BRAKEPRO™ TECHNICAL BULLETIN

VOLUME 3, # 10

AIR DRYERS AND OIL CONTAMINATION

Airbrake air dryers are very important to the delivery of clean, dry, oil-free air to the air brake system. How do they work? When should they be serviced? How can dryers give you more brake mileage? These are all important questions that need to be answered. Oil contamination is one of the many things that cause air brake timing to become out of specification and therefore make brakes work harder than they should.

In the process of compressing air, water and oil vapor are present in the outgoing air from the compressor. The compressed air leaving the compressor is heated by the action of compression and is capable of holding a relatively large amount of water and oil. As the air cools in the system, it loses its ability to retain the water and oil. This causes water and oil to be allowed into the air system reservoirs and be passed on to the entire system. The moisture freezes and also destroys the internal components in all of the air brake system valves. Oil causes swelling and slows down the valve action resulting in slow-responding brakes. Brakes that are slow to respond cause more wear on other brakes and make them wear out prematurely.

Most commercial trucks, tractors, and busses today use some form of air dryer to remove these unwanted contaminants from the air brake system. Before air dryers, moisture cooled and condensed in the wet tank, and a manual drain valve was used to drain the moisture on a regular basis. The operator or technicians often overlooked this, and the contaminants were left to pass into the airbrake system. Automatic drain valves were incorporated into the wet tanks to resolve the draining problem.

While other types of air dryers and automatic drain valves have been used in the past, the most common air dryer in use today is the type that uses a desiccant to remove moisture. A desiccant air dryer removes water and vapor using two primary principles: 1) condensation of water before it reaches the dryer, and 2) absorption of water molecules after entering the air dryer. Oil is condensed in the same way, and there is a filter that assists in oil collection to be eliminated when the dryer purges during compressor unloading.

Since the desiccant charge within the air dryer is capable of handling only a certain amount of moisture, there is a cycle built into the operation of the air dryer known as "purge". As the moisture is removed by the dessicant charge and it reaches its maximum limit, the compressor will shut down when the air system pressure reaches its maximum pressure. At that point, the air dryer purges all of the moisture in the dessicant charge and also dumps the excess that is at the bottom of the dryer. In essence there should never be any moisture in the "wet tank" at all. When moisture continues to show up in the "wet tank" on a regular basis, it means that the dessicant is not able to do its job. If the desiccant becomes partially or totally soaked with oil, it can no longer absorb moisture and therefore passes it on to show up in the "wet tank".

Once the oil reaches the "wet tank," it then is free to go to each valve and cause rubber swelling and contamination. When this occurs, the valves become slow to apply or release the brakes, creating problems. This problem causes the brake linings to wear faster than expected and run at higher temperatures. This problem is usually diagnosed as poor or inferior friction material.

Simply understanding the service requirements and intervals of dryer service and being able to recognize the indications of moisture in the "wet tank" can help you. Knowing that oil will soon reach the system may assist you in preventing it by servicing the dryer first.