

Toward In-use Testing

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As with private firms, the Environmental Protection Agency is continually searching for new ways to maximize our product while using a minimal amount of resources. Since our ultimate responsibility is the protection of the nation's environmental assets, we realize that any task we take on must have environmental benefit.

In that regard, over the last couple of years we have shifted our focus from the certification of prototype engines to actually testing the engines during their actual use, both light-duty and heavy-duty vehicles. We realized it didn't make sense to put a lot of effort into verifying that a particular engine family was engineered to meet air quality standards when it was highly possible the same engines may be violating standards while on the road.

Unfortunately this new approach poses a number of problems. Perhaps the most significant of these is the lack of a reliable commercial tool that we could use to actually measure the emissions of vehicles while in-use. Most of the testing that had been done on post-production vehicles in the past was performed in a laboratory on dynamometers driving well-defined patterns that for the most part didn't reflect actual driving conditions. Also compliance with our current regulations is only dependent upon complying with our standards while driving this laboratory pattern so when exceedances of the standard may occur during in-use testing, our response to those exceedances would be limited.

We took steps to solve the problem of measuring emissions from the vehicle by inventing a prototype unit we call the Real-time On-road Vehicle Emissions Reporter (ROVER). ROVER allows us to measure NO_x, CO, and various other pollutants from a vehicle while in-use. Notably this device does not measure PM at this time. While ROVER can be somewhat time-consuming to work with, the advantage it has is that it attaches directly to a vehicle's emission's system and allows us to take real-time readings of the pollutants from this vehicle during everyday use. It can be used on both on- and off-road vehicles, both gasoline and diesel powered.

We followed the invention of ROVER with the development of a second-generation device called the Portable Emissions Measurement Strategy (PEMS) unit. This unit added a remote capability to measuring emissions from a vehicle that allows us to attach it to a vehicle anywhere in the United States and obtain real-time measurements from the vehicle regardless of its location. This tremendous improvement will allow us to better understand how vehicles are operating under a variety of different geographical and meteorological conditions. We can observe how the emissions of heavy-duty engine differ when driving through the deserts of California as compared to the mountains of Colorado. Does this same engine exceed standards when operating under sub-zero conditions in North Dakota during the middle of winter? How do on-road engines compare with non-road engines?

These devices will provide a wealth of information. In addition to the obvious regulatory purposes such as determining compliance with emissions standards, the Agency can use the emissions data to develop new models that help us better understand the actual pollution contributions of motor vehicles. These models are invaluable in determining whether a region's implementation plans for meeting air quality standards are realistic, not only to the EPA but also to state and local air quality agencies. Industry will use these units to collect data that allows them to build cleaner, more durable engines. We can even envision environmental and watchdog organizations using portable emissions units to insure vehicle compliance with environmental regulations.

The final step to complete our focus on in-use testing will be realized in early 2002 when commercial mobile testing units become available. Over the next several years, we intend to collect hundreds of thousands of data points that will tremendously increase our understanding of vehicle emissions and their contribution to air quality in our country. The ultimate result will be an improvement in air quality for our country and significant health benefits for our citizens.

リアルワールド計測に向けて

EPAは民間企業と同様、限られた資源で最大限の価値を生み出すよう常に新しい手法を追求しています。私達は国の環境資産を保護することが究極の責任であり、常に環境のために仕事をしなければならないと考えています。

私達は最近、従来の排ガス認証試験だけでなく、路上を走行中の排ガス試験にも着目しています。これは、路上という種々の走行条件のもとでは、認証試験時の環境基準に適合しないところがあるのでは、という疑問に基づくものです。

残念なことに、この新しいアプローチには数々の問題が生じています。おそらく、その中で最も重要なことは、路上走行試験に使用できる最適な市販装置がなかったことです。しかし、現在のようなシャシダイナモ上での規定モード試験を行っているだけでは、実際の路上での排ガスに対して私達が言及できる範囲は限られてしまいます。

そこで私達は、Real-time On-road Vehicle Emissions Reporter(ROVER)という排ガス試験システムを試作しました。ROVERを車両に直接搭載することで、路上走行中のNOx・CO等の排ガス成分をリアルタイムに測定できます。この装置は、オン・オフロード、ガソリン・ディーゼルを問わずに広く使用可能です。

さらに、私達は、ROVERを次世代の測定装置、Portable Emissions Measurement Strategy(PEMS)unitへと発展させました。PEMSでは計測中のデータ通信機能が付加されており、地理的条件・気象条件の異なる合衆国各地での結果をそのまま比較できます。

これらの装置から得られる多くのデータは、規制目的だけではなく、自動車環境に与える影響をより正確にモデリングするための重要な情報を提供します。このようにして構築されるモデルは、各種の環境基準案の妥当性評価に応用できます。また、ROVERやPEMSは、自動車産業による環境負荷の小さいエンジンの開発や、環境団体によるモニタリングなどにも役立つはずで

す。EPAでは、これら仕様の最終まとめを2002年初頭に設定しています。その後は数年にわたって数多くの路上走行データを収集し、合衆国における自動車の環境への影響度の解析を進める計画です。この試みは、最終的に、合衆国の環境と国民の健康面とに大きな利益をもたらすものと信じます。

(抄訳 編集部)