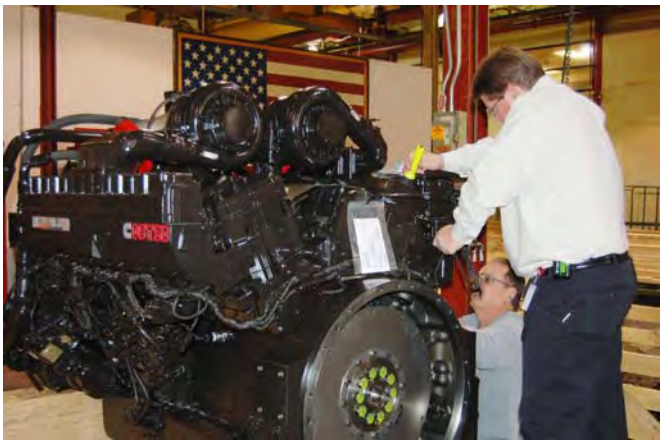
## Big Engines benefit from Small Details.

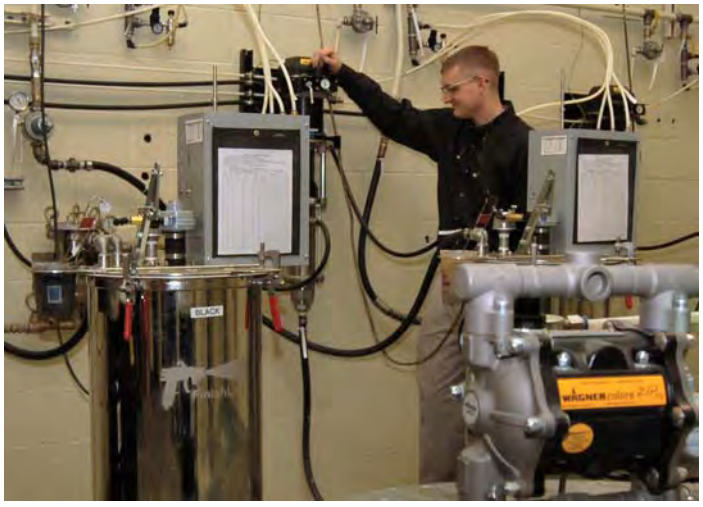
Improving paint delivery improves productivity at Cummins Engine

The saying goes, “for want of a nail the kingdom was lost”. So it is in manufacturing – a small cog in the machine can frequently make an unexpectedly big difference in a large production process. When the



Cummins Engine Company plant in Seymour, IN realized that production of their giant diesel engines was being hindered by frequent problems with paint fluid delivery they decided to revamp their paint mix room to fix the problem. The solution helps Cummins to produce diesel engines for everything from their own Onan® line of power generators to riverboats more efficiently and with better quality. During Operations Desert Shield and Desert Storm, the Cummins VTA-903 diesel engines made in Seymour powered over 2,500 Coalition vehicles including every Bradley Fighting Vehicle in the field.

Each of the massive diesel engines produced by Cummins gets a primer coat and any of five colored top coat finishes ranging from Onan green to a semi-gloss beige. But inconsistent pressure and problems with pump cycling and reliability caused a number of problems, from poor paint coverage and contamination to safety concerns. “We had constant issues with our paint delivery” explain s Dan Wiederholt, “from problems with pumps cycling to leaks in the system. The problems with paint delivery caused downtime; and even when the system was up, the old design made it harder for us to get the uniform paint coverage we need” says Wiederholt.



“After we changed over to the new system” says David Phillips, Engine Business Technology Leader “one of our regular inspectors said “I don’t know what you did, but our engines ‘look better’.

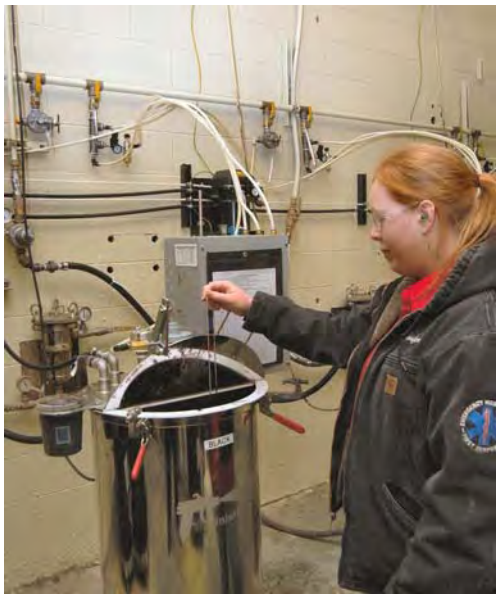
What Cummins did was to completely renovate their paint mix room by replacing their existing pumps with a new system of Wagner 3-600 Puma piston pumps. The 3:1 high volume circulation wall-mounted

pumps use a vertical reciprocating piston capable of delivering nearly 20 gallons per minute with extreme reliability and uniformity. The PUMA pump is specifically designed to operate with extremely low pulsation in material flow which allows for excellent paint atomization.

Reliable pumps are critical since the paint kitchen feeds each of three manual spray booths located throughout the plant with hundreds of feet of stainless steel recirculating paint lines, so proper design is imperative to the spray painters.

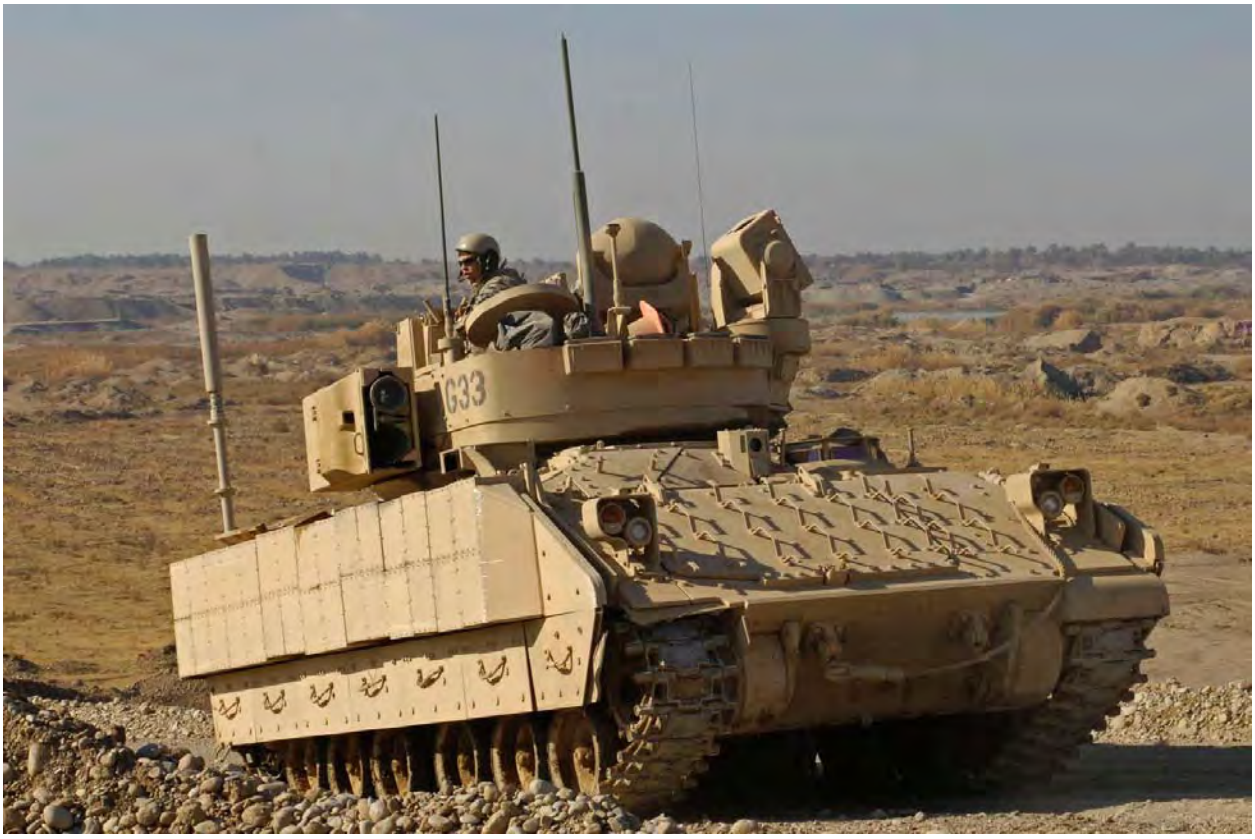
Paint is stored, and kept conditioned in 30 gallon stainless steel mix. Each mix tank is agitated by low shear, lube-free air motors that use 50% less air than conventional designs making them both quieter and more efficient.

The mix tanks were outfitted with a custom engineered float valve system so that when the paint level in each tank drops to a pre-set level, paint is pumped from separate supply drums outfitted with Wagner Zip-52 stainless steel double diaphragm pumps. Maintaining the proper level in the supply tanks prevents problems like accidently introducing air into the system and allows for more uniform agitation and viscosity control. The Zip-52 pumps were selected because of the high durability from their anti-stalling pilot valve and long life diaphragm design as well as a pulsation-free change over valve.



The 'hands-off' filling system frees up Cummins operators from the task of monitoring and replenishing paint and allows them to concentrate on more productive issues. The automatic check valve system as well as the integration and installation of the paint room equipment was handled by FinishLine Technologies, a Wagner equipment distributor headquartered in Columbus, IN. "We planned the project with FinishLine so that we could changeover the paint room over a single 3-day holiday weekend" explains Brian Wiseman, Manager of Paint and Tag. "The difference is night and day" says Joe Garry of FinishLine Technologies, the system runs with minimal operator supervision and provides higher reliability and better paint quality".

(Picture of Bradley Fighting Vehicle Below)




*“For want of a nail.” Improvements to the Cummins Engine Company plant in Seymour, Indiana make production of engines like those used for the Bradley Fighting Vehicles deployed in Desert Storm more efficient and cost-effective.*