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Barry Richter, San Gabriel Valley Division 9 master mechanic leader, discovered a replacement for cracked manifolds. His two-piece solution included a clam-shell insulator and a manifold developed for diesel engines. *Photo by Ned Racine*

Master Mechanic Slows Avalanche of Engine Problems

By NED RACINE, Editor

(Aug. 14, 2008) An exhaust manifold is one of the simpler pieces of a modern bus. It removes the scalding gases from the combustion chambers and sends the gases on their way to the tail pipe. Not too complicated—unless the manifold begins failing.

That is what began happening in 2007, when a number of Detroit Diesel natural gas (CNG) engines reached approximately 250,000 miles of service. Their cast-iron exhaust manifolds cracked, meaning a noisy engine, loss of power and sidelined buses.

John McBryan, Division 9 maintenance manager, recalls that at one time the agency had 40 to 50 buses sidelined by the cracked part. According to McBryan, the \$2,300 manifolds started cracking as early as 2000, but an avalanche began in September 2007.

Complicating the problem was that Detroit Diesel no longer manufactured the engine or parts for it.

"We couldn't get [replacements] fast enough," McBryan said. Metro needed a stopgap solution. Quickly.

Fortunately, Barry Richter, San Gabriel Valley Division 9 master mechanic leader, had an idea and

pursued it through testing and approval.

Richter, who has worked for Metro for 16 years, researched the misbehaving manifold and discovered Detroit Diesel offered an identical part, made for diesel engines. Metro even had some in stock. Richter began testing the part with good results.



Richter needed to find a way to insulate the heat of the manifold from the rest of the engine.

Another problem remained, however. He needed to find a way to insulate the heat of the manifold from the rest of the engine because the manifold reaches 1,000 degrees when it idles; 1,200 degrees when it runs.

Using the M3 system, Richter found a Metro vendor who made an insulating wrap for coach exhaust pipes. That vendor agreed to produce a clam-shell-shaped insulator needed for the new manifold.

“Our plan was to get this done and feel very comfortable in what we were doing first,” McBryan said. “Someone else had to approve it.”

By December 2007, insulator in hand, Richter had a two-piece solution, a solution that saved the agency over \$1,000 from the cost of the original manifold.

The big test came on January 29, 2008. Kwesi Annan, project engineer for Vehicle Technology & Support, tested Richter’s solution and approved it. Particularly satisfying for McBryan and Richter, the stopgap solution had as good a heat rating as the original manifold.

Division 9 mechanics began bolting the new manifolds on immediately. As of August 1, 100 of the new manifolds have been used. Richter’s solution will eventually be installed on hundreds of similar Detroit Diesel engines in Metro’s fleet.

“The ease of working with the clam-shell insulation blew everyone away,” McBryan said, noting that the results removed any skepticism about replacing original engine equipment with Richter’s solution. In fact, the clam-shell insulator will be used on other buses, in part because it is less expensive, has fewer pieces and is easier to inspect.

“Bob New [director, Purchasing] was very instrumental in making this happen,” McBryan, a 37-year Metro veteran, said, describing the stopgap solution as a team effort.

McBryan noted that John Roberts, DEO Operations, first noticed a pattern in the manifold failures. He also praised support from Mike Bottone, director of Equipment Engineering, Vehicle Technology & Support, and Richard Hunt, general manager, San Fernando Valley service sector.

Richter’s fellow Division 9 mechanics helped refine the clam-shell insulator.

“With this idea [we have] a stopgap [preventing] a catastrophe because these buses would have been down, and there was nothing you could do about it.”

The stopgap solution isn't perfect. Bolts still need to be tightened, and gaskets need to be replaced.

"Yet, that bus would have been parked if we hadn't put this design on it and run it," Richter said. "It got us our buses moving again."

"We came up with a better mouse trap," Richter added.

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