University of Richmond Law Review

Volume 4 | Issue 2 Article 8

1970

# Automobile Noise- An Effective Method For Control

# AUTOMOBILE NOISE—AN EFFECTIVE METHOD FOR CONTROL

The automobile as a contributing factor to air pollution has in recent years received widespread attention.[1] Deserving of similar attention is the automobile's contribution to another increasing environmental problem, "noise pollution." [2]

Although automobile noise[3] has long been a problem,[4] several reasons explain why it has become more significant today than ever before. First of all, modern research in the fields of psychology and acoustical engineering has revealed that noise of many types, including that made by the automobile, is, in addition to being annoying and depressing,[5] capable of producing a wide range of ill effects in human health and behavior.[6] These ill effects include loss of hear-

[1] Although the problem has been the subject of several books and law review articles, as well as countless political speeches, it has probably received its most extensive coverage from the news media, particularly national magazines. *See, e.g.*, Buchan & Charlson, *Urban Haze: The Extent of Automotive Contribution*, SCIENCE, Jan. 12, 1968, at 192; *Clearing the Air*, TIME, Aug. 21, 1964, at 81; Lehrer, *The Big Sewer in the Sky*, LIFE, Aug. 13, 1965, at 4; Lessing, *As Air Pollution Grows More Intolerable, Detroit Faces the Revolt Against the Internal Combustion Engine*, FORTUNE, July, 1967, at 78; *Smog at the Bar*, NEWSWEEK, Nov. 10, 1969, at 67; *Smog Over Auto Accord*, BUS. WEEK, Jan. 18, 1969, at 28.

[2] For an excellent discussion of today's environmental noise problem, *see Urban Noise Control*, 4 COLUM. J. OF L. & SOC. PROB. 105 (1968). *See also* COMMITTEE ON ENVIRONMENTAL QUALITY OF THE FEDERAL COUNCIL FOR SCIENCE AND TECHNOLOGY, NOISE—SOUND WITHOUT VALUE (1968); J. Maguire, *Noise—the New Pollution*, HEALTH NEWS, Nov. 1967, at 2; J. Mecklin, *It's Time to Turn Down All That Noise*, FORTUNE, Oct. 1969, at 130.

[3] The term "automobile noise", as used in this comment, refers only to those sounds emanating from automobile engines and exhausts. It does not refer to other sources of automobile noise such as horns, tires, brakes, radios, and loose components and parts.

[4] The problem actually dates back to the early 1900's when the courts were filled with negligence cases involving noisy automobiles and frightened horses. *See, e.g.*, Christy v. Elliott, 216 Ill. 31, 74 N.E. 1035 (1905); House v. Cramer, 134 Iowa 374, 112 N.W. 2 (1907); Ellsworth v. Jarvis, 92 Kan. 895, 141 P. 1135(1914); Shinkle v. McCulloughy, 116 Ky. 960, 77 S.W. 196 (1903); Towle v. Morse, 103 Me. 250, 68 A. 1044 (1907); Fletcher v. Dixon, 107 Md. 402, 68 A. 875 (1908); Mahoney v. Maxfield, 102 Minn. 377, 113 N.W. 904 (1907); Tudor v. Bowen, 152 N.C. 441, 67 S.E. 1015 (1910); Rochester v. Bull, 78 S.C. 249, 58 S.E. 766 (1907); Brown v. Thorne, 61 Wash. 18, 111 P. 1047 (1910).

[5] M. RETTINGER, ACOUSTICS—ROOM DESIGN AND NOISE CONTROL 139 (1968).

[6] Although most authorities agree that noise is capable of producing psychological ill effects in human behavior, several experts feel that more scientific research must

ing,[7] impaired vision,[8] heart disease,[9] indigestion,[10] allergies,[11] fatigue,[12] insomnia,[13] nervousness,[14] mental illness,[15] and the loss of billions of dollars each year in reduced worker efficiency.[16] Noise has even been cited as a possible cause of death,[17] homosexuality,[18] and the increasing rate of crime.[19] Largely through the efforts of concerned civic organizations,[20] these facts have in recent years been brought to the attention of national, state, and local governmental officials, many of whom have shown a sincere interest in abating the problem.[21]

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be done before it can be determined exactly what those ill effects may be. *See, e.g.*, D. Broadbent, *Effects of Noise on Behavior*, in HANDBOOK OF NOISE CONTROL, at 10-9 (C. Harris ed. 1957).

[7] M. RETTINGER, *supra* note 5. *See also* SUBCOMM. ON NOISE OF THE COMM. ON CONSERVATION OF HEARING AND RESEARCH CENTER SUBCOMM. ON NOISE, GUIDE FOR CONSERVATION OF HEARING IN NOISE (1964).

[8] M. RETTINGER, *supra* note 5, at 138.

[9] N.Y. Times, March 19, 1967, § 1, at 42, col. 1 (report of Dr. Samuel Rosen at Conference on Noise Control, New York City); M. Ragon, *Impact*, WORLD HEALTH, Feb.-Mar. 1966, at 28.

[10] M. RETTINGER, *supra* note 5, at 138.

[11] *See* S. Blum, *Noise: How Much More Can We Take?*, McCALL'S, Jan. 1967, at 113; J. Maguire, *supra* note 2, at 6.

[12] J. Maguire, *supra* note 2, at 6; M. RETTINGER, *supra* note 5, at 138.

[13] *Id.*

[14] *Id.*

[15] Report by Dr. Fabian Rouke, COMMITTEE FOR A QUIETER CITY, INC., FINAL REPORT AND RECOMMENDATIONS, July 17, 1960, at 24.

[16] It is estimated that reduced worker efficiency costs American industry over four billion dollars per year. Address by Senator Hatfield to the Noise Abatement Council of America, Oct. 8, 1969, Rich. Times-Dispatch, Feb. 8, 1970, § F (Perspective), at 1, col. 2.

[17] Dr. Vern O. Knudsen, former chancellor of the University of California at Los Angeles and a founder of the Acoustical Society of America, has been quoted as saying, "Noise is a slow agent of death." Bailey, *The Sound of Madness–'Noise Is a Slow Agent of Death'*, N.Y. Times, Nov. 23, 1969, § 6 (Magazine), at 131; J. Mecklin, *supra* note 2, at 133.

[18] *See* Bailey, *supra* note 17; J. Mecklin, *supra* note 2, at 132.

[19] *See* QUIET, vol. 1, Spring 1969, at 2. *See also* J. Mecklin, *supra* note 2, at 130.

[20] Two of the most prominent of these organizations are as follows:

a) Citizens League Against the Sonic Boom, directed by William A. Shurcliff, Harvard University, with headquarters at 19 Appleton St., Cambridge, Mass. 02138.

b) Citizens for a Quieter City, Inc., headed by Robert A. Baron, Box 777, F.D.R. Station, New York, N.Y. 10022.

[21] One of the most active anti-noise crusaders has been Senator Mark Hatfield of Oregon who in a recent address before the Senate remarked:

> From my research I learned that the noise levels in the United States–which is considered the noisiest country in the world–were fast approaching lethal proportions in many areas of our Nation. . . . As you are aware, the pollution of our land, air, and water has become such a problem that we are now faced with a situation which, if not met immediately and with all of the creativity and

Secondly, automobile noise, like other environmental pollutants,[22] is cumulative in nature so that sounds made by several individually quiet vehicles may form a loud and menacing noise when operated together in a congested city or town.[23] This particular aspect of the problem has increased with growing urbanization[24] and a constantly rising number of automobiles in operation.[25]

Thirdly, in addition to a steady rise in automobile noise levels, there have been increases in many other environmental noises as well.[26] As a

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ingenuity of our age, could mean the extermination of all forms of life in many areas of our planet. As yet, noise has not reached this proportion, but given the present increases in our environment the same threat could soon prevail in noise pollution that does in air and water contamination—and by soon, I mean within our lifetime.

115 Cong. Rec. E9031 (daily ed. Oct. 28, 1969) (remarks of Senator Hatfield). *See also* Address by Senator Hatfield, *supra* note 16.

Another active campaigner for stricter noise control laws has been former New York Representative and now New York Supreme Court Judge Theodore R. Kupferman, who has been quoted as saying, "In addition to the merits of the anti-noise cause, I don't see why more politicians don't take up the cudgel. Who's going to be in favor of noise?" J. Mecklin, *supra* note 2, at 132.

[22] Two examples are smoke in relation to air pollution and sewage in relation to water pollution.

[23] *See, e.g.*, Address by Senator Hatfield, *supra* note 16, at 1, col. 1.

[24] "No fewer than 89 million cars . . . and about 18 million trucks and buses . . . are cluttering our roads and streets. Millions of them are operating with defective mufflers, which always wear out faster than the vehicle." J. Mecklin, *supra* note 2, at 133.

[25] Although the problem is greater in urban areas, it is by no means restricted to them, as evidenced by the following passage:

> Some years ago the Los Angeles City Council called for a noise survey in residential areas about the city, implemented by a 16mm film showing the noise sources, whose noise had simultaneously been recorded on magnetic tape. The council received a most revealing impression of the pertinent conditions when the screen showed, first, the gleaming sunrise near Laurel Canyon Pass (an exclusive residential district), then heard the twittering of the birds and the chirping of the crickets, after which, like a peccary out of purgatory, an Austin-Healey sportscar came roaring over the summit, not only drowning out all natural noises, but patently intent on waking all sleeping residents within a furlong of the car.

M. RETTINGER, *supra* note 5, at 159-60.

[26] In discussing the growing environmental noise problem, Robert A. Baron, Executive Vice President of Citizens for a Quieter City, Inc., remarked:

> There is no escape during leisure time, in the city or the country. Street noises prevent his [the American citizen's] sleeping late on Saturday and Sunday. The jets may follow him to the beaches, power lawnmowers may follow him to his country retreat. Motorboats, highway, traffic, and jet flyovers can make ear pollution as distressing at campsites as anywhere else. Where can he go for quiet, undisturbed relaxation? Resort hotels and motels that may not be soundproofed? Even patients in hospitals are exposed to noise which interferes with their rest and sleep, so necessary for healing and convalescence.

Address by Robert Baron, Community Noise State of the Art Seminar held at the

result, the overall noise level of many communities has risen to such an extent that all major noise contributors, including the automobile, have become individually significant.[27]

Finally, the increased importance of automobile noise is attributable, in part, to a recent change in consumer tastes. For many years it was thought by nearly all American automobile buyers that the quietest car was necessarily the most efficient and, therefore, the most desirable to own. As a result, auto manufacturers tried, for the most part at least, to keep their products as quiet as was economically feasible. However, just as the youth explosion of the sixties altered certain markets in the clothing and entertainment industries, it created a new market in the automobile industry for fast and sporty vehicles.[28] To meet the demand, auto manufacturers, in addition to developing styling and handling improvements and installing bigger, more powerful engines, have recently engineered so-called high performance exhaust systems.[29] These systems, although designed in part to place fewer restrictions on the free flow of exhaust gases and thereby increase horsepower, are primarily intended to make the car louder and sound more powerful.[30] Furthermore, instead of conventional type mufflers, some of these special systems utilize what are commonly termed as

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74th Meeting of the Acoustical Society of America, November 14, 1967, in SOUND AND VIBRATION, May 1968, at 8.

27 "Well-informed scientists reckon that if city noise continues to rise as it is presently rising, by one decibel a year, everyone will be stone deaf by the year 2000." Bailey, *supra* note 17, at 131.

"Very roughly, the noise level in busy sections of American communities is doubling every ten years." J. MECKLIN, *supra* note 2, at 133.

28 *See, e.g.*, Rich. Times-Dispatch, Feb. 13, 1970, § B (1970 Auto Review) at 1, cols. 1, 3, 4.

29 Nearly all the high performance cars now come equipped with special exhaust systems. Some of the more popular models include the Ford Mustang Boss 302, the Chevrolet Chevelle SS 396, the Plymouth Roadrunner, and the Pontiac G.T.O., which also has available an optional "cutout" feature called "Driver Controlled Exhaust" (Option No. 611). *See also* the discussion in note 39 *infra*.

30 In this regard the Automotive Equipment Standards Engineer for the California Highway Patrol recently reported:

> We find from talking to operators that noise to them means horsepower; however, we in engineering know that this is not necessarily true. For instance, the Harley-Davidson XLCH sportster model motorcycle equipped with a properly tuned muffler system produces noise below the present standards, and the machine also produces an additional 10% horsepower over the previous year model, but the operators who are driving the vehicles believe that they are not performing as well as the older models. . . . Perhaps the noise problem which we all have is a matter of education.

Address by Ross Little, Meeting of the Acoustical Society of America, Nov. 4, 1969.

"glasspacks," devices which rapidly disentegrate with use and thereby become even less effective in reducing engine noise.[31]

Somewhat surprisingly, nearly every state presently has at least one statute regulating automobile exhaust noise.[32] The most common provision requires that each automobile be equipped and operated with a muffler to prevent excessive or unusual noise.[33] Many jurisdictions require, in addition, that no automobile exhaust system be in any way modified so as to increase the noise made by the original factory installed system.[34]

Although the constitutionality of such provisions has been consistently upheld by the courts,[35] neither provision is effective in reducing noise. The vague "excessive or unusual" provision is extremely difficult to enforce.[36] The "standard factory equipment" provision, while presenting little difficulty in enforcement,[37] fails to regulate the many

[31] *See* Commonwealth v. Zimmerman, 39 Pa. D. & C. 2d 765, 767 (Columbia County Ct. 1966).

[32] For a compilation of existing state automobile noise control laws, *see* J. Kaufman, *The Legal Aspects of Noise Control,* 115 CONG. REC. E9031, at E9041 (daily ed. Oct. 28, 1969) (submitted by Senator Hatfield).

[33] Typical of such provisions is Virginia's:

> No person shall drive and no owner of a motor vehicle shall permit or allow the operation of any owned vehicle upon a highway unless such motor vehicle is equipped with an exhaust system . . . in good working order and in constant operation to prevent excessive or unusual noise . . . .

VA. CODE ANN. § 46.1-301 (1967).

[34] It is provided in Virginia, for example, that:

> No person shall drive and no owner of a motor vehicle shall permit or allow the operation of any owned vehicle upon a highway unless such motor vehicle is equipped with an exhaust system of a type installed as standard factory equipment, or comparable to that designed for use upon the particular vehicle as standard factory equipment . . . .

VA. CODE ANN. § 46.1-301 (1967).

Many states also have statutes prohibiting the sale, as well as the operation, of vehicles equipped with such devices as "gutted mufflers", "muffler cutouts", and "straight exhausts." *See, e.g.,* VA. CODE ANN. § 46.1-302 (1967). *See also* J. Kaufman, *supra* note 32.

[35] *See, e.g.,* Smith v. Peterson, 131 Cal. App. 2d 241, 280 P.2d 522 (1955); People v. Finch, 119 Cal. App. 2d 892, 258 P.2d 1124 (1953); People v. Byron, 17 N.Y.2d 64, 215 N.E.2d 345, 268 N.Y.S.2d 24 (1966); People v. Merry, 12 Misc. 2d 20, 178 N.Y.S.2d 454 (J.P. Ct. 1958); Dayton v. Zoller, 96 Ohio App. 424, 122 N.E.2d 28 (1954); *Ex Parte* Trafton, 160 Tex. Crim. 407, 271 S.W.2d 814 (1953), *appeal dismissed,* 348 U.S. 803 (1954).

[36] This is so because of the difficulty in defining what is excessive or unusual. "[Noise that] . . . may be objectionable to one person need not be to another; and what may be objectionable to one person at one time may not be so at another." M. RETTINGER, *supra* note 5, at 136-37.

[37] A cursory examination of the exhaust system will usually reveal whether or not it is other than standard factory equipment.

vehicles that are equipped with unnecessarily loud factory installed exhaust systems.[38] In fact, by limiting the ways in which one can legally operate a loud sounding vehicle, such provisions encourage manufacturers to produce and charge higher prices for noisy cars.[39]

Two states, California[40] and New York,[41] and several local communities throughout the country[42] have enacted legislation to supplement their pre-existing noise control laws.[43] These new statutes establish maximum noise levels, measured in decibels,[44] that no vehicle may exceed.[45] Scientific measurements are made by the investigating officer

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[38] *See* notes 29 & 30 *supra.*

[39] On most models, including the Chevrolet Chevelle SS 396, the Ford Mustang Boss 302, and the Plymouth Roadrunner, high performance exhaust systems are included in a special package along with several other performance items, thereby making it impossible to determine the individual additional cost of the exhaust system. However, the 1969 manufacturer's suggested retail price for "Dual Chambered Exhausts" (Option No. N10) on the Chevrolet Camaro Z-28 is listed separately as $15.80. The Z-28's more sophisticated "stablemate," the Chevrolet Corvette, has available "Dual Side-Mounted Exhausts" (Option No. N14) at a manufacturer's suggested retail price of $147.45. The special "cutout" option for the Pontiac G.T.O., mentioned in note 29 *supra*, carries a manufacturer's suggested retail price of $63.19. Moreover, the prices for all these options are in addition to extra charges made for conventional dual exhausts.

[40] *See* CAL. VEHICLE CODE §§ 23130, 27160 (West Supp. 1970).

[41] *See* N.Y. VEHICLE & TRAFFIC LAW § 386 (McKinney Supp. 1969-70).

[42] *See* J. Kaufman, *supra* note 32, at E9047.

[43] Both states left their old "excessive or unusual" and "standard factory equipment" provisions intact. *See* CAL. VEHICLE CODE §§ 27150, 27151 (West 1960); N.Y. VEHICLE & TRAFFIC LAW § 375, subdiv. 31 (McKinney 1960).

[44] A decibel is the universally accepted unit of measurement for the sound pressure that causes audible vibrations within the ear. *See generally* A. PETERSON & E. GROSS, HANDBOOK OF NOISE MEASUREMENT, 4-6 (6th ed. 1967); M. RETTINGER, *supra* note 5, at 49-57.

[45] It is provided in California, for example, that:

> . . . No person shall operate either a motor vehicle or combination of vehicles of a type subject to registration at any time or under any condition of grade, load, acceleration or deceleration in such a manner as to exceed the following noise limit for the category of motor vehicles based on a distance of 50 feet from the center of the lane of travel within the speed limits specified in this section:

| | Speed limit of 35 mph or less | Speed limit of more than 35 mph |
|---|---|---|
| (1) Any motor vehicle with a manufacturer's gross vehicle weight rating of 6,000 pounds or more, any combination of vehicles towed by such motor vehicle, and any motorcycle other than a motor-driven cycle: | | |
| (A) Before January 1, 1973 ..... | 88 dbA | 90 dbA |
| (B) On and after January 1, 1973 .... | 86 dbA | 90 dbA |
| (2) Any other motor vehicle and any combination of vehicles towed by such motor vehicle ..... | 82 dbA | 86 dbA |

> . . . .

with an inexpensive instrument that fits comfortably into the palm of the hand.[46] Inherent in these statutes are minor difficulties in finding enough time to train policemen to operate the measuring device,[47] locating suitable areas for its operation,[48] and overcoming certain techno-

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. . . [Nor shall any person] . . . offer for sale a new motor vehicle which produces a maximum noise exceeding the following noise limit at a distance of 50 feet from the centerline of travel under test procedures established by the department:

| | |
|---|---|
| (1) Any motorcycle manufactured before January 1, 1970 ..... | 92 dbA |
| (2) Any motorcycle, other than a motor-driven cycle, manufactured on or after January 1, 1970, and before January 1, 1973 ..... | 88 dbA |
| (3) Any motorcycle, other than a motor-driven cycle, manufactured on or after January 1, 1973 ..... | 86 dbA |
| (4) Any motor vehicle with a gross vehicle weight rating of 6,000 pounds or more manufactured on or after January 1, 1968, and before January 1, 1973..... | 88 dbA |
| (5) Any motor vehicle with a gross vehicle weight rating of 6,000 pounds or more manufactured on or after January 1, 1973 .... | 86 dbA |
| (6) Any other motor vehicle manufactured on or after January 1, 1968, and before January 1, 1973..... | 86 dbA |
| (7) Any other motor vehicle manufactured after January 1, 1973 .. | 84 dbA |

CAL. VEHICLE CODE §§ 23130, 27160 (West Supp. 1970).

[46] "[Termed a sound level meter] . . . the instrument consists of an omnidirectional microphone, a calibrated attenuator, an amplifier, an indicating meter, and weighting networks . . .

. . . .

[The instrument conforms] . . . to the requirements of *USASI USA Standard Specification for General-Purpose Sound Level Meters* (S1.4-1961) and IEC Recommendation R123. . . . It can be mounted on a tripod, held in the hand, or placed on table or bench with equal facility. Readings and settings are easily made with the microphone in a vertical or horizontal position." A. PETERSON & E. GROSS, *supra* note 44, at 80.

In Connecticut experimentation is presently being conducted with an instrument that mounts on the dashboard of the patrolman's car. When the car is parked alongside the road, the instrument records the sound level of every passing vehicle. Moreover, if any vehicle exceeds the maximum allowable level, a split-image photograph is taken of it. *See* N.Y. Times, Nov. 15, 1969, at 73, col. 1 (Connecticut to Gauge Auto Noise Level); Bailey, *supra* note 17, at 131 (picture).

[47] In California, after preliminary research and the preparation of a basic instruction manual, only two days were found necessary to train six four-man teams to operate the measuring device. DEPT. OF CAL. HIGHWAY PATROL, SIX-MONTH SUMMARY, ON-HIGHWAY NOISE ENFORCEMENT, September 1969, at 1 (Oct. 27, 1969).

[48] In order to obtain an accurate measurement for a particular vehicle, the surrounding area must be relatively free of objects and other noises. Procedural guidelines for choosing a proper test site as established by the Society of Automotive Engineers and reported in SOC. AUTOMOTIVE ENGINEERS HANDBOOK 889-90 (1967) (Standard J762: Measurement of Truck and Bus Noise; approved Jan. 1957, reaffirmed without change, Jan. 1962) have been followed in both California and New York. *See* CAL. VEHICLE CODE § 27160(b) (West Supp. 1970); N.Y. VEHICLE AND TRAFFIC LAW § 386(2)(a) (McKinney Supp. 1969-70).

Perhaps the best solution to the problem of finding a proper test site is to supple-

logical problems,[49] but, for the most part, statutes based upon the decibel system of noise control are highly advantageous. They are flexible in accordance with overall community noise levels, and they set forth a clear and certain standard to facilitate enforcement. In addition, such statutes can be extended to encompass all types of motor vehicles, including trucks,[50] buses,[51] motorcycles,[52] and noisy foreign and domestic sports cars.[53] Most importantly, perhaps, experience has shown that they are capable of prodding manufacturers to produce quieter cars.[54] In short, statutes based upon the decibel method of noise control offer the most effective and equitable means yet devised for solving the problematic effects of automobile noise. Other states should follow the California and New York lead in adopting such statutes.[55]

C. W. P., JR.

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ment on-the-road tests of vehicle noise with periodic tests at state inspection stations. At those stations not suitable for sound level measurements, a suspected vehicle can be driven to a suitable site and tested there. For an interesting discussion of various noise control inspection techniques used in foreign countries, *see* D. Loye, *The Legal Aspects of Noise Control,* NOISE CONTROL, July 1956, at 60.

[49] Since the sound level meter measures the intensity or power, but not the frequency of a sound, a standard frequency scale must be adopted for uniform measurement. Although there is still no universal standard for measuring noises derived from more than one source, many acoustical and law enforcement experts now agree that the A-scale is an acceptable frequency network for automobile noise. *See, e.g.,* Address by Ross Little, *supra* note 30; M. RETTINGER, *supra* note 5, at 173.

[50] *See, e.g.,* CAL. VEHICLE CODE §§ 23130(a)(1), 27160(a)(4),(5) (West Supp. 1970).

[51] *Id.*

[52] *See, e.g.,* CAL. VEHICLE CODE §§ 23130(a)(1), 27160(a)(1)-(3) (West Supp. 1970).

[53] *See, e.g.,* CAL. VEHICLE CODE §§ 23130(a)(2), 27160(a)(6),(7).

[54] The Automotive Equipment Standards Engineer for the California Highway Patrol recently reported:

> . . . [T]here have been a few of the sportier model passenger cars which we have found in non-compliance [with the California decibel statute]. These are the Chevrolet Camaro Z-28, and the Plymouth Roadrunner. Chrysler provided a special California package. . . . Chevrolet has now redesigned the exhaust system on the vehicle and the new production vehicles are coming out with a new exhaust system. Also, the factory has recalled all of the Camaro Z-28's that were sold in California and is installing new systems.

Address by Ross Little, *supra* note 30.

[55] *See* J. Kaufman, *supra* note 32, at E9033. *But cf. Urban Noise Control, supra* note 2, at 114.