

Freedom of movement: With the belt removed from the tensioner and a pull handle or belt removal tool attached to the tensioner, move the tensioner its full limit of travel. The tensioner should move freely with no evidence of a sticking or binding condition.

Tensioner assembly: Perform a visual inspection of the tensioner assembly for any evidence of cracks in the arm or housing. Pay special attention in the area of the tensioner stops, positioned on the arm and spring housing. Any presence of metal-to-metal contact between the arm and spring case is an indication of bushing wear, requiring a tensioner replacement.

Belt tracking: With the belt installed, examine the position of the belt in relation the tensioner pulley. The belt should not be running off the edge of the tensioner pulley. If the belt is positioned at or off the pulley's edge, a tensioner replacement will be necessary, as tensioner bushing wear is evident.

Taking these few extra steps and considerations to examine the integrity of the driven components and their proper alignment can save you and the customer much frustration.

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