Evaluation of an Automobile Power
and Deceleration Governor

*the Smith*

April 1974

Test and Evaluation Branch
Emission Control Technology Division
Environmental Protection Agency
Mr. Coye Conner, representing Mr. Edward Smith, inventor of the Power and Deceleration Governor, contacted the Mobile Source Air Pollution Control laboratory in Ann Arbor, Michigan, to request a laboratory and engineering evaluation of Mr. Smith's invention. Submitted with the request was a test report prepared by Automotive Research Associates, Inc. of San Antonio, Texas, indicating significant reductions of exhaust emissions. A confirmatory test program was conducted by the Test and Evaluation Branch of the Emission Control Technology Division.

The Power and Deceleration Governor is a vacuum controlled throttle valve assembly installed between the carburetor and the engine intake manifold. The control mechanism of the device affects a carburetion cut-off during deceleration and limits throttling during acceleration. There are no parameter changes made to the engine's basic spark timing, idle CO setting, or idle rpm.

**Key Words and Document Analysis**

- Air Pollution Control
- Emission
- Exhaust Gases
- Tests
- Exhaust emissions
- Motor Vehicles
- Power and Deceleration governor

**Distribution Statement**

- RELEASE UNLIMITED
Background

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Device Description

The Power and Deceleration Governor is a vacuum controlled throttle valve assembly installed between the carburetor and the engine intake manifold. The control mechanism of the device affects a carburation cut-off during deceleration and limits throttling during acceleration. There are no parameter changes made to the engine's basic spark timing, idle CO setting, or idle rpm. The cost of the device is approximately $50 and can be installed in about one hour.

Test Program

A 1966 Chevrolet Impala, 283 CID, supplied by the inventor was used in the testing. Three tests were conducted, two with the device installed, and one with a standard carburetor. Two additional tests were run with the standard carburetor, but were invalid due to an exhaust system leak. All testing was performed in accordance with the 1975 Federal Test Procedure as outlined in the November 15, 1972, Federal Register. The tests were conducted using the standard dynamometer inertia loading of 4000 pounds and Indolene 30 as the test fuel.

Test Results

The test results are presented in the Appendix of this report. These results are summarized as follows:

<table>
<thead>
<tr>
<th>Summary of Emission Results</th>
<th>PDG Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC</td>
<td>18% increase</td>
</tr>
<tr>
<td>CO</td>
<td>23% decrease</td>
</tr>
<tr>
<td>CO2</td>
<td>13% increase</td>
</tr>
<tr>
<td>NOx</td>
<td>45% decrease</td>
</tr>
<tr>
<td>Fuel Economy</td>
<td>5% penalty</td>
</tr>
</tbody>
</table>
Conclusions

1. Significant penalties in hydrocarbon emissions and in fuel economy resulted from the device installation. Carbon monoxide and oxides of nitrogen were significantly reduced.

2. Vehicle driveability with the device was not evaluated, but would require analysis in any further development effort.
APPENDIX

Comparison of 1975 FTP Emission Results
with and without the Power and Deceleration Governor

<table>
<thead>
<tr>
<th>Date</th>
<th>HC gm/mi</th>
<th>CO gm/mi</th>
<th>CO₂ gm/mi</th>
<th>NOx gm/mi</th>
<th>Fuel Economy</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-5</td>
<td>7.02</td>
<td>79.2</td>
<td>454.45</td>
<td>3.32</td>
<td>14.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>HC gm/mi</th>
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<th>NOx gm/mi</th>
<th>Fuel Economy</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-2</td>
<td>8.32</td>
<td>57.9</td>
<td>509.95</td>
<td>1.71</td>
<td>14.4</td>
</tr>
<tr>
<td>4-3</td>
<td>8.22</td>
<td>61.2</td>
<td>513.40</td>
<td>1.82</td>
<td>14.1</td>
</tr>
</tbody>
</table>

% Emission Change

-17.8%  22.7%  -12.9%  45.2%  -4.7%

NOTE: a negative sign indicates an increase of emissions or fuel economy penalty.