



Roscommon Equipment Center

- FINAL REPORT -

CATALYTIC CONVERTER STUDY

PROJECT NO. 27

NORTHEAST FOREST FIRE SUPERVISORS

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Beginning with the 1975 model year, all U.S. and many foreign automobile manufacturers began installing catalytic converter exhaust emission controls on vehicles under 6,000 GVW in an effort to comply with Federal regulations limiting the amounts of hydrocarbons and carbon monoxide present in automobile exhaust. Almost immediately, concerns were expressed by fire protection personnel that converter-equipped vehicles would exhibit greatly increased exhaust system temperatures and therefore increase the probability of wildfire starts, if these vehicles were operated or parked in areas where forest fuels might contact the exhaust system. Another area of concern was that increased exhaust system temperatures could lead to more frequent vehicle fires and present personnel safety problems.

Since these concerns were first voiced in 1975, there have been several studies conducted on catalytic converters as regards their potential to ignite forest fuels. Each of these studies reached a similar conclusion. Included in this report is a list of publications that may be obtained if you desire to study testing methods and procedures in more detail.

Generally, the test data indicates that converter equipped vehicles have about the same fire setting potential as non-converter equipped vehicles under normal operating conditions. However, if an engine is misfiring or malfunctioning in some other manner, the exhaust systems of converter and non-converter vehicles react in opposite manners. In vehicles not equipped with converters, any engine malfunction is likely to lower exhaust system temperature, while converter vehicles produce much higher temperatures and therefore have a greater fire setting potential.

Catalyst temperature increase is usually caused by an excess amount of unburned fuel passing into the converter, usually as a result engine ignition malfunctions such as misfiring spark plugs, poor timing, or faulty ignition wires. Catalysts are designed to oxidize unburned hydrocarbons, releasing into the air carbon dioxide, water, and heat. The unburned fuel represents a large amount of hydrocarbons which the catalyst must convert. In

doing so, the quantity of heat released is so great that the converter and surrounding equipment can reach dangerously high temperatures. The "Preliminary Report on Catalytic Converter Temperature Tests" released in July 1975, by the U. S. Forest Service, San Dimas, Equipment Development Center, stated that during the malfunction phase of testing, testing was halted when exhaust system surface temperature exceeded 1600°F., hot enough to produce almost instantaneous ignition of dry grass and pine needles should they come in contact with the system.

The San Dimas tests did not address the question of the frequency of engine malfunctions. Universal Oil Products Company and the California Air Resources Board (CARB) took this variable into consideration when interpreting their test data. CARB reported, "Analysis of the data by estimating the fire hazard based on the probability of malfunctions showed that the overall increased fire hazard for the catalyst cars was small or non-existent."

However, it would be helpful to impress upon field personnel the need to make an effort to document fires whose cause can be directly attributed to catalytic converters. In this manner we may be able to assemble enough data to determine whether or not converter equipped vehicles are responsible for significantly more fire starts than vehicles equipped with conventional exhaust systems.

Prevention personnel should be made aware of the fact that if vehicles with catalytic converters develop engine problems, they will produce extremely high exhaust system temperatures. During prevention contacts with the public, our prevention people should emphasize the increased potential for converter caused fires due to poorly timed or malfunctioning engines.

While it does not yet appear that the catalytic converter is the "fire-breathing dragon" envisioned by some when it was first introduced, there is enough evidence of its fire starting capabilities that fire protection personnel should be concerned about its presence in wildland areas.

Reference Material

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