DURABILITY EVALUATION OF UREA SCR CATALYSTS FOR HEAVY-DUTY DIESEL ENGINES

Kent Koshkarian, Eric Liang, and Joe Cibulka
Caterpillar Inc

Selective Catalytic Reduction (SCR) technology is well established for NO_X emissions reduction on stationary sources. Unlike stationary applications, however, application on mobile diesel engines presents a host of engineering, regulatory, and customer acceptance constraints. In the last couple of years a significant amount of work has been undertaken to understand better the potential for adapting SCR to mobile diesel applications. A vast amount of the work has been focused on ascertaining the NO_X reduction performance that can be achieved as well as addressing the engineering issues. In addition to understanding these issues it is also important to assess the long-term durability of the different SCR catalyst materials when exposed to the conditions that will be encountered in a mobile diesel engine application.

Caterpillar Inc., with the participation of catalyst suppliers, initiated a project with the objective of assessing the durability of SCR systems. A series of laboratory and engine dyno evaluation tests were run on six different SCR catalyst formulations. The tests were designed to assess the catalysts' ability to maintain NO_X reduction performance when exposed to conditions that would stress them both chemically and thermally. Testing revealed that there were significant differences in the overall durability of the various SCR catalyst formulations. To meet the requirements for application on heavy-duty diesel engines, catalyst suppliers will need to continue developing improved SCR catalyst formulations. A discussion of the test methods as well as a summary of the results from this durability evaluation testing will be presented.