

VAC-U-MAX Solves Metro North Wheel True Woes

MTA Metro-North Railroad the second-largest commuter line in the United States, provides more than 240,000 customer trips each weekday and some 71,800,000 trips per year. It currently has a fleet of better than 950 cars and engines, 384 route miles, and 775 miles of track. Since the engines and cars ride on the track with wheels made of solid steel (weighing in excess of 800 lbs. each) as well as being attached to the bottom of a train weighing as much as 420 tons, servicing these huge machines is no simple task. Chief among the areas of concern is the wheel truing facility. The steel wheels run over steel rails and when sudden braking occurs, the wheels lose roundness in areas which are known in the industry as "spots", with larger "spots" referred to as "flats" (typically larger than 1" in length). Wheel truing is the method by which the steel wheels are milled back to a round condition using a wheel truing machine. The latest vacuum technology and custom engineering by VAC-U-MAX is being utilized by Metro North to improve working conditions for wheel true operators, extend the working life of wheel true equipment, and to increase the number of wheels being trued in a day.



Typical Chip Conveyor Under Wheel True Machine

The Pressure is "On" to Find a Better Way

Downtime on The 40-year-old wheel true machine on Track 44 at Metro North's Croton-on-Hudson facility was a big problem. VAC-U-MAX of Belleville, New Jersey teamed up with John Hoban of MNRR and Simmons Machine Tool Company of Albany NY, the manufacturer of the wheel true machine, to develop a Central Vacuum System which could be incorporated into MNRR's wheel truing operation to alleviate the chronic problems. The Track 44 wheel true



Chip Buildup in pit covering Four (4) inch pipe from pressure blower

machine was originally supplied with a pressure blower system for chip removal. A large fan would blow the chips generated by the milling heads through a piping system out of the wheel true pit and into a railside hopper. The pressure blower system was notorious for wearing out critical components in the collection system from the high-speed cast iron chips. The fan was very loud and it dispersed smoke from the truing operation into the larger shop area. In addition, a significant volume of chips did not get into the pressure blower system. They would accumulate in the pit area and other nooks and crannies around the wheel true machine. Operators (or "pilots" as they are called in this industry) would use compressed air to blow the loose chips and piles into the pit away from the work surfaces. Occasionally those blown chips would lodge in critical places resulting in damage to seals and piston surfaces.

This Job is the Pits

Chips in the pit collected with dirt, water, sand, and other debris that entered the facility on the railcars during the Fall and Winter seasons which clogged the drain in the pit. The buildup of material required a crew or workers to enter the pit on their hands and knees with short shovels and 5-gallon pails to clean it out—an unfriendly, slow, and dreaded job for the pilots. It resulted in lost wheel true time—as much as a full workday. Every day that a railcar is out of service is lost passenger miles and therefore a revenue loss for MNRR.



Chip Buildup in Wheel True Pit, Tail end of chip conveyor shown at right

Time is Money

Phase I of the system consisted of three main components; a vacuum producer, a vacuum-tight forkliftable hopper and a steel piping network. Instead of the chips being blown through a piping network, the chips are now drawn through the collection system by high vacuum. John Hoban also wanted manual hose stations for the pilot and co-pilot so that they could easily vacuum clean the stray chips rather than blow them with compressed air. Each new vacuum operation would reduce the chip build-up in the pit which increased up-time for the wheel true machine and reduced maintenance due to foreign object damage.

The Squeaky Wheel Gets the....

John Hoban also knew that his pilots would listen for certain tones coming from the wheel true operation as a type of status indication for the wheel set. So the new vacuum system needed to be quiet as well as powerful. Hoban also knew that he had limited space alongside Track 44 for this new vacuum equipment so VAC-U-MAX engineered a mounting frame for the vacuum pump in order to elevate it on an existing truss column—floor space saved and noise level problems avoided. Space constraints were also met with a 1.5 cubic yard vacuum-tight hopper for the chips that provided extended wheel true sessions.

It's All About the Workers

Eliminating the drudgery of the pit cleaning operation was important. MNRR encourages its workers to participate in improving working conditions or operations at their facilities. One pilot's suggestion improved the chip wipers that surround the cutting head in order to improve the chip capture. Phase II of the vacuum system upgrade involves direct connection of the chip chutes to the vacuum system to cause an inward draft of air at the chip wipers to draw in stray chips (which can be red hot!!) to keep the pilots from being pelted. In addition, the milling head on the wheel true machine consists of multiple carbide inserts, or cutting bits, which shave the steel off the wheel surface. New industrial hygiene and safety regulations resulted in health warnings being posted on the carbide insert cartons due to the respirable dust that comes from the wearing of the inserts. The inward draft of air around the chip wipers is also intended to reduce the pilot's exposure to those dusts. The old method of blowing the stray chips with compressed air was also eliminated which will prevent personnel injuries.



High Powered Vacuum System with Vacuum Pump and a Self Dumping Chip Hopper

From Here to There

Older wheel true machines utilize the pressure blower for chip collection. Newer systems use chip conveyors that are frequently used in the metalworking industry. The chip conveyors were a big improvement over the pressure blowers in terms of reduced noise levels and better chip collection. But there is still room for big improvement. Chip conveyors still present significant maintenance problems. More importantly, they don't solve the problem of stray chips around the machine or chips that miss the conveyor mechanism—the pit problem and respirable dusts and stray hot chips still exist.

Good Clean Scrap

The pressure-type collection systems and chip conveyors take the chips and drop them into open-top hoppers or dumpsters. If the open hoppers were located near pedestrian traffic areas, they extended an invitation to passers-by to throw their trash into the container. This would reduce the recycle value of the scrap. Open top dumpsters located outside a wheel true building are also exposed to the environment, collecting rain water and snow, which would cause the chips to rust in the dumpsters. Dumpsters with holes in the bottom would leak oily water onto the ground that causes environmental managers to lose sleep. The enclosed VAC-U-MAX system is environmentally friendly because it prevents foreign debris from entering the hopper and is weather-resistant.

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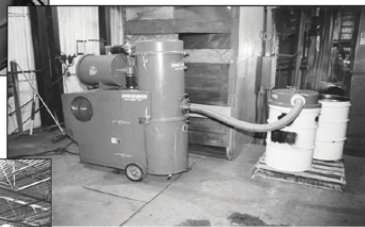


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