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# Extended Vehicle Idling

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## ■ Introduction

Item (xi) of Section 108 (f) of the 1990 amended Clean Air Act defines "programs to control extended idling of vehicles" as a candidate transportation control measure. The idea is that vehicular emissions can be reduced by eliminating vehicle idling, either by turning the engine off while the vehicle is stopped or by limiting the periods of time in which a vehicle must be stopped and idling. One method of reducing vehicle idle time is through the use of traffic flow improvement techniques, and these are discussed in the corresponding chapter of these information documents. This chapter addresses two other sources of extended idling of vehicles:

- Passenger vehicles using drive-through facilities, such as those existing at banks and fast food restaurants, where the vehicle is kept idling during the service period.
- Heavy-duty vehicles that are not in use and are kept idling rather than being shut off, such as buses that are kept idling at layover points or trucks that are left to idle while being loaded or unloaded.

The tradeoff between idling emissions and hot start emissions by vehicles of a particular type depends on a number of factors including the age of the vehicle, the type of control equipment used, the type of fuel used, the pollutant of interest, and the ambient temperature. For example, catalytic controls work well in the idle mode, so that idle emissions from newer vehicles are far less of a problem than from older, non-catalyst equipped automobiles. It is difficult, therefore, to develop a single transferable number that represents the maximum desired idling time. The following is an analysis for one urban area which indicates the factors which should be considered.

In preparing the 1982 Revised Air Quality Management Plan (AQMP) for the South Coast Air Basin, a strategy for reducing idling emissions by restriction or elimination of drive-through facilities was considered (3). An emissions analysis of drive-through facilities was done by comparing the emissions from idling with those from a hot start/hot soak cycle, which would represent a person parking, carrying out a business transaction within an hour, restarting the car, and leaving. The results are summarized in Table 1.

According to this analysis, for CO a car could idle for 6 minutes before it would generate the same emissions as when it was restarted. The equivalent idling times are even greater for HC and NO<sub>x</sub>. Based on this analysis, it was concluded that the banning of drive-through facilities would be counter-productive.

**Table 1. Vehicle Idle vs. Hot Start/Soak Emissions**

Year	Pollutant	Hot Start Emissions (gm/start)	Hot Soak Emissions (gm/soak)	Idling Emissions (gm/min)	Idling Time Equivalent to Start/Stop Cycle Emissions
1987	THC	4.16	1.67	.2217	26
	NOx	.71		.0551	13
	CO	13.18		2.3541	6
2000	THC	4.06	.67	.1743	27
	NOx	.41		.0386	11
	CO	10.93		1.8164	6

Source: (3)

Heavy-duty vehicle idling represents a different problem. Trucks are often left idling while their drivers await access to facilities to make pickups or deliveries. Older trucks often required longer amounts of time to warm up and cool down, and some operating habits have carried over in the use of modern vehicles. Modern vehicles, however, require less than five minutes to reach an operating temperature that assures proper engine lubrication under load.

Not all engine idling is at the discretion of the driver. Many facilities are operated in such a manner that idling is required. For example, at some facilities, trucks are required to be in a slowly moving queue to make pickups or deliveries; trucks are required to move at a moment's notice, and are therefore kept idling to be ready to move.

Public transit vehicles such as diesel buses and diesel locomotives also may be left idling for long periods of time. Examples include the period between runs, midday layovers, or even overnight. Transit authorities increasingly are instituting operations policies to limit this idling as a means of controlling fuel costs and minimizing community complaints over excessive emissions and noise.

### **Description of Measures**

The following types of measures have been considered to control extended vehicle idling:

- Controls on drive-through facilities;
- Laws or operating policies that limit idling of heavy-duty vehicles; and
- Mechanical modifications to the vehicle that restrict the amount of time that it can idle.

Possible controls on drive-through facilities include:

- Limitations on the construction of new drive-through facilities,
- Removal of existing facilities, and
- Specification of design standards applicable to the development and operation of new drive-through facilities.

The removal of existing facilities would affect the largest market, but also would involve a retroactive control or reversal of previous development decisions. Proposals to eliminate existing drive-through facilities have resulted in considerable opposition and been abandoned as being politically infeasible. More realistic approaches are to manage the way in which new drive-through facilities are developed and operated. For example, a fast food window configuration could be required where there are three stops – one to

place the order, one to pay, and one to receive the food. Such an approach could shorten the total length of time a vehicle is in queue, and thereby lead to both reduced idling time and fewer acceleration/deceleration cycles. As described in the following section, this kind of management approach is receiving current interest as a means of controlling both congestion and emissions.

Interest also is increasing in more carefully managing the emissions of heavy-duty vehicles while operating in the idle mode. For example, a law to restrict heavy-duty vehicle idling has been considered by the California legislature. As an example of the third type of control, Volkswagen is working on an engine that may increase fuel efficiency by as much as 90 per cent, using measures such as computer control that shut off the engine during idling and storing energy in a flywheel to provide an instant restart.

## ■ Case Study Examples

### **Proposed California Legislation to Limit Heavy Truck Idling**

The South Coast Air Quality Management District (SCAQMD) has worked with the California state legislature to develop legislation that would restrict truck idling. The proposed law was developed by the California AB 2595 Technical Advisory Group with the cooperation of the trucking industry (2). The trucking industry cooperated because they believed that it would be better to have a single, consistent statewide law on heavy duty vehicle idling than to have a number of possibly different regional or local regulations.

The proposed law has two significant provisions:

- No person shall cause, allow, or permit the engine of a heavy-duty motor vehicle to idle for more than five consecutive minutes if the vehicle is not performing useful work.
- No person responsible for the shipping or receiving of goods by a heavy-duty motor vehicle shall operate a facility in such a manner that causes, allows, or permits, a heavy-duty motor vehicle to idle for more than five consecutive minutes when the vehicle is not performing useful work.

The proposed bill contains exceptions for buses picking up passengers, motor vehicles stopped in the line of traffic, snow removal equipment, and emergency vehicles. It also provides for the following exceptions that pertain especially to trucks:

- Motor vehicles whose primary power source is utilized in whole or part for necessary and definitively prescribed mechanical operation other than propulsion, passenger compartment heating, or air conditioning (e.g., refrigerated trailers that require an idling engine to receive power).
- Motor vehicles manufactured with a sleeper berth while the sleeper berth is being used, in a non-residential area, by the vehicle operator for sleeping or resting, provided that the vehicle is not in a queue, and provided that the operation of the vehicle does not create a public nuisance.
- Motor vehicles used under adverse weather conditions, including rain, snow, temperatures below freezing, and temperatures in excess of 100 degrees Fahrenheit.
- Motor vehicles when the driver compartment is in direct sunlight and the temperature is in excess of 80 degrees Fahrenheit, provided that the engine idling is required to operate an air conditioning system.

The Technical Advisory Committee also determined that a truck operator education program would be a cost-effective measure in conjunction with the proposed law.

### **Limitations on Drive-Up Windows**

In the Sacramento metropolitan area, the 1982 AQMP programs for the County of Placer and the Cities of Lincoln, Rocklin, and Roseville included drive-up window limitations (3). The measures are intended to limit the number and design of new drive-up window facilities to reduce idling time and congestion.

The County of Sacramento regulates drive-up facilities by a use permit. The code is intended to ensure that the design and location of a drive-up facility will not contribute to increased congestion on public or private streets adjacent to the facility. The code requires that:

- Design and location will not impede access to or exit from the parking lot serving the facility, nor impair normal circulation in the parking lot;
- No drive-up lane shall extend closer than 25 feet to the access driveway;
- Advance ordering stations be located a minimum of 120 to 180 feet from the window;
- The window cannot be used to justify fewer parking spaces; and
- The use permit is revocable if congestion due to the window regularly occurs.

## ■ Estimated Impacts

The regional emission reductions associated with reducing the number of new drive-through facilities are expected to be minimal, primarily because of the small amount of travel impacted relative to the total highway vehicle mobile source inventory. At best, such measures may be effective in reducing localized CO hotspots.

Controls on extended vehicle idling of heavy duty vehicles may have a larger emissions reduction impact in commercial urban areas than will the limitations of drive-through facilities. This is because of the higher unit emissions of heavy duty vehicles compared to light duty automobiles.

## Program Costs and Other Considerations

The proposed California law on heavy duty truck idling would require funding for public awareness, facility inspection, law enforcement, and truck operator education. It could also incur additional cost to truck operators by shortening starter life, but would also reduce the costs of fuel consumption and engine wear.

Elimination of existing drive-through facilities would require compensation of the affected businesses and physical modifications to the facilities. The affected market segments would be shopping and personal business trips that use these facilities, primarily in suburban areas.

The costs associated with efforts to influence the design or limit the number of new drive-through facilities would largely be limited to small administrative costs to manage the new development code. Costs to building owners and operators could be mixed, with lower construction costs and higher operating costs if buildings must be kept open for longer periods of time.

## Implementation Considerations

Because most heavy-duty vehicles operate across jurisdictional boundaries, laws to restrict heavy-duty vehicle idling should be implemented statewide rather than locally so as to ease enforcement. In the case of California, the proposed law would be enforced by air pollution control districts through routine inspections of facilities with heavy-duty truck activity and through response to public complaints. The California Highway Patrol and local law enforcement agencies would have discretionary enforcement authority. The Technical Advisory Committee suggested that current resource constraints on enforcement of traffic safety regulations might make it necessary to develop new funding or cost sharing mechanisms between law enforcement and air pollution control agencies in order to enforce the proposed restrictions (2).

Affecting the development of drive-through facilities currently is controlled through the zoning process and limitation of conditional use permits, which is exclusively under the control of cities and counties. Hence, this type of control measure may be difficult to implement on a regional, statewide, or national basis.

Equity considerations are an issue that has arisen in past public policy debates over the possible limitation of drive-through facilities. Is it fair to remove existing, already approved and operating drive-up facilities? Conversely, is it fair to ban or even limit new drive-up facilities and allow existing services to continue to operate?

The following implementation guidelines can be summarized:

- Controls on vehicle operations are probably most effectively implemented at the state level.
- Controls on development are the province of local jurisdictions. In this case, regional and state agencies can play a valuable technical assistance role.
- Controls on drive-through facilities generally are most effective as limitations rather than outright bans.
- Design standards represent an appropriate implementation mechanism, based on congestion as well as emission considerations.
- Data should be collected prior to enactment of any measure so as to establish the magnitude of existing idling emissions that would be impacted.
- Controls on extended idling of vehicles will impact existing businesses as well as the public. It is important that representatives of both groups be actively involved in the planning, analysis, and development of any such controls. As evidenced by the history of the proposed California legislation on heavy-duty vehicle idling, implementation prospects can be enhanced by actively involving potentially impacted business interests in the development of proposed control measures.

## ■ Bibliography

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