Emission Control

Privatizing Vehicle Inspection and Reducing Fraud in Mexico City

The vehicle inspection program in Mexico City is regarded as one of the most successful in a developing country. As the program evolved, it suffered the problem common to most such schemes in developing countries—high levels of evasion. But the program now operates well, through high-volume, test-only centers entirely in the hands of the private sector. As an increasing number of developing country cities consider how to enforce emissions standards as a way to control transport-related air pollution, Mexico City offers valuable lessons on how to ensure compliance.

Mexico City accounted for 3 million of the estimated 7.4 million gasoline-fueled vehicles in Mexico in 1999. These vehicles are believed to be responsible for Mexico City’s serious ozone problem. The resulting productivity losses, hospital visits and admissions, and asthma attacks and respiratory problems cost the economy hundreds of millions of dollars a year. In response to the worsening air pollution, the local government initiated a voluntary vehicle inspection and maintenance program in 1982. The program has since undergone changes to ensure stricter and more reliable testing and to reduce the number of vehicles obtaining a pass certificate despite emissions that are too high—a “false pass” (table 1).

How the system has evolved
All motorists, whether their vehicles are registered in the Federal District or the State of Mexico (Mexico City’s two jurisdictions), have to display a sticker showing that their vehicle has passed an annual emissions test or risk a fine (US$85 in 2001) imposed by traffic police (later, this became the work of ecological police). The sticker also shows when the vehicle can be driven. Since 1996 Mexico City’s “day without a car” program has placed restrictions on when vehicles can be operated, depending on their emission levels. Today there are four categories of emission levels, with cars in the cleanest two allowed on the road any day of the week. The emissions standards, which define pass-fail as well as the four categories, initially applied to hydrocarbons and carbon monoxide. They were progressively tightened between 1994 and 1999. The changes in the standards were aimed at removing older and more polluting vehicles from the city.
Comparing test and test-and-repair centers
The annual inspections, made mandatory in 1988 for vehicles of a certain age, were initially conducted in test-only centers operated by the city government. But soon afterward independent test-and-repair garages were authorized. In 1991 the government launched a program to create independent, multi-lane, test-only “macro-centers” in which some testing lanes would be equipped with dynamometers (allowing simulations of loads). By 1993 there were 500 test-and-repair centers and 24 macro-centers in full operation, all privately owned.1

The test-and-repair centers were convenient for vehicle owners. They provided a one-stop solution, eliminating the “ping-pong” effect of a vehicle owner being caught between a garage arguing that it had correctly repaired and tuned a vehicle and a macro-center reporting that the vehicle exceeded the emissions standards. As a result, most private vehicles went to the test-and-repair garages. Vehicles that were not privately owned had to go to the macro-centers for the dynamometer test, which was unavailable at the test-and-repair centers.

Because the macro-centers limited their services to testing, they were far easier for the government inspectors to supervise. In addition, the concentrated ownership of these centers (they were owned by a few industrial groups specializing in emissions inspection) aided the adoption of new technology and led to more uniform results among centers.

Over time the quality of testing by the test-and-repair centers deteriorated. The garages soon found that they could offer lower prices if they cheated in the emissions testing, which allowed them to cut back on the repair services performed. In a market with surplus capacity the desire to increase profits by expanding the volume of business was strong, and the chances of being caught were small. So, while the test-and-repair garages were convenient for users, they had considerably less impact on emissions than the test-only centers. Indeed, as problems worsened, an estimated 50 percent of the vehicles going through the test-and-repair centers obtained their approval certificate fraudulently.

The public began to see the emissions control program as highly flawed, and it came close to being shut down.

Moving to test-only verificenters
These problems led to complete restructuring of the program in January 1996. Despite the political implications, licenses were withdrawn from all 600 test-and-repair centers, while the number of test-only macro-centers was increased from 26

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to 33, for a total of 180 test lanes. The program introduced a series of stringent quality controls and technical changes in the operation of the multi-lane centers and created a new public identity for these centers—as test-only “verificenters.”

Besides making technical adjustments to the testing procedures, the verificenters introduced elaborate precautions to prevent testers from giving false passes. These included “blind” test lanes where the tester could not see the test results (available only at the station exit), central computer and video monitoring of testing, and technical audits of centers by government inspectors. As a result of these actions, the share of failing tests increased substantially. In the second half of 1995—before the restructuring—the test-and-repair centers had reported a rejection rate of 5.8 percent, and the macro-centers a rejection rate of 10.3 percent. In the first half of 1996, under the new operating rules, the verificenters had a rejection rate of 22.5 percent.

Facing persistent problems

Still, even though an estimated 73 percent of vehicles obtained correct emissions certificates in the first half of 1997, 8 percent obtained false passes because of incorrect testing practices by the verificenter, and another 19 percent received false passes because of incorrect practices by the garage that tuned the vehicle before the test. Tuning vehicles “late and lean,” with late ignition timing and a lean fuel and air mixture, became a common practice among garages, as did disconnecting air hoses from the intake manifold. Once the vehicle passed the test, it would be retuned. These practices sometimes reduced engine power during testing to an undrivable level and increased nitric oxide emissions. But the practices effectively, though temporarily, reduced hydrocarbon and carbon monoxide emissions, and they could not be detected by the testing procedures used. Even so, these rates of false passes compare very favorably with the rates of more than 50 percent estimated for the test-and-repair centers.

Despite the great improvements in the emissions control program by 1997, several issues still needed to be addressed:

- Eliminating the test-and-repair centers caused a large bottleneck in the verificenters. This problem was particularly evident at the end of each month, when extremely long queues formed as irate vehicle owners tried to get a test during the last few days of their assigned time slot.
- The conditions specified in the testing protocol were insufficient to warm up and ignite the catalytic converter on many vehicles, preventing testers from seeing whether it was working.
- The standards were easy to circumvent by tuning late and lean. Since nitric oxide was not being measured, there were no controls against this practice.

In addition, the testing protocol neither generated sufficiently stable or replicable test results nor produced sufficiently low levels of uncertainty to allow its use with the new, tighter standards introduced in 1996.

Strengthening quality control

The program solved the problem of inadequate capacity by increasing the number of verificenters to 76 and authorizing 337 test lanes. The higher number of centers provided a balance between the quality of service to users (such as waiting time) and the centers’ profitability. If there were too many centers, the waiting time would be negligible, but so would the centers’ return on investment. The low returns would create pressure for unethical behavior if that could improve profitability. Indeed, some centers did modify their procedures to attract more clients—charging no fee for vehicles that failed to pass, turning a blind eye to visual inspection failures, and, in some cases, giving false passes.

When there were fewer centers, the companies had been so profitable that they were willing to police themselves to ensure that they could remain in this excellent business. With the increase in centers, the quality of service for vehicle owners increased dramatically, but so did the need for government supervision.

Two other changes probably led to higher emissions than would otherwise have been the case. First, in 1997 a requirement that vehicles registered in the Federal District be tested there was lifted, allowing the owners to choose either the State of Mexico or the Federal District for
testing. In 1998 the State of Mexico authorized additional verificenters and test lanes, many of them near the Federal District. By 1999 the two jurisdictions had a total of 154 verificenters operating 572 test lanes. But they did not share a similar determination to maintain high standards in the emissions inspection program, and many vehicle owners—particularly those with the most polluting vehicles—sought out testing centers in the State of Mexico that would issue a pass more easily. Between the first half of 1997 and the second half of 1999 an estimated 500,000 vehicles that earlier would have been tested in the Federal District were tested in the State of Mexico or not at all. The requirement was reimposed in January 2001, resulting in a significant increase in the vehicles tested in the Federal District and in the fines collected there on vehicles that had not been tested. Second, during 1998 and 1999, in a move to reduce the public perception of corruption in the police force, traffic police were forbidden to stop vehicles because of inspection sticker violations. This became the prerogative of the ecological police, of which there were few at the time. As a result, it became possible to drive around the city without a sticker with little risk of being stopped.

To address technical problems in the testing procedures, in 1995–96 the Mexico City government defined a new protocol—the acceleration simulation mode—and put it into effect for the second half of 1997. The changes in the testing protocol were aimed at generating more certain test results, permitting the use of tighter standards, and reducing false approvals. Today, test centers in the Federal District caught not following the new testing or administrative procedures face a fine of up to US$40,000.

During the first half of 2000 the government established nitric oxide limits, eliminating the possibility for polluting vehicles to pass by being tuned late and lean. The limits caused too high a failure rate, however, so the government relaxed the standards by maintaining the same emission limits but slightly modifying the testing protocol.

Conclusion
The experience in Mexico City shows that, to be effective, a vehicle inspection and maintenance program needs several ingredients:

- A legal and regulatory framework that allows independent monitoring of the testing stations and sanctions for failure to carry out the testing protocols correctly.
- Testing protocols designed to minimize the chances of testers giving false passes.
- An easily monitored certificate for passing the test, sufficient monitors (such as traffic police) to ensure a high probability of catching vehicles without such a certificate, and a fine for lacking a certificate that is high enough to act as an incentive to pass the test.
- Testing technology capable of preventing temporary tuning that enables a vehicle to pass the test but that cannot be sustained for regular driving. In the absence of such technology, motorists and garages become adept at circumventing the purpose of the testing procedure—to identify the most polluting vehicles.
- Equally rigorous implementation of protocols and inspection of procedures at all testing centers. Otherwise, owners of the most polluting vehicles can easily identify the “softest” centers.
- The optimal number of centers relative to the volume of traffic to be tested. If there are too many small centers, the tests tend to become less rigorous as each garage tries to increase market share.

Note
1. As a result of strong lobbying by the independent garages, the city government had closed its own test-only centers. Private operators may be better than public for several reasons, including their risk of loss of license if they fail to operate by the rules, their lack of access to soft budgets, and their greater flexibility in hiring.