

# **Periodic Motor Vehicle Inspection in Hawaii: A Study of Selected Issues**

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## FOREWORD

This report has been prepared in response to House Resolution No. 12, House Draft 2 (1995), which requests the Legislative Reference Bureau to conduct a study of the state Department of Transportation's motor vehicle safety inspection program for motor vehicles with a gross weight rating of 10,000 pounds or less.

Among other things, this study attempts to (1) provide a clear statement of the objectives of the State's periodic motor vehicle inspection program, (2) analyze equipment-related fatal traffic accidents involving vehicles of less than 10,000 pounds gross vehicle weight, which occurred in Hawaii between January 1, 1990 and December 31, 1994, (3) determine the number of equipment defects that were reported by vehicle inspectors between January 1, 1990 and December 31, 1994, and identify those defects that could have caused or contributed to traffic accidents, and (4) examine the variables that appear to determine the effectiveness of the periodic motor vehicle inspection program, and suggest ways that the Legislature could improve the program.

The Bureau has no particular expertise with respect to automotive mechanics or accident investigation. As such, the Bureau is sincerely appreciative of the time, thought, and knowledge contributed to this study by:

- Gary Tanakaya and Rochelle Toyama, Department of Transportation, Motor Vehicle Safety Office, State of Hawaii;
- Gary Tashima and Walter Lai, Department of Finance, Motor Vehicle Control Section, City and County of Honolulu;
- Jack Wong, Office of the Administrative Director of the Courts, Telecommunications and Information Services Division;
- Jody Hicks, Institute of Police Technology and Management, University of North Florida;
- Ron Foss, Hawaii Automotive and Retail Gasoline Dealers Association; and
- Ken Libbey, United States General Accounting Office, Cincinnati Regional Office.

The generous assistance and cooperation of these individuals contributed substantially toward the preparation of this report and made its timely completion possible.

Wendell K. Kimura  
Acting Director

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## **Chapter 1**

### **INTRODUCTION**

#### **Scope and Structure of this Study**

**Scope.** House Resolution No. 12, H.D. 2, which is included in this report as Appendix A, requested the Legislative Reference Bureau to conduct a study of the state Department of Transportation's motor vehicle safety inspection program for motor vehicles with a gross weight rating of 10,000 pounds or less, and to provide the Legislature with:

- (1) A clear statement of the objectives of the safety check program;
- (2) An analysis as to how the program is meeting those objectives;
- (3) A review of any enforcement problems encountered by the counties;
- (4) Recommendations, including legislative proposals, on how to improve the program and ensure that it best meets the stated objectives of the program; or if the program is deemed to be ineffective, a recommendation for the discontinuance of the program; and
- (5) The number of detected defects and whether any of these defects could have resulted in serious accidents.

This study excludes motor carrier vehicles<sup>1</sup> regulated under the Motor Carrier Safety Law (chapter 286, part XI, *Hawaii Revised Statutes*). Other areas in which this study is limited are discussed in conjunction with the applicable subject areas.

**Structure.** This report is organized to be used by laypersons and experts without having to read it in its entirety. Each chapter, except for this introduction, contains a summary section and, when applicable, a suggestions section. While casual readers may find the amount of information contained in the discussion section of each chapter sufficient for their needs, avid readers may wish to refer to the endnotes for more detailed or additional information.

Chapter 2 provides a statement of the objectives of the State's periodic motor vehicle inspection program. Chapter 3 analyzes equipment-related fatal traffic accidents involving vehicles of less than 10,000 pounds gross vehicle weight, which occurred in Hawaii between January 1, 1990 and December 31, 1994. Chapter 4 determines the number of equipment defects that were reported by vehicle inspectors between January 1, 1990 and December 31, 1994, and identifies those defects that could have caused or contributed to traffic accidents. Chapter 5 examines the variables that appear to determine the effectiveness of the periodic motor vehicle inspection program, and suggests ways that the Legislature could improve the program.

#### **State of Periodic Motor Vehicle Inspection in Hawaii**

Section 286-26, *Hawaii Revised Statutes*, requires ambulances; trucks, truck-tractors, semitrailers, and pole trailers having a gross vehicle weight rating of more than 10,000 pounds; buses; rental or U-drive motor vehicles one year of age or older; and taxi cabs, to be

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inspected and certified once every six months. All other vehicles (e.g., your typical passenger car, light truck, and four-wheel drive), including motorcycles, trailers, semitrailers, and pole trailers having a gross vehicle weight rating of 10,000 pounds or less, and antique motor vehicles, must be inspected and certified once every twelve months.<sup>2</sup>

According to section 19-133.2-22, Hawaii Administrative Rules (Department of Transportation), a vehicle inspector may charge the following fees for the inspection of automobiles, trucks, motorcycles, trailers, and sun screening devices (e.g., tint films) affixed to the glazing materials (e.g., windshields) of vehicles:

- (1) Automobiles and trucks -- not more than \$14.70;
- (2) Motorcycles and trailers -- not more than \$8.75; and
- (3) Sun screening devices -- not more than \$5.00.

The items checked during a safety inspection are steering, wheel alignment, suspension, tires, wheels and rims, exhaust system, intake and fuel system, service brakes, parking brakes, headlamps, stop lamps, signal lamps, tail lamps, warning lamps, other lamps, horn, other electrical, windshield, other windows, windshield wipers, rear view mirror, registration, door latches, hood latches, seats and seat belts, fenders, bumpers, floor pan, body items, speedometer/odometer, window tint, and no-fault insurance.<sup>3</sup>

### A Brief History of Periodic Motor Vehicle Inspection in Hawaii

Prior to 1967, all four counties required periodic motor vehicle inspection under separate county ordinances. Act 214, Session Laws of Hawaii 1967, as amended by Act 48, Session Laws of Hawaii 1968, required each county to administer and enforce a periodic motor vehicle inspection program that complied with standards established by the state highway safety coordinator.<sup>4</sup>

Act 253, Session Laws of Hawaii 1988, transferred the administration and enforcement of the periodic motor vehicle inspection program from the counties to the state Department of Transportation, and allowed the department to contract with the counties for the performance of necessary administrative and enforcement services. Act 326, Session Laws of Hawaii 1989, required the counties to provide for the administration and enforcement of the periodic motor vehicle inspection program, and required the State to reimburse the counties for the costs incurred in providing these services.

### Periodic Motor Vehicle Inspection in Other States

Those persons who advocate the elimination of periodic inspections in Hawaii place a great deal of emphasis on the fact that only twenty-two states and the District of Columbia have periodic motor vehicle inspection programs. While this would seem to suggest that there are no motor vehicle inspection programs in the other twenty-nine states, the Bureau's examination of the situation revealed that:<sup>5</sup>

- (1) Four states require motor vehicle inspections before the sale of a vehicle, the transfer of title to a vehicle, the registration of an out-of-state vehicle, or the registration of a dismantled or salvaged vehicle;

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- (2) Fourteen states have no periodic, random, or purposive (*i.e.*, conducted for reasonable cause) motor vehicle inspection programs;
- (3) Ten states allow law enforcement officers to conduct motor vehicle inspections at random or for reasonable cause along roadsides;
- (4) Motor vehicle inspection programs are conducted by certain cities in the State of Tennessee; and
- (5) Twenty-two states (including Hawaii) and the District of Columbia have periodic motor vehicle inspection programs.

Of the thirty-six states that have some type of motor vehicle inspection program, twenty-two states have "periodic" (*i.e.*, occurring at regular intervals) inspection programs. States with periodic motor vehicle inspection programs appear to be the rule (rather than the exception) when all fifty states and the District of Columbia are grouped according to the manner in which inspections--if any--are conducted (*i.e.*, periodically, randomly, or purposively).

According to the National Highway Traffic Safety Administration,<sup>6</sup> the states that do not accept periodic motor vehicle inspection programs frequently cite the lack of data showing that vehicle failures cause or contribute to crashes, or that periodic motor vehicle inspection programs reduce crashes. Other factors that have been cited are: costs are too high for the benefits gained; lack of sufficient public interest and legislative support; occurrence of abuses in a state-appointed or state-licensed system (*e.g.*, Hawaii); and lack of sufficient supervisory resources to monitor the program effectively.<sup>7</sup>

### Limitations of the Literature on Periodic Motor Vehicle Inspection

It has been often stated that there is no conclusive evidence in the literature that periodic motor vehicle inspection programs are effective in reducing crashes. This statement typifies the limitations of research concerning the effectiveness of periodic motor vehicle inspection programs--the inability of researchers to identify equipment defects that were suspected of causing or contributing to crashes, and that could have been detected during inspections. Assessing the effectiveness of periodic motor vehicle inspection programs by comparing states' overall crash rates is inadequate because there are many other factors that can affect a state's overall crash rate (*e.g.*, bad weather, heavy alcohol consumption, high speed limits, and winding roads), and statistical tests may lack sufficient "power" to detect small differences in states' crash rates.<sup>8</sup> While longitudinal studies of states that either enact or repeal periodic motor vehicle inspection programs are less susceptible to certain biases (*e.g.*, high speed limits and winding roads), these studies are not immune to observer bias, which can result in data that are intentionally or unintentionally slanted for or against periodic motor vehicle inspection programs.

The effectiveness of periodic motor vehicle inspection programs in eliminating traffic accidents that are caused by mechanical failure appear to depend on several factors. These factors include the procedures for conducting inspections, the implementation and enforcement of these procedures, and the imposition of penalties for either violating these procedures or operating a vehicle without a current certificate of inspection. For example, while states with periodic motor vehicle inspection programs generally agree on the overall vehicle systems that should be inspected, there is considerable variation in the specific



equipment items inspected (e.g., brake failure indicator, brake pedal pressure, brake pedal reserve, brake linings, brake fluid, road or platform test, and parking brake).<sup>9</sup>

Unless the design, implementation, and enforcement components of periodic motor vehicle inspection programs are analyzed separately, it is extremely difficult to determine whether the programs' inability to eliminate these traffic accidents was the result of poor program design, poor program implementation, or poor program enforcement, or a combination of the foregoing.

Conclusive evidence may never be available because obtaining it would be impractically expensive; because periodic motor vehicle inspection programs are too variable to allow rationalisation according to strict scientific canons; and because periodic motor vehicle inspection programs involve a number of value judgments.

## Two Studies of the Effectiveness of Periodic Motor Vehicle Inspection Programs

**National Highway Traffic Safety Administration (NHTSA).** According to the 1989 NHTSA study of the effectiveness of state periodic motor vehicle inspection programs,<sup>10</sup> there is little question that periodic motor vehicle inspection programs can lead to somewhat improved vehicle condition, and that better maintained vehicles have some potential for lower involvement in crashes.<sup>11</sup> There is, however, no "conclusive" evidence in the literature that periodic motor vehicle inspection programs are effective in reducing crashes.<sup>12</sup>

Based on its own analyses of crash involvement data, the NHTSA concluded that there appears to be no evidence to suggest that periodic motor vehicle inspection programs affect the crash involvement rates of older vehicles as compared to newer vehicles.<sup>13</sup> The analyses conducted by the NHTSA were based on the theory that periodic motor vehicle inspection programs are effective in preventing motor vehicle crashes because they maintain the mechanical condition of older vehicles. The NHTSA theorized that the relative crash involvement rate of old to new vehicles in states with periodic motor vehicle inspection programs would be lower than in states without those programs. Differences in the crash involvement rates of newer vehicles would not be expected because the vehicles would have not been in service long enough for significant wear of mechanical components to occur.

To make the data fit the theory that there would be no differences in the total (versus fatal) crash involvement rates of newer vehicles, the NHTSA adjusted the data in its sample to reflect the belief that the states with periodic motor vehicle inspection programs<sup>14</sup> were reporting fewer crashes than the states without periodic motor vehicle inspection programs.<sup>15</sup> Adjusting the data eliminated the differences in the total crash involvement rates of states with periodic motor vehicle inspection programs and states without those programs. This belief turned out to be incorrect,<sup>16</sup> and the unadjusted data indicated that total crash involvement rates were always higher in the states without periodic motor vehicle inspection programs as compared to the states with periodic motor vehicle inspection programs.<sup>17</sup> In fact, the overall total crash involvement rate for the states with periodic motor vehicle inspection programs was 16.33 per cent lower than the overall total crash involvement rate for the states without periodic motor vehicle inspection programs.<sup>18</sup>

Based on its own analysis of data on crash-involved vehicles in which a component failure was reported by the investigating police officer, the NHTSA concluded that:<sup>19</sup>

- (1) States without periodic motor vehicle inspection programs reported a significantly higher percentage of old and new crash-involved vehicles with

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defective tires, brakes, and lights, than states with periodic motor vehicle inspection programs. The significantly higher percentage of reported tires failures in older vehicles in states without periodic motor vehicle inspection programs suggests a possible periodic motor vehicle inspection program "effect".

- (2) Tire failures account for the majority of the increased percentage of component failures reported in states without periodic motor vehicle inspection programs.
- (3) The fact that states without periodic motor vehicle inspection programs reported a significantly higher percentage of component failures in relatively new cars suggests that a factor other than the presence or absence of periodic motor vehicle inspection programs may account for the differences in component failures reported.

**General Accounting Office (GAO).** According to the GAO,<sup>20</sup> various organizations have criticized the NHTSA for alleged shortcomings in its 1989 report, and for its lack of support for periodic motor vehicle inspection programs. Consequently, the GAO was asked by the Chairperson of the Subcommittee on Oversight and Investigations, U.S. House Committee on Energy and Commerce, to assess whether the NHTSA has adequately carried out its periodic motor vehicle inspection program responsibilities, and what safety benefits can be attributed to these programs. The GAO focused its work on determining whether:

- (1) The NHTSA report accurately represented the safety benefits of state periodic motor vehicle inspection programs;<sup>21</sup>
- (2) Available evidence indicated that state periodic motor vehicle inspection programs reduce accident rates;<sup>22</sup> and
- (3) The NHTSA appropriately carried out its legislative responsibilities toward state periodic motor vehicle inspection programs.<sup>23</sup>

According to the GAO,<sup>24</sup> a large majority of the studies reviewed by the NHTSA, and four additional studies identified by the GAO, indicated that periodic motor vehicle inspection programs improve highway safety. When all the studies and analyses are considered together, even taking into account their individual limitations, their relative consistency justifies a conclusion that periodic motor vehicle inspection programs reduce accident rates. None of the studies, however, produced a reliable estimate of the magnitude of accident reduction that can be expected from a periodic motor vehicle inspection program. Various studies have placed the magnitude of accident reduction as low as less than 1 per cent to as high as 27 per cent.

While the GAO concluded that it would be reasonable, on the basis of current evidence, for the NHTSA to encourage the adoption of periodic motor vehicle inspection programs, it also opined that states would have a better basis for considering these programs if the NHTSA sponsored a carefully controlled research project to estimate their accident reduction potential. Ideally, this research would follow the accident experience of a randomly selected group of inspected vehicles and a control group of vehicles not subject to inspection.

## Comments Regarding the Preliminary Draft of this Report

On November 22, 1995, the Bureau transmitted to the state Department of Transportation, the Office of the Administrative Director of the Courts, the Honolulu Department of Finance, the Institute of Police Technology and Management, the Hawaii Automotive and Retail Gasoline Dealers Association, and the Honolulu Police Department, a preliminary draft of this report. The Bureau asked that these agencies and organizations make any comments, cite any errors, state any objections, or suggest any revisions to the draft. An example of the Bureau's transmittal letter is included in this report as Appendix F. The Honolulu Department of Finance, the Institute of Police Technology and Management, the Hawaii Automotive and Retail Gasoline Dealers Association, and the Honolulu Police Department either provided verbal comments of a technical nature or indicated that they had no comments. The written comments of the Administrative Director of the Courts and the state Department of Transportation are included in this report as Appendices G and H, respectively. When deemed appropriate by the Bureau, revisions to the draft were made and the agencies' and organizations' comments and suggestions incorporated into this report.

In the interest of accuracy and fairness, and to facilitate the external review process, the Bureau submitted early rough drafts of this study to those individuals who were quoted extensively in this report. These individuals were allowed to rephrase their comments as they felt appropriate.

## Endnotes

1. A "motor carrier vehicle" is any motor vehicle or vehicle, including integrally mounted equipment and specially constructed motorized equipment, used by a motor carrier to transport passengers or property on the public highways. A "motor carrier" is any person who owns a motor vehicle used in, or engages in the transportation of persons or property by motor vehicle on the public highways in the furtherance of any commercial, industrial, or educational enterprise.

Hawaii Rev. Stat., section 286-201.

2. A vehicle that has been involved in an accident must be inspected and certified before it is operated again if a police officer or insurer determines that the vehicle's equipment has been damaged so as to render the vehicle unsafe, or if the vehicle is rebuilt or restored.

Hawaii Rev. Stat., section 286-26(c).

An uncertified vehicle must be inspected and certified prior to the issuance of a temporary or permanent registration, and prior to the transfer of any registration.

Hawaii Rev. Stat., section 286-26(d).

3. Hawaii, Department of Transportation, Motor Vehicle Safety Office, "Annual State Total Detects Spreadsheet for Calendar Year 1994", 1 p.
4. U.S., Department of Transportation, National Highway Traffic Safety Administration, Study of the Effectiveness of State Motor Vehicle Inspection Programs (Final Report)(August 1989), p. 22.

According to section 1 of Act 48, Session Laws of Hawaii 1968, the Highway Safety Act of 1966 was passed by Congress and enacted into law on September 9, 1966. Title I of the Highway Safety Act provided for the establishment of a highway safety program in each state and required that each program be developed in

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accordance with uniform standards promulgated by the U.S. Secretary of Commerce. Title I also provided that no funds appropriated under the Highway Safety Act would be apportioned after December 31, 1968, to any state that is not implementing a highway safety program approved by the Secretary and that any federal-aid highway funds apportioned on or after January 1, 1969, to any state that is not implementing a highway safety program approved by the Secretary by that time shall be reduced by ten per cent.

Section 1 also found that although the Hawaii Highway Safety Act (chapter 286, Hawaii Revised Statutes) forms the foundation for the Hawaii highway safety program, amendment of the Hawaii Highway Safety Act is urgently required: (1) so that the State's highway safety program will meet the program standards issued by the U.S. Secretary of Transportation and the State, prior to December 31, 1968, may actively implement a highway safety program developed in accordance with the standards; (2) to improve state progress towards the goal of increased highway safety; and (3) to make harmonizing and clarifying amendments to Act 214, Session Laws of Hawaii 1967, and the Revised Laws of Hawaii 1955.

5. Charles Butler and Kay Hamada (eds.), Digest of Motor Laws (60th ed.; Florida: American Automobile Association, 1994), 491 pp.
6. U.S., Department of Transportation, National Highway Traffic Safety Administration, Study of the Effectiveness of State Motor Vehicle Inspection Programs, p. 31.
7. According to the National Highway Traffic Safety Administration (NHTSA), the general belief of states without periodic motor vehicle inspection programs is that the costs are greater than the safety benefits of vehicle inspection to the motorist and the state; there is no public outcry for enacting a periodic motor vehicle inspection program law; and governmental intrusions unnecessary. The states that repealed their periodic motor vehicle inspection program laws generally cite the withdrawal of federal sanctions against states without periodic motor vehicle inspection programs in 1976, the lack of data justifying the program, and problems with maintaining the integrity of a state-licensed system.  
  
Eleven states repealed their periodic motor vehicle inspection programs, and several states reduced the frequency of inspection and eliminated some equipment items of inspection, after the withdrawal of federal sanctions against states without periodic motor vehicle inspection programs.  
  
Ibid., pp. 23 and 31.
8. A discussion on statistical power is beyond the scope of this study. See Joan Welkowitz, Robert Ewen, and Jacob Cohen, Introductory Statistics for the Behavioral Sciences (2nd ed.; New York: Academic Press, Inc., 1976), pp. 192-194, regarding the concepts of power analysis.
9. National Highway Traffic Safety Administration, pp. 26-27.
10. Ibid., pp. 16-17.
11. According to the NHTSA, most studies regarding the effectiveness of periodic motor vehicle inspection programs in improving vehicle condition have found a correlation between improved vehicle condition and the presence of a periodic motor vehicle inspection program. In the majority of these studies, jurisdictions with periodic motor vehicle inspection programs were observed to have vehicles in somewhat better condition than jurisdictions without periodic motor vehicle inspection programs. While the methodologies employed in most of these studies can be questioned, it seems reasonable to conclude that vehicle condition is frequently--but not always--better in jurisdictions with periodic motor vehicle inspection programs.

Ibid.

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12. According to the NHTSA, in assessing changes in vehicle component-related crashes with periodic motor vehicle inspection, previous researchers questioned the ability to evaluate periodic motor vehicle inspection effectiveness by looking at vehicle-defect crash rates because of the small proportion of vehicle-defect crashes found in crash investigations. In the 1977 tri-level study of crash causation in Indiana, vehicle defects were found to be definitely causal in about 4.5 per cent of crashes, probably causal in a further 8.1 per cent, and possibly causal in a further 12.6 per cent of the 420 crashes studied in-depth. Of the 3,000 crashes studied in all, approximately 2.4 per cent were judged to be caused only by vehicle defects.

There have been a number of studies that have looked at fatal, injury, and total crashes. These studies are generally inconclusive and unreliable due to the lack of credible data or weaknesses in the study design. While some studies have shown some crash reduction benefit from periodic motor vehicle inspection programs, other studies have indicated no effect of periodic motor vehicle inspection programs and, in some instances, have shown a negative effect.

The literature includes various studies both supporting periodic motor vehicle inspection as a cost-effective program, while other studies conclude that periodic motor vehicle inspection is not a cost-effective program. All of the literature that supports periodic motor vehicle inspection programs as having safety benefits greater than the cost are based on correlation or regression studies from which causal inferences must be drawn with caution, plus the studies include questionable benefit estimates and incomplete cost estimates. None of the reviewed studies provided credible evidence that current periodic motor vehicle inspection programs were cost-effective on a cost "safety benefit" basis. This is mainly because there is a shortage of convincing research on the effectiveness of periodic motor vehicle inspection programs in reducing vehicle-defect related crashes.

Ibid., p. 17.

13. According to the NHTSA, the fatal crash involvement rates of older vehicles as compared to newer vehicles is not significantly different between states with periodic motor vehicle inspection programs and states without periodic motor vehicle inspection programs. In addition, state data files on total crash involvement do not indicate a difference between crash involvement rates, by model year, in states with periodic motor vehicle inspection programs and states without periodic motor vehicle inspection programs.

Ibid., pp. 44-45.

14. Louisiana, Missouri, Pennsylvania, and Texas.
15. California, Colorado, Florida, Illinois, Kansas, and Washington.

The unadjusted data indicated that the total crash involvement rates of newer vehicles in the states without periodic motor vehicle inspection programs were greater than the total crash involvement rates of newer vehicles in the states with periodic motor vehicle inspection programs. The data were adjusted in the belief that the states with periodic motor vehicle inspection programs reported fewer crashes as compared to the states without periodic motor vehicle inspection programs because the former had higher damage reporting thresholds (as measured in dollars) than the latter.

Ibid., pp. 43.

16. U.S., General Accounting Office, Resources, Community, and Economic Development Division, Motor Vehicle Safety: NHTSA Should Resume Its Support of State Periodic Inspection Programs, GAO/RCED-90-175 (Washington, D.C., July 1990), p. 18.

The General Accounting Office (GAO) found that the states with periodic motor vehicle inspection programs had lower damage reporting thresholds than the states without periodic motor vehicle inspection

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programs--\$263 versus \$392.

U.S., General Accounting Office, Resources, Community, and Economic Development Division, "Working Paper No. 342804 (Automobile Inspection Program)" from Motor Vehicle Safety: NHTSA Should Resume Its Support of State Periodic Inspection Programs, (November 16, 1989), 1 p.

According to GAO Working Paper No. 342804, these errors were acknowledged by Dr. Mark Edwards of NHTSA's Center for Research and Statistics.

U.S., General Accounting Office, Resources, Community, and Economic Development Division, "Working Paper No. 342804 (Automobile Inspection Program).

The Bureau found that the NHTSA and the GAO were both wrong to a certain extent: the average damage threshold for the states with periodic motor vehicle inspection programs, from July 1, 1985 to June 30, 1986, could not be computed; and the average damage threshold for the states without periodic motor vehicle inspection programs, during the same time period, was \$358, not \$392. The first error arose because the damage threshold for the State of Pennsylvania was changed from \$200 to "tow away" on July 1, 1977 (see 1976 P.L. 162, No. 81, §1; 160 General Assembly, Regular Session). The latter error arose because the damage threshold for the State of Washington did not increase to \$500 until October 1, 1987 (see L1987, ch. 463, §2; 50th Legislature, Regular Session).

17. U.S., Department of Transportation, National Highway Traffic Safety Administration, Study of the Effectiveness of State Motor Vehicle Inspection Programs, p. 43.
18. Ibid.
19. Ibid., p. 49.
20. U.S., General Accounting Office, Resources, Community, and Economic Development Division, Motor Vehicle Safety: NHTSA Should Resume Its Support of State Periodic Inspection Programs, p. 18.
21. To carry out this objective, the GAO reviewed the NHTSA report and discussed it with the NHTSA personnel who prepared it. The GAO involved methodological experts on its staff in assessing the analyses of available data conducted by the NHTSA; reviewed some of the prior studies cited by the NHTSA, most of which were done before 1980, and in other cases, accepted the summarization prepared by the NHTSA; and considered whether, given the information contained in the NHTSA report, it would have arrived at similar conclusions.  
  
Ibid.
22. To carry out this objective, the GAO reviewed comments submitted to the NHTSA by states and other interested parties to determine if there was other information or studies that the NHTSA did not consider in its 1989 report. The GAO also reviewed an available literature search and asked officials from the NHTSA, states, and interested organizations if they were aware of other relevant studies or analyses. From this effort, the GAO identified four studies not discussed by the NHTSA in arriving at its conclusions. The GAO used this additional information along with the studies discussed by the NHTSA to assess the relationship between periodic motor vehicle inspection programs and accident rates.  
  
Ibid., p. 11.
23. To carry out this objective, the GAO reviewed legislation, regulations, and other documents relating to NHTSA safety programs and discussed their implementation with officials from the NHTSA; the American Association of Motor Vehicle Administrators; and the Coalition for Safer, Cleaner Vehicles. Specifically, the GAO

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considered whether the NHTSA met its minimum obligations under the 1966 legislation and whether it adopted an appropriate role in response to the 1976 legislative changes.

The GAO also considered whether the NHTSA should encourage periodic motor vehicle inspection programs and how the programs could be improved. The GAO interviewed officials from interested organizations and visited states with inspection programs as well as states without them.

Ibid., pp. 12-13.

24. Ibid., p. 20

## Chapter 2

### ENDS AND MEANS

#### Introduction

This chapter provides a statement of the objectives of the State's periodic motor vehicle inspection program,<sup>1</sup> as requested by House Resolution No. 12, H.D. 2. The Bureau interpreted the term "objectives" to mean both outcome and process objectives (or the ends to be accomplished and the means for accomplishing these ends) because no documents specifically establish the objectives of the State's periodic motor vehicle inspection program.<sup>2</sup>

#### Purpose and Rationale

**The Federal Perspective.** Based on language in the National Traffic and Motor Vehicle Safety Act of 1966, the Highway Safety Act of 1966, and the Uniform Guidelines for State Highway Safety Programs, it appears that the purpose of periodic motor vehicle inspection is to reduce traffic accidents and deaths, injuries, and property damage resulting from traffic accidents<sup>3</sup> by reducing the number of vehicles having existing or potential conditions that cause or contribute to, or increase the severity of, traffic accidents.<sup>4</sup>

According to the National Highway Traffic Safety Administration:<sup>5</sup>

All motor vehicles deteriorate with time due to normal wear and tear, abuse, improper maintenance or other factors. With the deterioration of critical safety components such as brakes, steering and tires, the chances of vehicles becoming involved in a crash increase. . . . Thus, the purpose of a periodic motor vehicle inspection . . . program is to ameliorate deterioration by regularly inspecting vehicles for failures, detecting these failures and requiring owners to correct them.

**The State Perspective.** Based on language in the state Department of Transportation's 1985 request for preliminary approval of two proposed administrative rules, it appears that the purpose of periodic motor vehicle inspection is to reduce the number of mechanically unsafe vehicles operating on the public highways.<sup>6</sup>

According to the state Department of Transportation, Hawaii's periodic motor vehicle inspection program is based on three assumptions:<sup>7</sup>

. . . (1) that some [traffic] accidents are caused because of mechanical failure that could have been prevented with better vehicle maintenance; (2) that people will not maintain their vehicles without a mandatory PMVI [periodic motor vehicle inspection] program; and (3) that the required program is effective relative to eliminating [traffic] accidents that are caused by mechanical failure.

**Discussion.** The National Traffic and Motor Vehicle Safety Act of 1966 and the Highway Safety Act of 1966 appear to specify the end to be accomplished by periodic motor vehicle inspection (i.e., the outcome), and the Uniform Guidelines for State Highway Safety



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Programs appear to specify the means for accomplishing this end (*i.e.*, the process).<sup>8</sup> Although the state Department of Transportation's 1985 request for approval of proposed rulemaking suggests that the desired outcome of periodic motor vehicle inspection is to reduce the number of mechanically unsafe vehicles operating on the public highways, the Bureau believes that the removal of these vehicles from the public highways is a means to an end (*i.e.*, a process) rather than an end in itself (*i.e.*, an outcome).

The Bureau believes that the real "public purpose"<sup>9</sup> of periodic motor vehicle inspection is to reduce traffic accidents and deaths, injuries, and property damage resulting from traffic accidents. Although periodic motor vehicle inspection can benefit the environment by decreasing air pollution, there are more effective and efficient means (*e.g.*, emissions testing) for achieving this end. Similarly, although periodic motor vehicle inspection can benefit consumers by reducing operating, maintenance, and replacement costs, there are less intrusive and controversial means (*e.g.*, consumer education) for achieving this end.

Periodic motor vehicle inspection is intended to periodically remove (*i.e.*, screen) mechanically unsafe vehicles from the public highways; it is not intended to guarantee the safety of vehicles operating on these highways. Periodic motor vehicle inspection does not relieve drivers of the responsibility to keep their vehicles in safe operating condition every day of the year; rather, it requires drivers to bring their vehicles into safe operating condition at least once every twelve months.<sup>10</sup>

### Summary

The desired outcome of the State's periodic motor vehicle inspection program is less traffic accidents and deaths, injuries, and property damage resulting from traffic accidents. This outcome is achieved by periodically removing mechanically unsafe vehicles from the public highways.

### Endnotes

1. For the purposes of this study, the Bureau excluded motor carrier vehicles having a gross weight rating of 10,000 pounds or less.
2. The Bureau reviewed more than ten years of internal and external correspondence regarding the State's periodic motor vehicle inspection program in an attempt to ascertain these objectives.
3. P.L. 89-563 (National Traffic and Motor Vehicle Safety Act of 1966) and P.L. 89-564 (Highway Safety Act of 1966).

According to the United States General Accounting Office, the Highway Safety Act of 1966 and the National Traffic and Motor Vehicle Safety Act of 1966 established responsibilities for the Secretary of Transportation in the area of periodic motor vehicle inspection. The Highway Safety Act required the Secretary to prescribe uniform standards for mandatory state highway safety programs. The Secretary was required to approve each state's program and withhold highway safety grant funds and ten per cent of highway construction funds from states not complying with the program standards. The Highway Safety Act specifically mentioned vehicle inspection among the potential subjects for state program standards. The National Traffic and Motor Vehicle Safety Act required the Secretary to establish safety standards for new vehicles, and standards for the inspection of vehicles in use.

## ENDS AND MEANS

In carrying out the Highway Safety Act, the U.S. Department of Transportation issued eighteen standards for state highway safety programs from 1967 through 1972. The first standard required each state to have a program for periodically inspecting all registered vehicles or an experimental, pilot, or demonstration program approved by the Secretary. In 1973, the National Highway Traffic Safety Administration (NHTSA) established specific standards for inspecting vehicles in use. These standards applied to brakes, tires, wheels, and steering and suspension components, and included such items as minimum brake lining thickness and tire tread depth.

In 1975, the NHTSA prepared to use the authorized funding sanctions in the Highway Safety Act to enforce state compliance with safety program standards, particularly those standards involving blood alcohol content for drunk driving, motorcycle helmet use, and periodic vehicle inspection. The sanction process was suspended when Congress passed the Highway Safety Act of 1976 and repealed the Secretary's authority to enforce the safety program standards by withholding highway construction funds. The Highway Safety Act of 1976 also specified that the Secretary should not require compliance with every uniform standard, or with every element of every standard, in every state.

While the Highway Safety Act of 1976 did limit the authority of the NHTSA to require state program activities, it did not repeal the Secretary's authority to approve state highway safety programs and withhold highway safety program funds from states not having approved programs. Nonetheless, the U.S. Department of Transportation adopted a policy that all highway safety program standards would be optional and states could determine their own priorities. Since 1977, the NHTSA has not withheld highway safety funds from any state for noncompliance with a safety program standard.

J.S., General Accounting Office, Resources, Community, and Economic Development Division, Motor Vehicle Safety: NHTSA Should Resume Its Support of State Periodic Inspection Programs, GAO/RCED-90-175 (Washington, D.C., July 1990), pp. 8-10.

The State of Hawaii enacted a periodic motor vehicle inspection law for motor carrier vehicles in 1961 (see Act 121, Session Laws of Hawaii 1961). A periodic motor vehicle inspection law for vehicles other than motor carrier vehicles was enacted in 1967 (see Act 214, Session Laws of Hawaii 1967).

4. 23 CFR 1204.4 (Uniform Guidelines for State Highway Safety Programs, Highway Safety Program Guideline No. 1: Periodic Motor Vehicle Inspection).
5. 53 FR 31951, August 22, 1988.
6. Hawaii, Department of Transportation, "Memorandum from Wayne Yamasaki, Director of Transportation to George Ariyoshi, Governor of Hawaii" (September 13, 1985), p. 2.

The memorandum actually stated that "... [t]he ultimate result expected by instituting the proposed rules is to reduce the number of mechanically unsafe vehicles from operating on the public highways."

See also Hawaii, Department of Transportation, "Memorandum from Edward Hirata, Director of Transportation to George Ariyoshi, Governor of Hawaii" (December 19, 1986), p. 2.

7. Hawaii, Department of Transportation, "Letter from Edward Hirata, Director of Transportation to Richard Gallagher" (February 14, 1989), pp. 1-2.
8. Reducing the number of mechanically unsafe vehicles operating on the public highways is synonymous with reducing the number of vehicles with existing or potential conditions that cause or contribute to, or increase the severity of, traffic accidents.

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9. All government programs should serve a public purpose. Government programs serve a public purpose if they are in the public interest and for the public health, safety, and general welfare of the State.
10. Motor carrier vehicles that transport passengers in the furtherance of a commercial enterprise must be inspected and certified every six months. Hawaii Rev. Stat., section 286-209.

## Chapter 3

### DEATH ON WHEELS

#### Introduction

This chapter analyzes equipment-related fatal traffic accidents involving vehicles of less than 10,000 pounds gross vehicle weight, which occurred in Hawaii between January 1, 1990 and December 31, 1994. The Bureau utilized data from the Fatal Accident Reporting System (FARS)<sup>1</sup> because (1) the data were available in a standardized format, (2) trained analysts gathered, translated, and entered the data, and (3) the data were automatically checked for acceptable range values and consistency. Although fatal traffic accidents represented less than one per cent of all traffic accidents occurring annually in Hawaii between January 1, 1984 and December 31, 1993,<sup>2</sup> the comprehensive nature of fatal traffic accident investigations and the reliability of FARS data made it possible to conduct analyses of vehicle equipment, weather and road conditions, road alignment, blood alcohol concentration, and other relevant factors.

The Bureau conducted this analysis to determine whether (1) some traffic accidents in Hawaii are caused because of mechanical failure that could have been prevented with better vehicle maintenance, (2) some people in Hawaii will not maintain (or are incapable of maintaining) their vehicles without a mandatory periodic motor vehicle inspection program, and (3) Hawaii's periodic motor vehicle inspection program is capable of reducing the number of fatal and nonfatal traffic accidents caused by mechanical failure. As discussed in Chapter 2, Hawaii's periodic motor vehicle inspection program is based on these assumptions.

#### Methodology

The Bureau reviewed thirty-five fatal traffic accident reports and the supporting documents (e.g., mechanics' and medical examiners' reports) in the possession of the state Department of Transportation. These traffic accidents accounted for thirty-eight fatalities between January 1, 1990 and December 31, 1994.

Each traffic accident report was summarized according to: state Department of Transportation case (i.e., island fatality) number(s), date of accident, expiration date of safety check, number of months before or since expiration of safety check, mechanic's report, weather condition, road condition (including evidence of skid or scuff marks within the roadway), road alignment, police officers' accident and vehicle inspection reports, statements of witnesses, and blood alcohol concentration. **ONLY THE VEHICLE AND PERSON THAT WERE SUSPECTED OF CAUSING THE TRAFFIC ACCIDENT WERE INCLUDED IN THE SUMMARY.**<sup>3</sup> A note was included in the summary if the vehicle that was suspected of causing the traffic accident was not the vehicle that had faulty equipment (e.g., worn tires), or if the mechanic's report indicated that the vehicle had no relevant equipment faults.

Of the thirty-five traffic accident cases reviewed by the Bureau, ten cases were deemed not relevant to this study. The data from these ten cases were suppressed and were not included in Tables 1, 2, and 3.<sup>4</sup> The twenty-five remaining traffic accidents accounted for twenty-seven fatalities between January 1, 1990 and December 31, 1994. Although data from traffic accidents suspected of being caused by persons with blood alcohol concentrations

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equal to or greater than 0.10 per cent were also suppressed,<sup>5</sup> the data were included in Tables 1, 2, and 3.

To protect the identity of the victims in these fatal traffic accidents, the Bureau (1) replaced the state Department of Transportation's case numbers with random, five-digit identifiers (i.e., Bureau case numbers), (2) deleted the dates of the accidents, the names of the persons involved in the accidents or their investigation, and the place names where the accidents occurred, and (3) turned over the only cipher for the Bureau's case numbers to the state Department of Transportation following the completion of this report.

According to Table 1, ten of fourteen *nonalcohol*, equipment-related fatal traffic accidents occurring in Hawaii between January 1, 1990 and December 31, 1994 involved tires.<sup>6</sup>

According to Table 2, seven of ten *nonalcohol*, tire-related fatal traffic accidents involved worn tires on wet asphalt. In addition, six of eight *nonalcohol*-related fatal traffic accidents involving worn tires occurred while it was raining.<sup>7</sup> (See Appendix B for an explanation of the different events and factors believed to have caused or contributed to these traffic accidents.)

According to Table 3, eight of fourteen vehicles suspected of causing *nonalcohol*, equipment-related traffic accidents had current safety checks.<sup>8</sup>

### Discussion

**Driver Error.** To some extent, all equipment-related traffic accidents are caused by driver error.<sup>9</sup> The question is: how much skill, knowledge, and ability should an average driver possess? What may be considered "driver error" to a professional driver may not be considered driver error to an average driver because of their differing skills, knowledge, and abilities.

Given the fact that the average driver does not have the chance to practice emergency maneuvers under controlled conditions, there is no reason to expect that the average driver will be skillful enough to perform these maneuvers when the need arises.<sup>10</sup> Likewise, given the fact that the average driver is not required to understand how a vehicle's condition can cause or contribute to a traffic accident, there is no reason to expect that the average driver will check a vehicle's condition before starting it. Similarly, given the fact that the average driver is not required to possess the same physical abilities as a professional driver, there is no reason to expect that the average driver will be able to respond like a professional driver in an emergency situation.

Except for driving under the influence of intoxicating liquor or causing a piece of equipment (e.g., brakes) to fail by improperly operating a vehicle (e.g., "riding" the brakes down a long, steep hill), the Bureau believes that the foregoing equipment-related traffic accidents should not be attributed automatically to driver error.

**Results.** As discussed in Chapter 2, Hawaii's periodic motor vehicle inspection program is based on three assumptions:<sup>11</sup>

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TABLE 1  
SUMMARY OF RAW DATA BY EQUIPMENT  
(striking through DUI)

<u>Case num.</u>	<u>Tires</u>	<u>Brakes</u>	<u>Steering</u>	<u>Lights</u>	<u>T Hitch</u>	<u>DUI</u>	<u>Not Relevant</u>
01011	X						
02368							x1
06907	X	?					
07056							x2
07119							x3
09429	X						
10365	X						
<del>10480</del>	<del>X</del>					0-15	
14342					X		
15011	X						
22368							X
<del>24130</del>	<del>X</del>	<del>X</del>				0-18	
28918							X
36857							x4
37570	?						
39975		X					
<del>40064</del>	<del>X</del>					0-14	
<del>42167</del>	<del>X</del>					0-11	
46573							X
48360			X				
<del>54085</del>				<del>X</del>		0-16	
<del>52162</del>	<del>X</del>					0-22	
61129	X						
63553	X						
69578	X						
<del>72906</del>			?			?	
<del>77924</del>	<del>X</del>					0-22	
85475							X
89579	X				X		
91977							x5
93003	<del>X</del>					0-29	
93969							X
<del>96304</del>	<del>X</del>					0-19	
97336	X						
99562			X				

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"DUI" means driving with a blood alcohol concentration that was equal to or greater than 0.10 per cent

(The figures in the DUI column indicate where drivers' blood alcohol concentrations were equal to or greater than 0.10 per cent)

"T Hitch" means trailer hitch

<sup>1</sup>Mechanic's report: the excessive use of brakes on the downhill resulted in overheating and failure; brake pads were in satisfactory condition

<sup>2</sup>Mechanic's report: 75% of the brake shoes on the front and rear wheels were remaining; everything in adjustment – brakes should have worked in this case

<sup>3</sup>Mechanic's report: the motorcycle's headlight was illuminated as in this model of motorcycle they are constantly illuminated and only a high/low beam switch is provided

<sup>4</sup>Although the vehicle that was suspected of causing the accident was the vehicle that had worn tires, there was insufficient information in the accident investigation to explain how worn tires could have caused or contributed to an accident that occurred on straight, level, dry asphalt

<sup>5</sup>Mechanic's report: vehicle in stock running condition

# DEATH ON WHEELS

TABLE 2  
SUMMARY OF RAW DATA BY CONDITIONS AND TIRE(S)  
(striking through DUI)

<u>Case num.</u>	<u>Weather condition</u>	<u>Road condition</u>	<u>Road alignment</u>	<u>Tire(s)</u>
01011	clear	wet asphalt	straight, grade	worn
06907	clear	dry gravel	curve, grade	worn <sup>1</sup>
09429	raining	wet asphalt	straight, level	worn
10365	raining	wet asphalt	curve, grade	worn
10480	clear	dry asphalt	straight, grade	worn
15011	raining	wet asphalt	curve, grade	SS spare
24150	clear	dry asphalt	straight, grade	worn <sup>2</sup>
37570	raining	wet asphalt	straight, grade	?
40961	clear	dry asphalt	curve, level	worn
42167	clear	dry asphalt	curve, grade	SS spare <sup>3</sup>
62162	clear	wet asphalt	curve, grade	worn
61129	raining	wet asphalt	straight, level	worn
63553	raining	wet asphalt	curve, grade	worn
69578	raining	wet asphalt	curve, grade	worn
77024	clear	dry asphalt	curve, level	worn
89579	clear	dry asphalt	straight, level	low tp <sup>4</sup>
93093	clear	wet asphalt	straight, grade	worn <sup>5</sup>
96301	clear	dry asphalt	curve, level	worn
97336	raining	wet asphalt	curve, grade	worn

"Clear" means no adverse atmospheric conditions

"DUI" means driving with a blood alcohol concentration that was equal to or greater than 0.10 per cent

"Low tp" means low tire pressure

"SS spare" means space saver spare tire

"Worn" includes bald tires and tires with less than 2/32" of tread

<sup>1</sup>Miscellaneous: a police report indicated that high heat was generated on the brake assembly

<sup>2</sup>Mechanic's report: faulty master (brake) cylinder - leaking; little or no braking action

<sup>3</sup>Miscellaneous: worn tires were mentioned in a police report, but no tread depth measurements or characterizations were provided; a police report indicated that the four tires on the vehicle were of different sizes

<sup>4</sup>Mechanic's report: the trailer hitch was worn; no safety second lock or pin to keep the primary lock mechanism in place; the truck and trailer weight (plus the weight of the trailer's cargo) exceeded the safe standard weight ratio factor of the foregoing with the trailer's cargo

<sup>5</sup>Miscellaneous: a police report indicated that the vehicle was traveling more than 25 mph over the posted speed limit



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TABLE 3

## SUMMARY OF RAW DATA BY SAFETY CHECK STATUS AND DUI (striking through DUI)

<u>Case num.</u>	<u>Equipment</u>	<u>Safety Check Status</u>	<u>Expiration (months)</u>
01011	tire(s)	unknown	unknown
06907	tire(s)	current	<6
	[brakes]		
09429	tire(s)	current	<3
10365	tire(s)	unknown	unknown
10480	tire(s)	current	<3
14342	t hitch	unknown	unknown
15011	tire(s)	current	<4
24130	tire(s)	current	<12
	brakes		
37570	[tire(s)]	current	< or < 1
39975	brakes	current	<10
40061	tire(s)	current	<6
42167	tire(s)	current	<5
48360	steering	expired	>4
61085	lights	unknown	unknown
62162	tire(s)	current	<8
61129	tire(s)	current	<8
63553	tire(s)	current	<4 or <5
69578	tire(s)	unknown	unknown
72906	[steering]	expired	>2 or >14
77921	tire(s)	expired	>27
89579	tire(s)	expired	unknown
	t hitch		
93098	tire(s)	current	<8
96304	tire(s)	current	<4
97336	tire(s)	current	<3
99562	steering	current	<3

"DUI" means driving with a blood alcohol concentration that was equal to or greater than 0.10 per cent

"t hitch" means trailer hitch

"<" means less than

">" means greater than

"[equipment]" signifies uncertainty

<sup>1</sup>Data not included to protect the identity of the victim

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. . . (1) that some [traffic] accidents are caused because of mechanical failure that could have been prevented with better vehicle maintenance; (2) that people will not maintain their vehicles without a mandatory PMVI [periodic motor vehicle inspection] program; and (3) that the required program is effective relative to eliminating [traffic] accidents that are caused by mechanical failure.

As discussed in this chapter, it appears that there were fourteen nonalcohol, equipment-related fatal traffic accidents in Hawaii between January 1, 1990 and December 31, 1994. It also appears that at least thirteen of these traffic accidents were caused by faulty equipment (*i.e.*, worn tires, faulty service brakes, and loose steering) that could have been detected and corrected during the vehicles' next safety inspection.<sup>12</sup> It further appears that rain<sup>13</sup> caused or contributed to at least six of eight nonalcohol-related traffic accidents that involved worn tires. Arguably, the drivers of these six vehicles were either caught unexpectedly on the road when it started to rain, not too concerned about driving in the rain with worn tires, or unaware that their tires were worn.

The data appear to support the assumptions that (1) some traffic accidents are caused because of mechanical failure that could have been prevented with better vehicle maintenance, and (2) some people will not maintain (or are incapable of maintaining) their vehicles without a mandatory periodic motor vehicle inspection program.

The effectiveness of Hawaii's periodic motor vehicle inspection program in eliminating traffic accidents that are caused by mechanical failure appears to depend on several factors. These factors include the procedures for conducting inspections, the implementation and enforcement of these procedures, and the imposition of penalties for violating these procedures or operating a vehicle without a current certificate of inspection (*i.e.*, safety check).

Unless the design, implementation, and enforcement components of Hawaii's periodic motor vehicle inspection program are analyzed separately, it is extremely difficult to determine whether the program's inability to eliminate these traffic accidents was the result of poor program design, poor program implementation, or poor program enforcement, or a combination of the foregoing. For example, why is it that eight of fourteen vehicles suspected of causing nonalcohol, equipment-related traffic accidents had current safety checks? One explanation is that periodic motor vehicle inspection is intended to periodically remove (*i.e.*, screen) mechanically unsafe vehicles from the public highways--not guarantee the safety of vehicles operating on these highways. Another explanation is that the faulty equipment involved in these fatal traffic accidents were not detected or corrected during the vehicles' last safety inspection.

While it is possible to conduct a study to demonstrate only the effectiveness of Hawaii's periodic motor vehicle inspection program in eliminating traffic accidents that are caused by mechanical failure, the inability to address the other half of the question (*i.e.*, why the program was not effective) would leave decisionmakers in the position of having to "throw the baby out with the bath water" if the program was not found to be effective. It is not enough for decisionmakers to know that the periodic motor vehicle inspection program is effective; decisionmakers must also know why the program is not effective so it can be improved. Because of the limited scope of this study, decisionmakers must be content with the knowledge that during a five-year period, at least thirteen of fourteen nonalcohol, equipment-related fatal traffic accidents were caused by faulty equipment that could have been detected and corrected during the vehicles' next safety inspection.

## PERIODIC MOTOR VEHICLE INSPECTION IN HAWAII

Given the fact that 85,110 tire defects, 32,085 service brake defects, and 9,827 steering defects were reported in Hawaii between January 1, 1990 and December 31, 1994, and assuming that most people corrected these defects, it appears that Hawaii's periodic motor vehicle inspection program is capable of reducing the number of fatal and nonfatal traffic accidents caused by worn tires, defective service brakes, and loose steering. Whether or not the periodic motor vehicle inspection program is also capable of reducing the number of fatal and nonfatal traffic accidents caused by other mechanical failures is not known. The scope of this analysis, which was limited to fourteen nonalcohol, equipment-related fatal traffic accidents, does not permit the Bureau to form conclusions about traffic accidents caused by other mechanical failures.

### Summary

The data appear to support the state Department of Transportation's assumptions that (1) some traffic accidents are caused because of mechanical failure that could have been prevented with better vehicle maintenance, and (2) some people will not maintain (or are incapable of maintaining) their vehicles without a mandatory periodic motor vehicle inspection program. The data also appear to support the assumption that Hawaii's periodic motor vehicle inspection program is capable of reducing the number of fatal and nonfatal traffic accidents caused by worn tires, defective service brakes, and loose steering.

### Endnotes

1. According to U.S. Department of Transportation, the Fatal Accident Reporting System (FARS) contains data on a census of fatal traffic crashes within the fifty states, the District of Columbia, and Puerto Rico. To be included in the system, a crash must involve a motor vehicle travelling on a trafficway customarily open to the public and result in the death of a person (occupant of a vehicle or a nonmotorist) within thirty days of the crash.

The system was conceived, designed, and developed by the National Center for Statistics and Analysis of the National Highway Traffic Safety Administration to provide an overall measure of highway safety, to help identify traffic safety problems, to suggest solutions, and to help provide an objective basis to evaluate the effectiveness of motor vehicle safety standards and highway safety programs.

The state employees who gather, translate, and transmit the data are called FARS analysts. The number of analysts in each state varies according to the state. Each FARS analyst attends a formal training program and is also trained on-the-job by other FARS analysts.

Data on fatal motor vehicle traffic crashes are gathered from the state's own source documents and are coded on standard FARS forms. The analysts obtain the documents needed to complete the FARS forms, which generally include some or all of the following: police accident reports, state vehicle registration files, state driver licensing files, state highway department data, vital statistics, death certificates, coroner/medical examiner reports, hospital medical reports, and emergency medical service reports.

The FARS file contains descriptions, in a standard format, of each fatal crash reported. Each crash has more than one hundred different coded data elements that characterize the crash, the vehicles, and the people involved. The specific data elements may be modified slightly each year to conform to changing user needs, vehicle characteristics, and highway safety emphasis areas. All data elements are reported on three forms.

The "accident form" asks for specific information such as the time and location of the crash, the first harmful event, whether the crash is a hit-and-run crash, whether a school bus was involved, the number of vehicles and people involved, and weather conditions. The "vehicle/driver form" calls for data on each crash-involved

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vehicle and driver. Specific data include the vehicle type, role in the crash, initial and principal impact points, the most harmful event, the driver's record and license status. The "person form" calls for data on each person involved in the crash, including their age and sex, their role in the crash (driver, passenger, nonmotorist, or unknown), alcohol and drug involvement, injury severity, and restraint use.

U.S., Department of Transportation, National Highway Traffic Safety Administration, "Fatal Accident Reporting System", 75333,2--M-144 (undated brochure), 6 pp.

U.S., Department of Transportation, National Highway Traffic Safety Administration, Traffic Safety Facts 1993, DOT HS 808 169 (October 1994), pp. 3 and 173-174.

2. Hawaii, Department of Transportation, Motor Vehicle Safety Office, Fatal Traffic Accidents, State of Hawaii 1993 (June 1994), p. 5.

The total number of traffic accidents occurring in Hawaii during calendar years 1992 and 1993 were 21,834 and 21,464, respectively.

Telephone interview with Rochelle Toyama, Research Statistician, State Department of Transportation, Motor Vehicle Safety Office, September 6, 1995.

3. Neither the Fatal Accident Reporting System nor the state Department of Transportation attribute the cause of a fatal traffic accident to any person or piece of equipment. These determinations were made by the Bureau based on the fatal traffic accident reports and supporting documents in the possession of the state Department of Transportation.
4. The Bureau's reasons for suppressing these data were included in the footnotes of Table 1 and the miscellaneous sections of Appendix C.
5. A person with a blood alcohol concentration equal to or greater than 0.10 per cent committed the offense of driving under the influence of intoxicating liquor if the person operated or assumed actual physical control of the operation of a vehicle between January 1, 1990 and December 31, 1994.

The Bureau's decision to suppress data from alcohol, equipment-related fatal traffic accidents was arbitrary. A driver's normal mental faculties and ability to guard against casualty were considered to be impaired if the driver had a blood alcohol concentration equal to or greater than 0.10 per cent. Consequently, a fatal traffic accident caused by such a driver was attributed to driver error rather than faulty equipment.

The Bureau did not suppress data from a fatal traffic accident where the driver of the vehicle tested positive for cocaine use. According to a police report, no one saw the driver of the vehicle using cocaine before the traffic accident. Because the driver of the vehicle died at the scene of the traffic accident and because there are no quantitative standards (e.g., 0.10 per cent) for the presence of cocaine metabolites in blood, it could not be determined if the driver's ability to operate the vehicle in a careful and prudent manner had been impaired by cocaine use. In other words, while tests exist to determine the presence of cocaine and other drugs in the human body, there are no standards to determine whether the driver was "under the influence" of the drug. The Bureau's decision not to suppress these data was arbitrary.

6. Data from LRB case number 37570 were suppressed because it was not clear that the vehicle's tires were worn.
7. Supra, note 6.
8. Supra, note 6.

## PERIODIC MOTOR VEHICLE INSPECTION IN HAWAII

9. According to the Northwestern University Traffic Institute, a traffic accident may result from a driver's failure to perceive a hazardous situation (e.g., heavy rain, wet road, and worn tires), failure in deciding what to do about the situation (e.g., slow down gradually to avoid losing control of the vehicle), or failure to do properly what was decided (e.g., braking hard and sending the vehicle into an uncontrollable spin).

Northwestern University Traffic Institute, The Traffic-Accident Investigation Manual (Evanston, Illinois: 1986), p. 15-26.

10. Knowledge does not imply skill; training and practice develop skill.
11. Hawaii, Department of Transportation, "Letter from Edward Hirata, Director of Transportation to Richard Gallagher" (February 14, 1989), pp. 1-2.
12. Trailer hitches are not an inspected items on trailers. See section 19-133.2-26, Hawaii Administrative Rules (Department of Transportation).
13. "Rain" means that it was raining at the time of a traffic accident. While rain will cause roadways to become wet, it is not the only cause of wet roadways. It is possible to have clear weather conditions, but wet road conditions.

## Chapter 4

### WHEN THE WHEELS FALL OFF

#### Introduction

This chapter determines the number of equipment defects (e.g., tires, service brakes, and headlamps) that were *reported* by vehicle inspectors (typically, service station personnel) between January 1, 1990 and December 31, 1994, and identifies those defects that could have *caused* or *contributed* to traffic accidents.

Although House Resolution No. 12, H.D. 2, requested the Bureau to determine the number of equipment defects that were *detected* by vehicle inspectors, there was no valid and reliable way for the Bureau to determine the number of defects that were detected but *not* reported by these inspectors.<sup>1</sup> Although House Resolution No. 12, H.D. 2, also requested the Bureau to determine whether or not any of the foregoing equipment defects could have resulted in serious traffic accidents, the nature of the extrinsic factors<sup>2</sup> that determine the seriousness of traffic accidents made it impossible to answer this question. Rather than speculate about whether or not the foregoing equipment defects could have resulted in serious traffic accidents, the Bureau asked the state Department of Transportation, to identify those equipment defects that could have caused or contributed to traffic accidents.<sup>3</sup>

#### Results

Table 4 indicates the kind (in alphabetical order) and number of equipment defects that were reported by vehicle inspectors in 1990, 1991, 1992, 1993, and 1994. Table 5 indicates the kind and number (in rank order) of equipment defects that were reported by vehicle inspectors in 1990, 1991, 1992, 1993, and 1994. The equipment defects that could have caused or contributed to traffic accidents were indicated in bolded capital letters (e.g., **TIRES, SERVICE BRAKES, SUSPENSION,**<sup>4</sup> and **STEERING**).

According to Table 5, there were 135,718 tire, service brake, suspension, and steering defects reported between January 1, 1990 and December 30, 1994, or approximately 27,144 tire, service brake, suspension, and steering defects each year.

TABLE 4  
REPORTED VEHICLE DEFECTS BY YEAR  
FOR THE STATE OF HAWAII  
JANUARY 1990 TO DECEMBER 1994

<u>Item</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>
body items	1,575	2,308	2,884	3,232	3,519
bumpers	555	593	784	699	595
door latches	769	922	970	1,053	1,118
exhaust system	9,387	11,657	13,430	13,591	13,534
fenders	228	252	294	243	238
floor pan	153	161	203	180	173
headlamps	48,853	49,582	44,690	39,503	38,394

# PERIODIC MOTOR VEHICLE INSPECTION IN HAWAII

TABLE 4  
(CONTINUE)

<u>Item</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>
hood latches	347	328	334	310	344
horn	4,330	4,731	4,687	4,573	7,301
intake & fuel system	859	960	995	868	842
no-fault insurance	7,891	9,535	10,802	12,630	13,159
other electrical	665	322	1,088	687	661
other lamps	16,702	20,409	22,709	23,048	22,630
other windows	719	983	1,677	1,751	2,839
parking brakes	5,609	5,496	5,842	5,171	4,500
rearview mirror	1,842	2,299	2,714	2,452	2,524
registration	51,007	65,702	72,508	77,447	81,331
seats & seat belts	356	314	360	266	355
<b>SERVICE BRAKES</b>	<b>6,511</b>	<b>6,463</b>	<b>6,763</b>	<b>6,465</b>	<b>5,883</b>
signal lamps	11,065	11,303	11,143	11,359	10,620
speedometer/odometer	309	360	379	423	530
<b>STEERING</b>	<b>1,386</b>	<b>1,612</b>	<b>2,057</b>	<b>2,127</b>	<b>2,645</b>
stop lamps	12,416	12,433	12,980	13,183	13,563
<b>SUSPENSION</b>	<b>1,213</b>	<b>1,400</b>	<b>1,857</b>	<b>1,946</b>	<b>2,280</b>
tail lamps	9,539	9,144	9,372	9,351	8,762
<b>TIRES</b>	<b>14,468</b>	<b>15,780</b>	<b>18,462</b>	<b>18,610</b>	<b>17,790</b>
warning lamps	6,029	6,325	6,938	7,638	6,867
wheel alignment	1,684	2,322	2,799	2,804	2,708
wheels & rims	683	762	886	998	1,083
window tint <sup>1</sup>	NA	NA	NA	NA	4,003
windshield	1,657	2,144	3,159	2,979	2,861
windshield wipers	7,954	8,325	8,018	7,491	6,895
<b>TOTAL BY YEAR</b>	<b>226,763</b>	<b>254,927</b>	<b>271,784</b>	<b>273,278</b>	<b>280,547</b>

<sup>1</sup>Effective July 1, 1994

Sources: January 1, 1994 to December 31, 1994 - Hawaii, Department of Transportation, Motor Vehicle Safety Office, "Annual State Total Defects Spreadsheet for Calendar Year 1994", 1 p.

January 1, 1993 to December 31, 1993 - Hawaii, Department of Transportation, Motor Vehicle Safety Office, "Monthly County Defects Spreadsheet for Calendar Year 1993", 6 pp.

January 1, 1992 to December 31, 1992 - Hawaii, Department of Transportation, Motor Vehicle Safety Office, "Monthly County Defects Spreadsheet for Calendar Year 1992", 6 pp.

January 1, 1991 to December 31, 1991 - Hawaii, Department of Transportation, Motor Vehicle Safety Office, "Monthly County Defects Spreadsheet for Calendar Year 1991", 6 pp.

January 1, 1990 to December 31, 1990 - Hawaii County Police Department, Maui County Department of Finance, Kauai County Department of Finance, and Honolulu County Department of Finance, "PMVI Reports for the Months of January 1990 to December 1990", 48 pp.

# WHEN THE WHEELS FALL OFF

**TABLE 5**  
**REPORTED VEHICLE DEFECTS BY EQUIPMENT**  
**FOR THE STATE OF HAWAII:**  
**JANUARY 1990 TO DECEMBER 1994**

<u>Item</u>	<u>1990-1994</u>
registration	347,895
headlamps	221,022
other lamps	105,498
<b>TIRES</b>	<b>85,110</b>
stop lamps	64,575
exhaust system	61,599
signal lamps	55,490
no-fault insurance	54,017
tail lamps	46,168
windshield wipers	38,683
warning lamps	33,997
<b>SERVICE BRAKES</b>	<b>32,065</b>
parking brakes	26,818
horn	25,622
body items	13,518
windshield	12,800
wheel alignment	12,317
rearview mirror	11,831
<b>STEERING</b>	<b>9,827</b>
<b>SUSPENSION</b>	<b>8,696</b>
other windows	7,969
door latches	4,829
Intake & fuel system	4,524
wheels & rims	4,412
window tint <sup>1</sup>	4,003
other electrical	3,423
bumpers	3,226
speedometer/odometer	2,001
hood latches	1,663
seats & seat belts	1,651
fenders	1,255
<u>floor pan</u>	<u>875</u>
<b>TOTAL BY EQUIPMENT</b>	<b>1,307,299</b>

<sup>1</sup>Effective July 1, 1994

Sources: January 1, 1994 to December 31, 1994 - Hawaii, Department of Transportation, Motor Vehicle Safety Office, "Annual State Total Defects Spreadsheet for Calendar Year 1994", 1 p.

January 1, 1993 to December 31, 1993 - Hawaii, Department of Transportation, Motor Vehicle Safety Office, "Monthly County Defects Spreadsheet for Calendar Year 1993", 6 pp.



## PERIODIC MOTOR VEHICLE INSPECTION IN HAWAII

January 1, 1992 to December 31, 1992 - Hawaii, Department of Transportation, Motor Vehicle Safety Office, "Monthly County Defects Spreadsheet for Calendar Year 1992", 6 pp.

January 1, 1991 to December 31, 1991 - Hawaii, Department of Transportation, Motor Vehicle Safety Office, "Monthly County Defects Spreadsheet for Calendar Year 1991", 6 pp.

January 1, 1990 to December 31, 1990 - Hawaii County Police Department, Maui County Department of Finance, Kauai County Department of Finance, and Honolulu County Department of Finance, "PMVI Reports for the Months of January 1990 to December 1990", 48 pp.

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### Endnotes

1. The discrepancy between what was detected and what was reported was caused by some vehicle inspectors' failure to issue incomplete certificates of inspection to applicants who refused to have corrective repairs performed immediately, and by these inspectors' consequent failure to submit these incomplete certificates of inspection to the State Department of Transportation after the thirty-day period for reinspection had lapsed. See Title 19, section 133.2-23 of the Administrative Rules of the state Department of Transportation.

Title 19, section 133.2-23 of the Administrative Rules of the state Department of Transportation requires a vehicle inspector to give the blue copy of an incomplete certificate of inspection to an applicant so that corrective repairs can be performed on the applicant's vehicle. If the applicant refuses to have corrective repairs performed immediately, the applicant has ten days (thirty days for a registration defect) to get the defects corrected and return to the inspection station for reinspection at no additional charge.

Title 19, section 133.2-22 of the Administrative Rules of the state Department of Transportation allows a vehicle inspector to charge an additional fee of \$5.00 for the reinspection of a vehicle if more than ten days have passed since the vehicle's initial inspection. A new, complete inspection is required if more than thirty days have passed since the vehicle's initial inspection. The vehicle inspector may charge a fee of \$14.70 for the complete inspection of an automobile or truck, and \$8.75 for the complete inspection of a motorcycle or trailer, if more than thirty days have passed since the vehicle's initial inspection.

Some vehicle inspectors will not charge an applicant for an inspection if the applicant's vehicle fails to qualify for certification. Because incomplete certificates of inspection are not being given to the applicants and, consequently, not being submitted to the state Department of Transportation, there is no way to determine the actual number of equipment defects that were detected by all vehicle inspectors. Since it is possible to determine only the number of equipment defects that were reported by vehicle inspectors, the data submitted to the state Department of Transportation represent only the minimum number of defects that were detected.

Interview with Ron Foss, Vice-President, Hawaii Automotive and Retail Gasoline Dealers Association, August 21, 1995.

2. These extrinsic factors included the speed and size of a vehicle, the use of guardrail along steep embankments and cliffs, the presence of immovable objects (e.g., trees and telephone poles) in the path of the vehicle, the use of median strips to separate opposing lanes of traffic, the grade and bank of the roadway, the use of child passenger restraints and safety belts, and the presence of pedestrians in the path of the vehicle. These factors are beyond the control of a periodic motor vehicle inspection program.
3. Telephone interview with Gary Tanakaya, Vehicle Equipment Safety Specialist, state Department of Transportation, Motor Vehicle Safety Office, September 27, 1995.

## WHEN THE WHEELS FALL OFF

Service brakes, steering, suspension, and tires are critical components of safe vehicle operation because they control a moving vehicle. This is not to say that other equipment defects could not have resulted in traffic accidents. It is possible to construct a plausible accident scenario for just about every equipment defect covered under periodic motor vehicle inspection. Supra

It is interesting to note that the vehicle in use inspection standards (49 CFR 570) adopted by the National Highway Traffic Safety Administration, for vehicles with gross vehicle weight ratings of 10,000 pounds or less, specify standards and procedures for the inspection of only service brake systems and brake power units, steering and suspension systems, and tire and wheel assemblies.

4. The most important function of a vehicle's suspension system is to keep the vehicle's tires in contact with the road. A vehicle cannot be steered or braked if its tires are not in contact with the road.

Tanakaya telephone interview.

## **Chapter 5**

### **PROBLEMS**

#### **Introduction**

As discussed in Chapter 1, the effectiveness of Hawaii's periodic motor vehicle inspection program in eliminating traffic accidents caused by mechanical failure appears to depend on several factors, including:

- (1) The procedures for conducting inspections;
- (2) The implementation and enforcement of these procedures; and
- (3) The imposition of penalties for either violating these procedures or operating a vehicle without a current certificate of inspection (i.e., safety check).

House Resolution No. 12, H.D. 2, requested the Bureau to conduct a review of any enforcement problems encountered by the counties with respect to Hawaii's periodic motor vehicle inspection program. Consequently, the purposes of this Chapter are to examine the foregoing variables, and to suggest ways that the Legislature could improve the program.

The Bureau's examination of these variables at the county-level was limited to the City and County of Honolulu because the county periodic motor vehicle inspection programs should be similar to one another,<sup>1</sup> and because the City and County of Honolulu has the greatest number of registered motor vehicles.<sup>2</sup>

#### **Procedures for Conducting Inspections**

**Scope of Discussion.** As discussed in Chapter 4, service brakes, steering, suspension, and tires are critical components of safe vehicle operation because they control a moving vehicle. Rather than discuss the procedures for inspecting all equipment defects that could affect the seriousness of traffic accidents, the Bureau limited the scope of the following discussion to the frequency of periodic motor vehicle inspection and the procedures for inspecting equipment defects that could cause or contribute to traffic accidents.

Inspection procedures followed in Hawaii, which are set forth in chapter 19-133.2, *Hawaii Administrative Rules* (Department of Transportation) are compared with the standards recommended by the American Association of Motor Vehicle Administrators (AAMVA).

**Frequency of Inspection.** According to the AAMVA,<sup>3</sup> the more frequently a vehicle undergoes a thorough inspection, the better the chances are of detecting and correcting failures in safety components that could cause or contribute to the vehicle being involved in a crash. Although the inspection of vehicles at least once every six months provides optimal safety results, most periodic motor vehicle inspection jurisdictions have found that mandatory inspection every six months overburdens inspection facilities and personnel, and creates some negative public reaction. Periodic motor vehicle inspection jurisdictions have found that annual inspections are acceptable and practical, and that the overall condition of safety components on vehicles remains generally good when subjected to annual inspection.

## PROBLEMS

The AAMVA recommends that every vehicle undergo an inspection of its safety components at a minimum of once every twelve months. Section 286-26, *Hawaii Revised Statutes*, requires ambulances; trucks, truck-tractors, semitrailers, and pole trailers having a gross vehicle weight rating of more than 10,000 pounds; buses; rental or U-drive motor vehicles one year of age or older; and taxi cabs, to be inspected and certified once every six months. All other vehicles, including motorcycles, trailers, semitrailers, and pole trailers having a gross vehicle weight rating of 10,000 pounds or less, and antique motor vehicles, must be inspected and certified once every twelve months.<sup>4</sup>

**Wheel Removal for Brake Inspection.** According to the AAMVA,<sup>5</sup> wheel removal is essential to proper brake inspection. Although dynamic brake testing (*i.e.*, brake testing performed on a moving vehicle) provides information on the operating efficiency of a vehicle's brake system, these tests do not indicate the depth of wear or disclose the actual physical condition of brake components. While the removal of all of the wheels on a vehicle provides the best inspection for the actual condition of the brake components on each wheel, these requirements are not practical during the inspection process because of time and cost factors. The detection and correction of worn brake components before a failure occurs reduces the probability of a vehicle becoming involved in a crash.

Although many periodic motor vehicle inspection jurisdictions do not require the removal of wheels because of liability and time considerations, those jurisdictions that do mandate wheel removal report experiencing no liability problems. In decentralized inspection programs (*i.e.*, inspection programs carried out in conjunction with privately-owned service stations), the time considerations have not proven to be an overwhelming obstacle and the results have more than offset the few additional minutes required to conduct an inspection. According to the AAMVA, periodic motor vehicle inspection jurisdictions that currently require the removal of wheels for brake inspection report that the number of vehicles rejected because of faulty brake components has risen dramatically.

The AAMVA recommends the instituting of dynamic brake testing and the removal of at least one wheel on each axle of a vehicle where the enclosure of brake components prevents the inspection of brake wear and condition. Section 19-133.2-31 does not require the removal of any wheels to inspect the wear and condition of enclosed brake components. Consequently, the inspection and certification of a vehicle's brake system is usually done by dynamic testing and visual inspection alone. Section 19-133.2-40 allows the inspection of enclosed brake components to be performed visually and the brake system to be certified based on the general appearance of the vehicle.

**Brake Pedal Reserve.** The AAMVA procedures for inspecting brake pedal reserve<sup>6</sup> do not appear to differ substantially from the inspection procedures described in section 19-133.2-31.

The AAMVA recommends the use of a force gauge to ensure the application of 150 pounds of force to a brake pedal for ten seconds when testing brake pedal reserve.<sup>7</sup> Section 19-133.2-31 does not require the use of a force gauge to test brake pedal reserve.

**Dynamic Brake Testing - Stopping Distance Method.** The AAMVA<sup>8</sup> recommends that a vehicle travelling at *twenty* miles per hour on level, dry, hard, smooth pavement free from oil, grease, or loose dirt be able to stop smoothly within twenty feet (for vehicles built after 1971) and stay within a 12-foot wide lane when the vehicle's brakes are applied. Section 19-133.2-31 requires a vehicle to be travelling between only *four and eight* miles per hour when the vehicle's brakes are applied. The vehicle is not required to stop within twenty feet or stay within a 12-foot wide lane.

## PERIODIC MOTOR VEHICLE INSPECTION IN HAWAII

**Steering.** The AAMVA procedures for inspecting steering<sup>9</sup> do not appear to differ substantially from the inspection procedures described in section 19-133.2-28.

The AAMVA recommends the use of a ruler, scale (i.e., a measuring instrument with graduated markings), or lash-checking instrument to measure steering wheel free play (i.e., lash). Section 19-133.2-28 does not require the use of a measuring instrument to assess steering wheel free play. According to the AAMVA, permissible values for steering wheel free play range from 2 inches (for power steering) to 3 inches (for manual steering) unless otherwise recommended by the manufacturer or the American Automobile Manufacturers Association.

**Suspension.** In general, the AAMVA procedures for inspecting suspension<sup>10</sup> do not appear to differ substantially from the inspection procedures described in section 19-133.2-28.

Depending on the model and year of a vehicle, the AAMVA recommends the use of a dial indicator or pull scale to measure ball joint wear. Section 19-133.2-28 does not require the use of a measuring instrument to assess ball joint wear. According to the AAMVA, manufacturers' tolerances for ball joint wear (in terms of vertical and horizontal movement) can range from 0.012 of an inch (less than 1/64") to 0.060 of an inch (less than 1/16").<sup>11</sup>

**Tires.** The AAMVA procedures for inspecting tires<sup>12</sup> do not appear to differ substantially from the inspection procedures described in section 19-133.2-29.

### Implementation of Inspection Procedures

**Inspectors.** To become a vehicle inspector, section 19-133.2-12 specifies that an applicant must:<sup>13</sup>

- (1) Be able to read and legibly print the English language and Arabic numerals;
- (2) Be at least eighteen years of age at the time the application is tendered;
- (3) Have a valid Hawaii driver license for the type of vehicle to be inspected;
- (4) Have:
  - (A) One year of training in automotive mechanics, or a related technical field at a school conducting regularly scheduled classes; or
  - (B) Two years of employment experience in automotive maintenance, repair, or service;and
- (5) Have completed a written and performance examination administered by the county agency contracted by the state Department of Transportation to supervise, enforce, and administer the periodic motor vehicle inspection program in that county.

Section 19-133.2-13 specifies that a vehicle inspector's certificate expires four years from the date of its issuance unless revoked or suspended. The AAMVA recommendations

## PROBLEMS

for the certification of vehicle inspectors<sup>14</sup> do not appear to differ substantially from the certification procedures described in section 19-133.2-12.

The AAMVA recommends the instituting of minimal background investigations to ensure that vehicle inspector applicants are qualified and suitable to perform periodic motor vehicle inspections. According to the AAMVA, vehicle inspectors are perceived by vehicle owners as representatives of the agency administering the periodic motor vehicle inspection program. The actions and abilities of vehicle inspectors reflect on the administering agency and the periodic motor vehicle inspection program. The support of vehicle owners is essential in retaining existing periodic motor vehicle inspection programs.

According to the Motor Vehicle Control Section of the Honolulu Department of Finance,<sup>15</sup> there are insufficient personnel resources and authority to conduct these background investigations.<sup>16</sup> Consequently, the Motor Vehicle Control Section is unable to verify that a vehicle inspector applicant has one year of training in automotive mechanics, or a related technical field at a school conducting regularly scheduled classes; or two years of employment experience in automotive maintenance, repair, or service.<sup>17</sup> In addition, the only way to deny an individual a certificate to work as a vehicle inspector on the basis of character and reputation is to demonstrate that the individual is on active suspension or had a previous certificate revoked by the Motor Vehicle Control Section.

Neither chapter 286, *Hawaii Revised Statutes*, nor chapter 19-133.2, *Hawaii Administrative Rules*, authorize investigations into the character and reputation of vehicle inspector applicants, or allow the results of these investigations to be used against vehicle inspector applicants.

The AAMVA also recommends establishing periodic retraining requirements for all vehicle inspectors. The training should cover the following topics: new or changed laws, rules, and policies; changes in vehicle technology; changes in inspection procedures; and problems identified by Motor Vehicle Control Inspectors.

Because there are no periodic retraining requirements in chapter 286, *Hawaii Revised Statutes*, or chapter 19-133.2, *Hawaii Administrative Rules*, these topics can be covered only when vehicle inspectors are recertified--every four years.<sup>18</sup>

**Inspection Stations.** The requirements to become a vehicle inspection station are specified in section 19-133.2-12. The rules specify, among other things:

- (1) The days of the week and the number of hours each day that a vehicle inspector must be available to conduct inspections, if a public inspection station;<sup>19</sup>
- (2) The qualifications of supervisors, managers, and owners of vehicle inspection stations;
- (3) The construction, composition, and physical condition of inspection areas;
- (4) The availability and working condition of specific tools and pieces of equipment; and
- (5) The kinds and amounts of insurance that must be maintained by the owners or operators of public inspection stations.

## PERIODIC MOTOR VEHICLE INSPECTION IN HAWAII

The AAMVA<sup>20</sup> recommends the instituting of background investigations to determine the character and reputation of businesses and individuals applying to operate vehicle inspection stations. The background investigations should cover the following topics: the length of time in business; financial stability; quality of repairs; responsiveness to customers; and honesty, criminal history, traffic violations, credit background, and business conduct.

According to the Motor Vehicle Control Section,<sup>21</sup> there are insufficient personnel resources and authority to conduct these background investigations.<sup>22</sup> Consequently, the only way to deny a business or individual a permit to operate a vehicle inspection station on the basis of character and reputation is to demonstrate that the business or individual is on active suspension or had a previous permit revoked by the Motor Vehicle Control Section.

Neither chapter 286, *Hawaii Revised Statutes*, nor chapter 19-133.2, *Hawaii Administrative Rules*, authorize investigations into the character and reputation of businesses and individuals applying to operate vehicle inspection stations, or allow the results of these investigations to be used against these businesses or individuals.

**Size of the Periodic Motor Vehicle Inspection Program in Honolulu.** According to the state Department of Transportation,<sup>23</sup> there were an average of 1,219 active vehicle inspectors and 375 active, public and private vehicle inspection stations in the City and County of Honolulu during calendar year 1994.

### **Enforcement of Inspection Procedures**

#### **Imposition of Penalties for Violating Inspection Procedures**

According to the state Department of Transportation,<sup>24</sup> the Motor Vehicle Control Section of the Honolulu Department of Finance monitored 2,322 inspection stations during calendar year 1994.<sup>25</sup> Sixty-three inspection station permits were suspended or revoked by the Motor Vehicle Control Section, or voluntarily surrendered by inspection stations withdrawing from the periodic motor vehicle inspection program or facing the threat of permit revocation.<sup>26</sup> Twenty-nine vehicle inspector certificates were suspended or revoked by the Motor Vehicle Control Section or voluntarily surrendered by vehicle inspectors withdrawing from the periodic motor vehicle inspection program or facing the threat of certificate revocation.<sup>27</sup>

#### **Enforcement of, and Penalties for, Driving Without Current Safety Sticker**

Based on interviews with persons knowledgeable about the periodic motor vehicle inspection program in the City and County of Honolulu, it appears that some Honolulu Police Officers do not issue citations for expired certificates of inspection unless they are issuing citations for other traffic violations (e.g., speeding or driving under the influence of intoxicating liquor). According to the Honolulu Police Department,<sup>28</sup> this practice is consistent with the discretionary powers afforded to police officers. Regardless of the reasons for this practice,<sup>29</sup> the upshot is that section 286-25, *Hawaii Revised Statutes* (which prohibits the operation of a vehicle without a current certificate of inspection and authorizes the imposition of a \$100 fine), may lack the vigorous enforcement needed to deter people from operating a vehicle without a current certificate of inspection.<sup>30</sup> Although the Motor Vehicle Control Section is empowered to issue citations for expired certificates of inspection, it must be remembered that the core of the periodic motor vehicle inspection program consists of only four Motor Vehicle Control Inspectors, one clerk, and one student aide.

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Parking Violations Clerks with the Traffic Engineering Division of the Honolulu Department of Transportation Services,<sup>31</sup> Traffic Control Officers with the Airports Division of the state Department of Transportation,<sup>32</sup> and Deputy Sheriffs with the Maritime Law Enforcement Division of the Department of Public Safety,<sup>33</sup> have the authority to issue citations for expired safety checks in conjunction with the issuance of citations for other traffic violations.<sup>34</sup> Parking Control Officers with the Automotive Management Division of the Department of Accounting and General Services<sup>35</sup> do not have this authority.

Appendix D indicates that 26.25 per cent (9,841) of the 37,489 citations issued in the State of Hawaii during calendar year 1993 for operating a vehicle without a current certificate of inspection were still pending<sup>36</sup> as of December 31, 1994, at least a year after issuance. According to Appendix E, approximately 30.62 per cent (8,662) of the 28,289 citations issued in the State for the same reason during calendar year 1994 were still pending as of October 4, 1995.

Appendix D indicates that 21.91 per cent (6,057) of the citations issued in 1993 and disposed in 1993 and 1994 (27,648) were dismissed, suspended, or partially suspended.<sup>37</sup> According to Appendix E, approximately 23.82 per cent (4,675) of the citations issued in 1994 and disposed in 1994 and as of October 4, 1995 (19,627) were dismissed, suspended, or partially suspended. Although the Bureau was unable to determine the reasons for these actions, one fact was undisputable—a person either did or did not have a current certificate of inspection when a citation was issued. Unlike more complicated offenses, there is very little middle ground here. Because a vehicle inspector is required to affix the new safety sticker for the motorist, the likelihood of cases (such as motor vehicle registration stickers) where the motorist has the sticker but simply forgets to affix it to the car are reduced.

Although 62.89 per cent (17,389) of the citations issued in 1993 and disposed in 1993 and 1994 (27,648), and approximately 58.19 per cent (11,421) of the citations issued in 1994 and disposed in 1994 and as of October 4, 1995 (19,627), were uncontested (i.e., the fine was paid), there was no follow-up to ensure that certificates of inspection were ever obtained. A person is not required to submit proof of a current certificate of inspection if the citation is not contested and the fine (\$40 effective July 1, 1994) is paid.<sup>38</sup> Although an outstanding citation will prevent the renewal of a driver's license, this could take as long as four years to enforce.<sup>39</sup> The upshot is that section 286-25, *Hawaii Revised Statutes*, may lack the timely and effective enforcement mechanisms needed to deter people from operating a vehicle without a current certificate of inspection.

### Reconstructed Vehicles

**Scope of Discussion.** A discussion on reconstructed vehicles has been included in this study because a reconstructed vehicle cannot be safety checked unless it has a reconstruction certificate from the Motor Vehicle Control Section of the Honolulu Department of Finance.<sup>40</sup> This discussion is not about the need for, or the pros and cons of operating, a statewide inspection program for reconstructed vehicles. Rather, this discussion is about loopholes in the law that allow potentially unsafe, reconstructed vehicles to be operated on the public highways, and that make the enforcement of periodic motor vehicle inspection laws and rules problematic.

The scope of the Bureau's examination of vehicle reconstruction was limited to the City and County of Honolulu because it is the only county required by state law to inspect and certify privately-owned reconstructed vehicles. Because of the controversial nature of vehicle



reconstruction and the limited scope of this discussion,<sup>41</sup> the Bureau recommends that the Legislature conduct public hearings on these matters.

**Background.** Section 286-85, *Hawaii Revised Statutes*, prohibits the operation of a reconstructed vehicle<sup>42</sup> upon a public highway,<sup>43</sup> in a county with a population of more than 500,000 people (i.e., Honolulu), unless the vehicle has been inspected and certified by the designated county agency (i.e., the Honolulu Department of Finance) as meeting the specifications and requirements established in rules adopted by the state Director of Transportation.<sup>44</sup>

Section 286-83, *Hawaii Revised Statutes*, prohibits the sale of any head lamp, auxiliary or fog lamp, rear lamp, signal lamp, reflector (which is required by law), glazing material (e.g., a glass windshield), hydraulic brake fluid, seat belt, and shoulder harness or seat belt and shoulder harness assembly, unless the device is of a type that has been approved by the state Director of Transportation.

The Motor Vehicle Control Section inspected 3,668 reconstructed vehicles during calendar year 1993. Approximately forty-four per cent (1,617) of these vehicles were unable to obtain reconstruction certificates because the vehicles could not pass inspection.<sup>45</sup> During calendar year 1994, the Motor Vehicle Control Section inspected 4,493 reconstructed vehicles. Approximately sixty-five per cent (2,940) of these vehicles were unable to obtain reconstruction certificates because the vehicles could not pass inspection.<sup>46</sup>

**Loopholes.** There are no laws or rules that prohibit the sale of tinted head lamp and rear lamp covers, tuneable mufflers, side-marker lamps, speed-flashers, and other "off-road" devices<sup>47</sup> even though these devices must be removed from a vehicle before the Motor Vehicle Safety Section will issue a reconstruction certificate. During an on-site visit to the Motor Vehicle Control Section's Kapaeha Inspection facility, the writer saw a young man removing the tinted head lamp covers on his sedan in order to pass inspection. Since the possession of these covers is not illegal, the young man could have reinstalled the covers after passing inspection. Although reinstalling equipment not listed on a vehicle's reconstruction certificate will void the certificate, a Honolulu Police Officer or Motor Vehicle Control Inspector would have to catch a vehicle being operated on a public highway in order to issue a citation. This same pass-and-switch tactic is used to surreptitiously obtain reconstruction certificates for vehicles using illegal equipment (e.g., oversized tires and negatively offset rims), or not using required equipment (e.g., fenders), on public highways.<sup>48</sup>

There are no laws or rules prohibiting the reconstruction of a vehicle to the extent that it cannot qualify for a reconstruction certificate.<sup>49</sup> For example, there are no laws or rules that prohibit the mounting of passenger car tires on trucks even though the passenger car tires may have improper loading capacity ratings; or the raising or lowering of vehicles so their headlights or bumpers are too high or too low, respectively.<sup>50</sup> There are also no laws or rules that prohibit the sale of an uncertified reconstructed vehicle.<sup>51</sup> While at the Motor Vehicle Control Section's inspection facility, the writer saw another young man attempt to obtain a reconstruction certificate for a pick-up truck that he had purchased. The young man was unable to obtain a reconstruction certificate because the pick-up truck could not pass inspection. This man had purchased a vehicle that could not be safety checked or registered.

Since there is no law or rule that specifies the time in which a reconstruction certificate must be obtained, it is possible to operate a reconstructed vehicle on a public highway for up to twelve months (i.e., when the vehicle's safety check expires) without obtaining a reconstruction certificate.<sup>52</sup>

## PROBLEMS

There are no laws or rules that (1) require a person to submit proof of a current reconstruction certificate and a current safety check when contesting a citation for operating a vehicle without a reconstruction certificate, (2) requiring a person to submit proof of a current reconstruction certificate and a current safety check when paying the fine on an uncontested citation,<sup>53</sup> and (3) preventing the renewal of a vehicle's registration if the fine on an uncontested citation issued to a person (versus the vehicle) is not paid.<sup>54</sup>

### Summary

**Procedures for Conducting Inspections.** The AAMVA procedures for inspecting and testing brakes appear to differ substantially from the inspection procedures described in chapter 19-133.2, *Hawaii Administrative Rules*. If the state Department of Transportation were to adopt the AAMVA procedures for inspecting and testing brakes, the number of vehicles rejected because of faulty brake components would probably increase. The adoption of the AAMVA procedures would increase the time required to perform an inspection, which would increase the cost of the inspection. In addition, the adoption of the AAMVA procedures would increase the amount of space needed to conduct an inspection, which would require some vehicle inspection stations to either undertake expensive capital improvement projects to upgrade their facilities, or refuse to conduct safety inspections.

**Implementation of Inspection Procedures.** Neither chapter 286, *Hawaii Revised Statutes*, nor chapter 19-133.2, *Hawaii Administrative Rules*, (1) authorize investigations into the character and reputation of vehicle inspector applicants, or businesses and individuals applying to operate vehicle inspection stations, or (2) allow the results of these investigations to be used against these applicants, or businesses and individuals. Consequently, the only way to deny an individual a certificate to work as a vehicle inspector, or to deny a business or individual a permit to operate a vehicle inspection station, on the basis of character and reputation, is to demonstrate that the individual or business is on active suspension or had a previous certificate or permit revoked.

**Enforcement of, and Penalties for, Violations of Safety Inspection Law.** Some Honolulu Police Officers do not issue citations for expired certificates of inspection unless they are issuing citations for other traffic violations (e.g., speeding or driving under the influence of intoxicating liquor). Although citations can be issued by Parking Violations Clerks with the Honolulu Department of Transportation Services, Traffic Control Officers with the state Department of Transportation, and Deputy Sheriffs with the Department of Public Safety, section 286-25, *Hawaii Revised Statutes* (which prohibits the operation of a vehicle without a current safety check and authorizes the imposition of a \$100 fine), may lack the vigorous enforcement needed to deter people from operating a vehicle without a current safety check.

The enforcement of this law could be improved by authorizing Parking Control Officers with the Department of Accounting and General Services to issue citations for operating a vehicle without a current safety check.

The timely and effective enforcement needed to deter people from operating a vehicle without a current safety check could be improved by (1) requiring a person to submit proof of a current safety check when contesting a citation for operating a vehicle without a safety check, (2) requiring a person to submit proof of a current safety check when paying the fine on an uncontested citation, (3) preventing the renewal of a vehicle's registration if the fine on an uncontested citation issued to a person (versus the vehicle) is not paid, and (4) prohibiting the suspension or partial suspension of citations. Because the foregoing suggestions could

## PERIODIC MOTOR VEHICLE INSPECTION IN HAWAII

affect the administrative procedures for determining court dates and imposing sanctions on violators, and because of the decriminalization of certain traffic offenses, the Legislature should request the Administrative Director of the Courts to propose specific procedures for implementing these ideas *before* they are enacted into law.

**Minimum Headlamp Height.** Section 291-25, *Hawaii Revised Statutes*, requires the headlamps on a vehicle to be securely mounted, not less than twenty-four inches nor more than fifty-four inches above the road surface when measured to the head lamp center, on a rigid part of the vehicle designed specifically for headlamp installation by the manufacturer. The minimum headlamp height for new vehicles prescribed by federal rules and enforced by the Motor Vehicle Control Section of the Honolulu Department of Finance for reconstructed vehicles is twenty-two inches. State laws and rules can be more stringent than federal laws and rules unless the former are preempted by the latter. In the case of minimum headlamp height, the state law is more stringent than the federal rule and should be applied. Since there are no procedures in section 291-25, *Hawaii Revised Statutes*, for granting variances from this minimum height requirement, the twenty-four inch minimum must be either enforced as written or amended by the Legislature.

### Endnotes

1. The rules governing the periodic motor vehicle inspection program apply equally to all counties.
2. All other things being equal, this means the City and County of Honolulu should have the greatest number of motor vehicles that are subject to periodic motor vehicle inspection.
3. American Association of Motor Vehicle Administrators, 1995 Vehicle Inspection Handbook: Recommended Programs for Inspection of Motor Vehicles Under 10,000 lbs. Gross Vehicle Weight Rating (Virginia: 1995), p. 3.
4. A vehicle that has been involved in an accident must be inspected and certified before it is operated again if a police officer or insurer determines that the vehicle's equipment has been damaged so as to render the vehicle unsafe, or if the vehicle is rebuilt or restored.

Hawaii Rev. Stat., section 286-26(c).

An uncertified vehicle must be inspected and certified prior to the issuance of a temporary or permanent registration, and prior to the transfer of any registration.

Hawaii Rev. Stat., section 286-26(d).

5. American Association of Motor Vehicle Administrators, pp. 3-4.
6. Ibid., p. 11.
7. If the brake pedal's height cannot be maintained for 10 seconds under 150 pounds of force or if the brake failure warning light illuminates, there may be a leak in the vehicle's hydraulic system.

Ibid., p. 11.

8. Ibid., p. 8.
9. Ibid., pp. 23-26.

## PROBLEMS

10. Ibid., pp. 27-35.
11. In comparison, the permissible values for steering wheel free play range from 2 inches (for power steering) to 3 inches (for manual steering) unless otherwise recommended by the manufacturer or the American Automobile Manufacturers Association.
12. American Association of Motor Vehicle Administrators, pp. 20-21.
13. Vehicle inspectors who were certified before July 1, 1986, and who are performing vehicle inspector duties satisfactorily are exempt from the language, age, driver license, and experience requirements. Vehicle inspectors who are limited to testing sun screening devices (e.g., tinting films) only are exempt from the experience requirement. See section 19-133.2-12, Hawaii Administrative Rules (Department of Transportation).
14. American Association of Motor Vehicle Administrators, p. 89.
15. Interview with Gary Tashima, Supervisor, Honolulu Department of Finance, Motor Vehicle Control Section, October 10, 1995.
16. According to the state Department of Transportation, the Motor Vehicle Control Section of the Honolulu Department of Finance processed 777 vehicle inspector applications and renewals between January 1, 1994 and December 31, 1994.

Memorandum from Gary Tanakaya, Vehicle Equipment Safety Specialist, state Department of Transportation, Motor Vehicle Safety Office, to Keith Fukumoto, regarding periodic motor vehicle inspection activities in the City and County of Honolulu for the period January 1, 1994 to December 31, 1994, October 5, 1995, 2 pp.

The renewal of a vehicle inspector certificate entails the same amount of work as the processing of a (new) vehicle inspector application since an individual must pass both the written and performance tests to become certified or to renew an existing certificate.

Tashima interview, October 10, 1995.

Four Motor Vehicle Control Inspectors, one clerk, and one student aide comprise the core of the periodic motor vehicle inspection program in the City and County of Honolulu. These four inspectors, with the assistance of inspectors from the abandoned vehicles program, are responsible for inspecting reconstructed vehicles (4,496 inspections in 1994), taxicabs (2,617 inspections in 1994), and U-drive (rental) vehicles (8,920 inspections in 1994); investigating complaints related to periodic motor vehicle inspection (304 investigations in 1994); permitting and monitoring vehicle inspection stations; certifying vehicle inspectors; and issuing citations for expired certificates of inspection (1,323 citations in 1994) and expired registrations (1,426 citations in 1994). The one clerk is responsible for selling, distributing, and inventorying the county's supply of safety check stickers and certificates of inspection.

Tashima interview, October 4, 1995.

Memorandum from Gary Tashima to Dennis Kamimura, Administrator, Honolulu Department of Finance, Motor Vehicle and Licensing Division, regarding the work done by the Motor Vehicle Control Section during calendar year 1994, January 3, 1995, 2 pp.

17. Tashima interview, October 10, 1995.
18. Ibid.

## PERIODIC MOTOR VEHICLE INSPECTION IN HAWAII

19. According to section 19-133.2-6, private vehicle inspection stations are allowed to conduct inspections only on those vehicles that are owned by, and registered to, the owner and operator of the vehicle inspection station. Conversely, public vehicle inspection stations are allowed to conduct inspections on all vehicles that are presented for inspection.
20. American Association of Motor Vehicle Administrators, p. 90.
21. Tashima interview, October 10, 1995.
22. According to the state Department of Transportation, the Motor Vehicle Control Section of the Honolulu Department of Finance processed 193 vehicle inspection station applications between January 1, 1994 and December 31, 1994. Vehicle inspection station permits, unlike vehicle inspector certificates, do not expire and are not renewable.

Tanakaya memorandum, October 5, 1995.

23. Ibid.
24. Ibid.
25. Section 15-20.1 of the Revised Ordinances of Honolulu 1990 requires public and private vehicle inspection stations to be inspected once every two months.

The Motor Vehicle Control Section of the Honolulu Department of Finance conducts spot inspections of these vehicle inspection stations since comprehensive inspections would take more time and reduce the frequency of inspections. Because spot inspections can be either purposive or random in nature, there is no way for a vehicle inspection station to evade the inspection of items that may have been deemed unsatisfactory in the past, or to predict which items will be inspected in the future. The end result is that vehicle inspection stations must be prepared for anything and everything, once every two months. Vehicle inspection stations with bad records can be targeted for more frequent inspection if necessary.

Tashima interview, October 10, 1995.

26. According to the Motor Vehicle Control Section of the Honolulu Department of Finance, vehicle inspection stations are given the chance to voluntarily surrender their permits--in effect putting the stations into a state of indefinite suspension--before they are revoked. Vehicle inspection stations that have their permits revoked can never participate in the periodic motor vehicle inspection program again.

Tashima interview, October 4, 1995.

The criteria and procedures for suspending or revoking a vehicle inspection station's permit or a vehicle inspector's certificate are described in chapter 19-133.5, Hawaii Administrative Rules.

27. Similar to vehicle inspection stations, vehicle inspectors are given the chance to voluntarily surrender their certificates--in effect putting the inspectors into a state of indefinite suspension--before they are revoked. Vehicle inspectors who have their certificates revoked can never participate in the periodic motor vehicle inspection program again.

Tashima interview, October 4, 1995.

28. Telephone interview with Major Barbara Wong, Honolulu Police Department, Accident Investigation Division, October 24, 1995.

## PROBLEMS

29. Given the many demands being placed on police officers, the relatively low priority given to enforcing the safety inspection law is somewhat understandable.
30. Appendices D and E indicate that a total of 37,489 and 28,289 citations were issued in 1993 and 1994 for the entire State, respectively, for expired certificates of inspection. By comparison, the Motor Vehicle Control Section of the Honolulu Department of Finance sold 536,537 and 536,875 one-year and six-month safety check stickers in 1993 and 1994, respectively.

Tashima interview, October 4, 1995.

It is difficult to accurately determine the number of vehicles being operated with expired certificates of inspection because of inaccuracies in the computer data base. See Appendix C and Table 3 regarding the discrepancies between police reports and mechanics reports concerning the expiration date of certificates of inspection.

According to the Motor Vehicle Control Section of the Honolulu Department of Finance, these inaccuracies occur because data processors are unable to read the handwritten information on certificates of inspection. Although the Motor Vehicle Control Section conducts a cursory review of all certificates of inspection for relevance (e.g., out-of-state registrations) and completeness before forwarding them to data processors, and warns vehicle inspection stations about submitting illegible certificates of inspection, there is nothing the Motor Vehicle Control Section can do to correct illegible data. Unreadable certificates of inspection are returned to the Motor Vehicle Control Section without being input into the computer data base.

Tashima interview, October 4, 1995.

31. Telephone interview with Ken Abe, Chief, Honolulu Department of Transportation Services, Parking Branch, October 17, 1995.
32. Telephone interview with James Cox, Operations Officer, State Department of Transportation, Airports Division, October 17, 1995.
33. Telephone interview with Roger Dainard, Administrator, Department of Public Safety, Maritime Law Enforcement Division, October 18, 1995.
34. Like Honolulu Police Officers, Parking Violations Clerks, Traffic Control Officers, and Deputy Sheriffs are responsible for more than the enforcement of section 286-25, Hawaii Revised Statutes.
35. Telephone interview with Harold Sonomura, Head, Department of Accounting and General Services, Automotive Management Division, October 17, 1995.
36. "Pending" citations included citations that (1) may have had summons, warrants, or default judgments issued, (2) may have had pending court appearances, and (3) may have been ignored.
37. "Dismissed" means the citation was contested and dismissed.  
  
"Suspended" means the citation was contested and the fine was suspended.  
  
"Partially suspended" means the citation was contested and the fine was partially suspended.
38. Telephone interview with Milton Heo, Manager, Office of the Administrative Director of the Courts, Traffic Violations Bureau-First Circuit, October 17, 1995.

James Dannenberg. "In the Matter of the Traffic Infraction and Bail Schedule for the District Court, First

## PERIODIC MOTOR VEHICLE INSPECTION IN HAWAII

Circuit" (Honolulu: June 1, 1994), p. 2.

Section 286-25, Hawaii Revised Statutes, authorizes the imposition of a \$100 fine for operating a vehicle without a current certificate of inspection.

39. Hee telephone interview.

Section 286-106, Hawaii Revised Statutes, provides that a driver's license shall expire on the first birthday of the licensee occurring not less than two years after the date of the issuance of the license if at that time the licensee:

- (1) Is sixty-five years of age or older;
- (2) Has been convicted of violations of the traffic laws of the State and of county traffic ordinances in the previous two years that, under the provisions of section 286-128, Hawaii Revised Statutes, total nine points;
- (3) Is twenty-four years of age or younger; or
- (4) Exhibits a physical condition or conditions that the examiner of drivers reasonably believes has impaired the driver's ability to drive, unless the licensee:
  - (A) Obtains a certificate from a licensed physician that the licensee's physical condition or conditions do not impair the licensee's ability to drive; or
  - (B) Is able to correct the physical impairment, or by using a vehicle adapted to overcome the physical impairment is to the satisfaction of the examiner of drivers able to drive safely.

40. Tashima interview, October 4, 1995.

41. The Bureau did not consult with automobile enthusiasts, automobile parts retailers, or the Department of Commerce and Consumer Affairs' Motor Vehicle Repair Industry Board.

42. A "reconstructed vehicle" is defined as a vehicle that is:

- (1) Registered to be operated on a public highway; and
- (2) Assembled from new or used parts by a person other than a recognized manufacturer of new vehicles;
- (3) Modified to the extent that the identity of its make, model, or type is obscured by material changes in its appearance; or
- (4) Is modified by the removal, addition, alteration, or substitution of other than original replacement essential parts, including, but not limited to, its body, power train, steering system, suspension system, exhaust system, intake system, or bumper system.

excluding ordinary body repair that does not change the exterior structure of the vehicle.

Hawaii Rev. Stat., section 286-2.

A "reconstructed vehicle" should not be confused with a "rebuilt vehicle", which is defined as a vehicle that

## PROBLEMS

has been declared a total loss by an insurer and has been rebuilt or repaired to operate on public highways. A vehicle is a total loss only if there is material damage to the vehicle's frame, unitized structure, or suspension system, and the projected cost of repairing the damage exceeds the market value of the vehicle at the time of the incident causing it to be declared a total loss.

Hawaii Rev. Stat., section 286-2.

- 43. By definition, a vehicle is not a reconstructed vehicle if it is not operated on a public highway.
- 44. Section 286-85, Hawaii Revised Statutes, does not apply to vehicles that are subject to the rules of the public utilities commission governing safety of operation and equipment.

Violations of section 286-85, Hawaii Revised Statutes, can be disposed by paying the fine (\$40 as of July 1, 1994).

James Dannenberg, "In the Matter of the Traffic Infraction and Bail Schedule for the District Court, First Circuit", p. 2.

- 45. Memorandum from Gary Tashima to Dennis Kaminura, regarding the work done by the Motor Vehicle Control Section during calendar year 1993, January 4, 1994, 2 pp.
- 46. Memorandum from Gary Tashima to Dennis Kaminura, January 3, 1995.
- 47. These devices are sold by automobile parts retailers with the understanding that they are to be used for off-road and display purposes only.

Tashima interview, October 4, 1995.

- 48. Ibid.
- 49. In contrast, section 291-21.5, Hawaii Revised Statutes, prohibits the installation, mounting, adhering, affixing, or use of any sun screening device (e.g., tinting films) or combination of devices in conjunction with the glazing material (e.g., a glass windshield) of a motor vehicle that does not meet the requirements of Federal Motor Vehicle Safety Standard (FMVSS) 205 in effect at the time of the glazing material's manufacture except as provided by law. Any person who violates this section is liable for the removal of any sun screening device applied contrary to this section.
- 50. Section 291-25, Hawaii Revised Statutes, requires the headlamps on a vehicle to be securely mounted, not less than twenty-four inches nor more than fifty-four inches above the road surface when measured to the head lamp center, on a rigid part of the vehicle designed specifically for headlamp installation by the manufacturer.

The minimum headlamp height for new vehicles prescribed by federal rules and enforced by the Motor Vehicle Control Section of the Honolulu Department of Finance for reconstructed vehicles is twenty-two inches.

Tashima interview, October 4, 1995.

State laws and rules can be more stringent than federal laws and rules unless the former are preempted by the latter. In the case of minimum headlamp height, the state law is more stringent than the federal rule and should be applied. There are no procedures in section 291-25, Hawaii Revised Statutes, for granting variances from this minimum height requirement.



## PERIODIC MOTOR VEHICLE INSPECTION IN HAWAII

Since the twenty-two inch minimum prescribed by federal rules is applicable to only new vehicles, it does not apply to reconstructed vehicles.

Telephone interview with Gary Tanakaya, October 18, 1995.

51. In contrast, temporary and permanent registrations cannot be issued or transferred unless a vehicle has a current safety check.

Hawaii Rev. Stat., section 286-26(d).

52. A reconstructed vehicle cannot be registered without a safety check, which cannot be performed without a reconstruction certificate. Failure to register a reconstructed vehicle is a violation of section 286-41, Hawaii Revised Statutes.

53. See telephone interview.

54. Ibid.

Section 291D-10, Hawaii Revised Statutes, prevents the renewal of a person's driver's license if the fine on an uncontested citation issued to the person (versus the vehicle) is not paid, and prevents the renewal of a vehicle's registration if the fine on an uncontested citation issued to the vehicle (e.g., an unattended vehicle) is not paid. The law does not prevent the renewal of a vehicle's registration if the fine on an uncontested citation issued to a person is not paid.

## Chapter 6

### QUESTIONS AND ANSWERS

The purpose of this chapter is to discuss, in a question and answer format, those issues that may be of greatest interest to the Legislature. Full discussions of each subject area are set forth in Chapters 2, 3, 4, and 5.

**Question:** What is the desired outcome of the State's periodic motor vehicle inspection program?

**Answer:** The desired outcome of the State's periodic motor vehicle inspection program is less traffic accidents and deaths, injuries, and property damage resulting from traffic accidents. This outcome is achieved by periodically removing mechanically unsafe vehicles from the public highways. For further discussion, see pages 13 to 14.

**Question:** Is the State's periodic motor vehicle inspection program achieving its desired outcome?

**Answer:** There is no conclusive evidence to indicate that the State's periodic motor vehicle inspection program either is or is not achieving its desired outcome. Conclusive evidence is not likely to be forthcoming because obtaining it would be impractically expensive; because periodic motor vehicle inspection programs are too variable to allow rationalization according to strict scientific canons; and because periodic motor vehicle inspection programs involve a number of value judgments. For further discussion, see pages 4 to 5.

The data gathered by the Bureau appear to support the state Department of Transportation's assumptions that (1) some traffic accidents are caused because of mechanical failure that could have been prevented with better vehicle maintenance, and (2) some people will not maintain (or are incapable of maintaining) their vehicles without a mandatory periodic motor vehicle inspection program. The data also appear to support the assumption that Hawaii's periodic motor vehicle inspection program is capable of reducing the number of fatal and nonfatal traffic accidents caused by worn tires, defective service brakes, and loose steering. For further discussion, see pages 24 to 25.

Generally speaking, the Bureau believes that Hawaii's periodic motor vehicle inspection program is capable of reducing the number of vehicles with existing or potential conditions that cause or contribute to traffic accidents or increase the severity of traffic accidents that do occur.

**Question:** Should the Legislature repeal the State's periodic motor vehicle inspection program?

**Answer:** No. As stated in this chapter, there is no conclusive evidence to indicate that the State's periodic motor vehicle inspection program is *not* achieving its desired outcome.

Based on data gathered by the Bureau, it appears that there were fourteen nonalcohol, equipment-related fatal traffic accidents in Hawaii between January 1, 1990 and December 31, 1994. It also appears that at least thirteen of these traffic accidents were caused by faulty equipment (i.e., worn tires, faulty service brakes, and loose steering) that could have been detected and corrected during the vehicles' next safety inspection. It further appears that rain caused or contributed to at least six of eight nonalcohol-related traffic accidents that involved worn tires. Arguably, the drivers of these six vehicles were either

## PERIODIC MOTOR VEHICLE INSPECTION IN HAWAII

caught unexpectedly on the road when it started to rain, not too concerned about driving in the rain with worn tires, or unaware that their tires were worn. For further discussion, see pages 18 to 19.

To some extent, all equipment-related traffic accidents are caused by driver error. The question is: how much skill, knowledge, and ability should an average driver possess? What may be considered "driver error" to a professional driver may not be considered driver error to an average driver because of their differing skills, knowledge, and abilities.

Given the fact that the average driver does not have the chance to practice emergency maneuvers under controlled conditions, there is no reason to expect that the average driver will be skillful enough to perform these maneuvers when the need arises. Likewise, given the fact that the average driver is not required to understand how a vehicle's condition can cause or contribute to a traffic accident, there is no reason to expect that the average driver will check a vehicle's condition before starting it. Similarly, given the fact that the average driver is not required to possess the same physical abilities as a professional driver, there is no reason to expect that the average driver will be able to respond like a professional driver in an emergency situation.

Except for driving under the influence of intoxicating liquor or causing a piece of equipment to fail by improperly operating a vehicle, the Bureau believes that equipment-related traffic accidents should not be attributed automatically to driver error. For further discussion, see pages 18 to 19.

**Question:** How many equipment defects that could have caused or contributed to traffic accidents were reported by vehicle inspectors between 1990 and 1994?

**Answer:** Vehicle inspectors reported 135,718 tire, service brake, suspension, and steering defects between January 1, 1990 and December 30, 1994, or approximately 27,144 tire, service brake, suspension, and steering defects each year. For further discussion, see pages 28 to 32.

**Question:** What can the Legislature do to improve the enforcement of the State's periodic motor vehicle inspection program?

**Answer:** The Legislature can authorize the state Department of Transportation to (1) conduct investigations into the character and reputation of vehicle inspector applicants, and businesses and individuals applying to operate vehicle inspection stations, and (2) allow the results of these investigations to be used against these applicants and businesses and individuals. At this time, the only way to deny an individual a certificate to work as a vehicle inspector, or to deny a business or individual a permit to operate a vehicle inspection station, on the basis of character and reputation, is to demonstrate that the individual or business is on active suspension or had a previous certificate or permit revoked. For further discussion, see pages 37 to 40.

The Legislature can authorize Parking Control Officers with the Department of Accounting and General Services to issue citations for operating a vehicle without a current safety check. Parking Violations Clerks with the Traffic Engineering Division of the Honolulu Department of Transportation Services, Traffic Control Officers with the Airports Division of the state Department of Transportation, and Deputy Sheriffs with the Maritime Law Enforcement Division of the Department of Public Safety, already have the authority to issue citations for expired safety checks in conjunction with the issuance of citations for other traffic violations. Because of the discretionary powers afforded to Honolulu police officers, some

## QUESTIONS AND ANSWERS

police officers do not issue citations for expired certificates of inspection unless they are issuing citations for other traffic violations. For further discussion, see page 42.

The Legislature can (1) require a person to submit proof of a current safety check when contesting a citation for operating a vehicle without a safety check, (2) require a person to submit proof of a current safety check when paying the fine on an uncontested citation, (3) prevent the renewal of a vehicle's registration if the fine on an uncontested citation issued to a person (versus the vehicle) is not paid, and (4) prohibit the suspension or partial suspension of citations. Because the foregoing suggestions could affect the administrative procedures for determining court dates and imposing sanctions on violators, and because of the decriminalization of certain traffic offenses, the Legislature should request the Administrative Director of the Courts to propose specific procedures for implementing these ideas *before* they are enacted into law. For further discussion, see page 42.

**Question:** Why did the Bureau include reconstructed vehicles in its study of the State's periodic motor vehicle inspection program?

**Answer:** The Bureau included a discussion on reconstructed vehicles in this study because a reconstructed vehicle cannot be safety checked unless it has a reconstruction certificate from the Motor Vehicle Control Section of the Honolulu Department of Finance. Critical equipment defects can be caused by normal wear and tear, faulty parts, unknowing hobbyists, and unethical mechanics. Regardless of how these defects are caused, the results are still the same--potentially unsafe vehicles operating on the public highways. For further discussion, see page 42.

**Question:** What did the Bureau find out about the regulation of reconstructed vehicles?

**Answer:** The Bureau found out that there are no laws or rules that prohibit the sale of tinted head lamp and rear lamp covers, tuneable mufflers, side-marker lamps, speed-flashers, and other "off-road" devices even though these devices must be removed from a vehicle before the Motor Vehicle Control Section of the Honolulu Department of Finance will issue a reconstruction certificate. Although reinstalling equipment not listed on a vehicle's reconstruction certificate will void the certificate, a Honolulu Police Officer or Motor Vehicle Control Inspector would have to catch a vehicle being operated on a public highway in order to issue a citation. This same "pass-and-switch" tactic is used to surreptitiously obtain reconstruction certificates for vehicles using illegal equipment, or not using required equipment, on public highways. For further discussion, see page 43.

There are no laws or rules that prohibit the reconstruction of a vehicle to the extent that it cannot qualify for a reconstruction certificate. For example, there are no laws or rules that prohibit the mounting of passenger car tires on trucks even though the passenger car tires may have improper loading capacity ratings; or the raising or lowering of vehicles so their headlights or bumpers are too high or too low, respectively. For further discussion, see page 44.

There are no laws or rules that prohibit the sale of an uncertified reconstructed vehicle. While at the Motor Vehicle Control Section's inspection facility, the writer saw a young man attempting to obtain a reconstruction certificate for a pick-up truck that he had purchased. The young man was unable to obtain a reconstruction certificate because the pick-up truck could not pass inspection. This man had purchased a vehicle that could not be safety checked or registered. For further discussion, see page 44.

## PERIODIC MOTOR VEHICLE INSPECTION IN HAWAII

There are no laws or rules (1) requiring a person to submit proof of a current reconstruction certificate and a current safety check when contesting a citation for operating a vehicle without a reconstruction certificate, (2) requiring a person to submit proof of a current reconstruction certificate and a current safety check when paying the fine on an uncontested citation, and (3) preventing the renewal of a vehicle's registration if the fine on an uncontested citation issued to a person (versus the vehicle) is not paid. For further discussion, see page 44.

**Question:** What should the Legislature do about the regulation of reconstructed vehicles?

**Answer:** The Legislature should hold public hearings on this issue. The Bureau is unable to make more specific recommendations because while tangentially related to periodic motor vehicle inspections, the regulation of reconstructed vehicles is a separate and distinct subject area. Changes should not be made in this area without the benefit of extensive input and review. The regulation of reconstructed vehicles may be analogized to the regulation of firearms in terms of the need to balance concerns for public safety with the emotional attachment that enthusiasts feel for their vehicles and the rights, privileges, and responsibilities involved in operating and maintaining them. The Legislature should also request the Administrative Director of the Courts to propose specific procedures for implementing its initiatives *before* they are enacted into law. For further discussion, see page 42.

HOUSE OF REPRESENTATIVES  
EIGHTEENTH LEGISLATURE, 1995  
STATE OF HAWAII

H.R. NO. 12  
H.D. 2

## HOUSE RESOLUTION

REQUESTING A STUDY ON THE STATE DEPARTMENT OF TRANSPORTATION'S  
MOTOR VEHICLE SAFETY INSPECTION PROGRAM.

1 WHEREAS, motor vehicle accidents are the cause of  
2 tremendous harm and suffering to Hawaii's families and  
3 communities; and

4  
5 WHEREAS, the condition of a motor vehicle corresponds  
6 with the quality of the vehicle's performance on the road; and

7  
8 WHEREAS, accordingly, a motor vehicle in good working  
9 condition will probably pose less of a threat than a poorly  
10 maintained motor vehicle; and

11  
12 WHEREAS, the Legislature has responded to the harmful  
13 toll taken by motor vehicle accidents in this State by enacting  
14 motor vehicle certificate of inspection or "safety check"  
15 requirements; and

16  
17 WHEREAS, the subsequent impact of safety check  
18 requirements on reducing the accident rate in Hawaii is not  
19 clear, and some vehicle owners fear that inspection stations  
20 may not be doing an adequate job; and

21  
22 WHEREAS, for safety check programs to be effective, it  
23 is important that the safety benefits accrued outweigh the  
24 additional burdens placed on the owners of motor vehicles; now,  
25 therefore,

26  
27 BE IT RESOLVED by the House of Representatives of the  
28 Eighteenth Legislature of the State of Hawaii, Regular Session  
29 of 1995, that the Legislative Reference Bureau is requested to  
30 conduct a study of the State Department of Transportation's  
31 Motor Vehicle Safety Inspection Program for motor vehicles with  
32 a gross weight rating of 10,000 pounds or less; and

33  
34 BE IT FURTHER RESOLVED that the Legislative Reference  
35 Bureau include in its study:

- 36  
37 (1) A clear statement of the objectives of the Safety  
38 Check Program;

- 1 (2) An analysis as to how the Program is meeting those  
2 objectives;
- 3
- 4 (3) A review of any enforcement problems encountered  
5 by the counties;
- 6
- 7 (4) Recommendations, including legislative proposals,  
8 on how to improve the Program and ensure that it  
9 best meets the stated objectives of the Program;  
10 or if the Program is deemed to be ineffective, a  
11 recommendation for the discontinuance of the  
12 Program; and
- 13
- 14 (5) The number of detected defects and whether any of  
15 these defects could have resulted in serious  
16 accidents;
- 17

18 and

19  
20 BE IT FURTHER RESOLVED that the Director of the  
21 Legislative Reference Bureau submit the study with its findings  
22 and recommendations, including proposed legislation, to the  
23 Legislature no later than twenty days before the convening of  
24 the Regular Session of 1996; and

25  
26 BE IT FURTHER RESOLVED that certified copies of this  
27 Resolution be transmitted to the Director of the Legislative  
28 Reference Bureau and the Director of Transportation.

## Appendix B

### TIRES

#### Introduction

The purpose of this Appendix is to explain, in nontechnical terms, the different events and factors believed to have caused or contributed to the nonalcohol, tire-related fatal traffic accidents discussed in Chapter 3. The simplistic explanations and examples contained in this Appendix belie the scientific basis (largely physics-related) for traffic accident investigation and the technical expertise of traffic accident investigators. Traffic accident investigation and traffic accident investigators are to a collision, what forensic medicine and criminalists are to a homicide.

This Appendix could not have been produced without the generous assistance of the Institute of Police Technology and Management, University of North Florida, which spent many hours providing the Bureau with information. The Bureau could not have generated the information in this Appendix and applied it to the foregoing fatal traffic accidents without the assistance of the Institute of Police Technology and Management.

#### Aquaplaning

According to the Institute of Police Technology and Management (IPTM),<sup>1</sup> there is a failure in grip on wet roads as speed increases and tread depth decreases. A worn (*i.e.*, bald or smooth) tire will ride up on water (*i.e.*, aquaplane or hydroplane) more easily than a new (*i.e.*, treaded) tire because shallow treads dissipate water less effectively than deep treads. The minimum speed at which a new tire will aquaplane (*i.e.*, AS or aquaplaning speed in miles per hour) when water depth exceeds tread depth is given by the following equation:

$$AS_{\text{new}} = (10.35)(\text{square root of tire inflation pressure in pounds per square inch})$$

The minimum speed at which a bald tire will aquaplane when water depth exceeds tread depth is given by the following equation:

$$AS_{\text{bald}} = (3)(\text{square root of tire inflation pressure in pounds per square inch})$$

The minimum aquaplaning speed of a chronically underinflated new tire ( $AS_{\text{new}}$ ) would be approximately 52 miles per hour when water depth exceeds tread depth (*i.e.*, approximately 8 millimeters or 5/16 inches when a tire is nearly new)<sup>2</sup> and tire inflation pressure equals 25 pounds per square inch. The minimum aquaplaning speed of a chronically underinflated bald tire ( $AS_{\text{bald}}$ ) would be approximately 40 miles per hour when water depth exceeds tread depth (*i.e.*, approximately 0 millimeters).

Once aquaplaning occurs, a vehicle is effectively out of control. An aquaplaning vehicle will not respond to brakes or steering, and only wind resistance or a collision with another object



will slow it down sufficiently for the tires to reestablish road grip.<sup>3</sup> Because the front tires on a vehicle traveling in a straight line displace water for the rear tires, it is possible for the front tires on a rear-wheel drive vehicle to aquaplane while the rear tires maintain road grip.<sup>4</sup> A driver may lose control of such a vehicle while traveling around a curve because the vehicle will not respond to steering while its front tires are aquaplaning. The front tires on a vehicle traveling around a curve do not displace water for the rear tires because the rear tires normally track inside the front tires while traveling around a curve.<sup>5</sup>

A tire cannot leave friction marks (i.e., skid marks and scuff marks)<sup>6</sup> while it is aquaplaning since it is no longer in contact with the road. Tire friction marks on wet surfaces are short-lived and usually occur at speeds in excess of 40 miles per hour.<sup>7</sup>

### Viscous Aquaplaning<sup>8</sup>

A type of aquaplaning that does not depend on water depth exceeding tread depth is viscous aquaplaning. The typical medium for this type of aquaplaning is a viscous (i.e., thick) mixture of road dust, automobile oils, and rainwater. This mixture is formed shortly after it begins to rain, but is quickly washed away by heavy or prolonged showers. Because this medium does not flow as easily as plain rainwater, it takes a tire more time to dissipate this medium than plain rainwater. As the size of the area where dry tire makes contact with dry road decreases, there is a failure in grip and the tire aquaplanes. Although the minimum speed at which viscous aquaplaning occurs is affected by tread depth and tire inflation pressure, there are no equations for predicting this speed.

### Space Saver Spare Tire

Because a space saver spare tire is not designed for normal driving, it has shallower treads than a full-size tire. Consequently, a new space saver spare tire dissipates water less effectively than a new full-size tire. Although the inflation pressure of a space saver spare tire is greater than a full-size tire, the tread depth of a new space saver spare tire is less than a new full-size tire.

When a space saver spare tire is placed on the front of a vehicle, there is a tendency for the vehicle to lean toward the space saver spare tire because the spare tire is smaller in diameter than the other (full-sized) tire on the axle. A vehicle's handling can be adversely affected if the space saver spare tire is on the outside corner of the vehicle when the driver turns sharply or at high speed. When turning sharply or at high speed, a vehicle's weight shifts naturally from the inside wheels to the outside wheels, and the vehicle rolls toward the outside of the curve.<sup>9</sup> A vehicle's natural tendency to roll toward the outside of a curve at high speed is increased when a space saver spare tire is placed on the outside, front wheel of the vehicle. This tendency is further increased if the space saver spare tire is underinflated.<sup>10</sup>

Handling is also adversely affected when a nonradial-ply (i.e., bias-ply or bias-belted ply), space saver spare tire is used in place of a radial ply, full-size tire because of differences in the amount of cornering force<sup>11</sup> produced by a given amount of tread distortion (i.e., slip angle).<sup>12</sup> A nonradial-ply tire requires more slip angle than a radial-ply tire to produce a given amount of cornering force. The imbalance in cornering force between two tires on the same axle results in

poor handling.<sup>13</sup> The tires have similar slip angles; therefore, they generate different cornering forces.<sup>14</sup>

### **Tire Inflation Pressure**

Underinflation of a tire can adversely affect a vehicle's handling if a heavy load shifts toward the underinflated tire (*e.g.*, a trailer carrying two large animals) and causes the tire to deflect to the side (*i.e.*, laterally). This sideways deflection is further increased if the underinflated tire is overloaded.<sup>15</sup>

Underinflation of a tire also causes a vehicle to tighten into a curve (*i.e.*, oversteer) rather than follow a straight line (*i.e.*, understeer).<sup>16</sup> Oversteering results in unnatural and unpredictable handling because the driver of an oversteered vehicle must wind steering off to stay on course (*i.e.*, turn toward the outside of a curve).<sup>17</sup> In contrast, understeering results in natural and predictable handling because the driver of an understeered vehicle must wind steering on to stay on course (*i.e.*, turn toward the inside of a curve).<sup>18</sup>

### **Roadway Surface**

According to the IPTM,<sup>19</sup> a new tire will stop a vehicle more quickly than a worn tire on a surface having loose material (*e.g.*, gravel). It also takes a tire more time to stop a vehicle on loose gravel than on packed, well-traveled gravel. The stopping distances for a vehicle on loose gravel would be similar to the stopping distances on wet, well-traveled cement; wet, polished, glazed asphalt; and wet, well-traveled, smooth asphalt.<sup>20</sup> The stopping distances for a vehicle on packed, well-traveled gravel would be similar to the stopping distances on wet, new, coarse cement.<sup>21</sup>

## **Endnotes**

1. Institute of Police Management and Technology, University of North Florida, Advanced Traffic Accident Investigation Manual, #953-B (Jacksonville: undated), p. 3-4.  
  
Telephone interview with Jody Hicks, Training Specialist, Institute of Police Technology and Management, University of North Florida (Jacksonville, Florida), October 1, 1995.
2. R.J. Grogan, An Investigator's Guide to Tire Failures (Jacksonville: Institute of Police Technology and Management, University of North Florida, 1987), p. 21.
3. R.J. Grogan, p. 22.
4. R.W. Rivers, Traffic Accident Investigators' Handbook (Springfield: Charles C. Thomas, 1980), p. 166.
5. Institute of Police Technology and Management, University of North Florida, Selected Portions of Traffic Accident Investigation: A Training and Reference Manual (Jacksonville: undated), pp. 426-427.
6. A skid mark is a tire friction mark made by a tire that is sliding without rotation on a road or other surface. A scuff mark is a tire friction mark made by a tire that is both rotating and slipping on a road or other surface.

J. Stannard Baker and Lynn Fricke, The Traffic-Accident Investigation Manual. At-Scene Investigation and Technical Follow-Up (Evanston: Northwestern University Traffic Institute, 1986), p. 17-4.

7. Hicks telephone interview.
8. Ibid.
9. J. Stannard Baker and Lynn Fricke, p. 17-24.
10. Ibid.
11. Cornering force (i.e., centripetal force) is the force that allows a vehicle to travel around a curve. It is supplied by the friction between a tire and the road surface, and by other forces brought into play by the bank of the roadway. Inertia (i.e., centrifugal force), on the other hand, is the force that causes a vehicle to escape from its curve path and follow a straight one. A vehicle traveling around a curve will run off the road when inertia exceeds cornering force. Inertia increases with increasing speed, and cornering force decreases with decreasing friction.

Institute of Police Technology and Management, Selected Portions of Traffic Accident Investigation: A Training and Reference Manual, pp. 425-426.

12. When a vehicle travels around a curve, its tires twist in such a way that their steered direction is slightly different than their direction of travel. The difference between the steered direction of a tire and its direction of travel is called slip angle. Although the slip angle of a cornering tire is only a few degrees (e.g., between 0 and 3 degrees in normal, day-to-day driving), the tire would simply slide across the road surface without slip angle.

R.J. Grogan, pp. 14-17.

13. Telephone interview with Sergeant John Daly, Training Specialist, Institute of Police Technology and Management, November 20, 1995.
14. Ibid.
15. J. Stannard Baker and Lynn Fricke, p. 17-24.
16. R.J. Grogan, pp. 18-19 and 23-24.
17. Ibid.
18. Ibid.
19. Institute of Police Technology and Management, Selected Portions of Traffic Accident Investigation: A Training and Reference Manual, pp. 389-390 and 409.
20. The coefficients of friction for the different roadway surfaces found commonly in Hawaii are:

**PORTLAND CEMENT (CONCRETE)(LEVEL)**

	<u>Polished or Glazed</u>	<u>Well- Travelled</u>	<u>New, Coarse</u>
Dry	0.50-0.75	0.60-0.75	0.70-1.20

Wet	0.35-0.60	0.45-0.70	0.50-0.80
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ASPHALT OR TAR (LEVEL)

	<u>Excess Tar, Bleeding</u>	<u>Polished, Glazed</u>	<u>Well-traveled, Smooth</u>	<u>New, Coarse</u>
Dry	0.35-0.60	0.45-0.75	0.55-0.80	0.65-1.20
Wet	0.25-0.55	0.40-0.65	0.40-0.65	0.45-0.80

GRAVEL (LEVEL)

<u>Loose</u>	<u>Packed, Well-traveled</u>
0.40-0.70	0.50-0.85

The coefficient of friction of a downgrade roadway is less than a level roadway. Conversely, the coefficient of friction of an upgrade roadway is greater than a level roadway.

Coefficient of friction (f), in terms of vehicle tires and a roadway surface, is the quotient of force (F) in pounds or kilograms required to move a vehicle with its brakes locked at a constant speed over a particular surface and the weight of the vehicle (W) in pounds or kilograms. It is expressed by the following equation and is dimensionless.

$$f = F/W$$

Institute of Police Technology and Management, Selected Portions of Traffic Accident Investigation: A Training and Reference Manual, pp. 387 and 407-409.

21. Supra, note 18.

## Appendix C

### EQUIPMENT-RELATED FATAL TRAFFIC ACCIDENTS INVOLVING VEHICLES OF LESS THAN 10,000 POUNDS GVW: JANUARY 1990 TO DECEMBER 1994

LRB case number: 10480  
Safety check: current (<3 months)  
Mechanic's report: not available  
Weather condition: no adverse atmospheric conditions  
Road condition: dry asphalt  
Road alignment: straight, grade  
Miscellaneous: bald right front tire (no tread depth measurement was provided)(inspection conducted by a police officer); a police report mentioned the lack of tire traction because of the wet, muddy, road shoulder; blood alcohol concentration - 0.15%

LRB case number: 22368  
Safety check: current (<6 months)  
Mechanic's report: not available  
Weather condition: no adverse atmospheric conditions  
Road condition: dry asphalt  
Road alignment: curve, leve.  
Miscellaneous: the vehicle that was suspected of causing the traffic accident was not the vehicle that had worn tires

LRB case number: 24130  
Safety check: current (<12 months)  
Mechanic's report: faulty master (brake) cylinder - leaking; little or no braking action; worn rear tires (no tread depth measurements were provided)  
Weather condition: no adverse atmospheric conditions  
Road condition: dry asphalt  
Road alignment: straight, grade  
Miscellaneous: blood alcohol concentration - 0.18%

LRB case number: 42167  
Safety check: current (<5 months)  
Mechanic's report: not available  
Weather condition: no adverse atmospheric conditions  
Road condition: dry asphalt  
Road alignment: curve, grade  
Miscellaneous: worn tires were mentioned in a police report, but no tread depth measurements (e.g., 00/32") or characterizations (e.g., "bald") were provided; a police report indicated that the four tires on the vehicle were of different sizes, and that a space saver spare tire was being used on the right rear of the vehicle; blood alcohol concentration - 0.11%

LRB case number: 37570

**Safety check:** current (discrepancy: one police report indicated that the safety check would have expired on 6-90; another police report indicated that the safety check would have expired on 4-91)

**Mechanic's report:** not available

**Weather condition:** raining

**Road condition:** wet asphalt (a police report documented the occurrence of skidding and scuffing within the roadway)

**Road alignment:** straight, grade

**Miscellaneous:** worn tires were mentioned in one police report, but another police report described the tread depths of the tires as "fair" (tread depth measurements were not provided in either report)

**LRB case number:** 77921

**Safety check:** expired (>27 months)

**Mechanic's report:** not available

**Weather condition:** no adverse atmospheric conditions

**Road condition:** dry asphalt

**Road alignment:** curve, level

**Miscellaneous:** worn tires were mentioned in a police report, but no tread depth measurements or characterizations were provided; blood alcohol concentration - 0.22%

**LRB case number:** 99562

**Safety check:** current (<3 months)

**Mechanic's report:** steering loose at the swivel joint; loose steering column

**Weather condition:** no adverse atmospheric conditions

**Road condition:** dry asphalt

**Road alignment:** straight, grade

**Miscellaneous:**

**LRB case number:** 96301

**Safety check:** current (<1 month)

**Mechanic's report:** not available

**Weather condition:** no adverse atmospheric conditions

**Road condition:** dry asphalt

**Road alignment:** curve, level

**Miscellaneous:** worn tires were mentioned in a police report, but no tread depth measurements or characterizations were provided; blood alcohol concentration - 0.19%

**LRB case number:** 89579

**Safety check:** expired (the trailer had no safety sticker)

**Mechanic's report:** the trailer's tires were cracked, the right tire was underinflated, and the trailer hitch was worn--it would not have passed safety inspection; no safety second lock or pin to keep the primary lock mechanism in place; the truck and trailer weight (plus the weight of the trailer's cargo) exceeded the safe standard weight ratio factor of the foregoing with the trailer's cargo

**Weather condition:** no adverse atmospheric conditions

**Road condition:** dry asphalt

**Road alignment:** straight, level  
**Miscellaneous:** the driver of the truck stated that the trailer came unhitched

**LRB case number:** 85475  
**Safety check:** current (< 8 months)  
**Mechanic's report:** not available  
**Weather condition:** no adverse atmospheric conditions  
**Road condition:** dry concrete  
**Road alignment:** straight, level  
**Miscellaneous:** the vehicle that was suspected of causing the traffic accident was not the vehicle that lost its wheel

**LRB case number:** 28918  
**Safety check:** current (< 18 months)  
**Mechanic's report:** not available  
**Weather condition:** raining  
**Road condition:** wet asphalt (no evidence of skidding within the roadway)  
**Road alignment:** straight, level  
**Miscellaneous:** the vehicle that was suspected of causing the traffic accident was not the vehicle that had a worn tire; **blood alcohol concentration - 0.08%**

**LRB case number:** 63563  
**Safety check:** current (< 4 months or < 5 months)(discrepancy: a police report indicated that the safety check would have expired in May; the mechanic's report indicated that the safety check would have expired in June of the same year)  
**Mechanic's report:** tread depth on left rear tire 1/32", on right rear tire - 00/32"  
**Weather condition:** raining  
**Road condition:** wet asphalt (no evidence of skidding within the roadway)  
**Road alignment:** curve, grade  
**Miscellaneous:** the driver of the vehicle that was suspected of causing the traffic accident passed a field sobriety test

**LRB case number:** 09429  
**Safety check:** current (< 3 months)  
**Mechanic's report:** not available  
**Weather condition:** raining  
**Road condition:** wet asphalt (no evidence of skidding within the roadway)  
**Road alignment:** straight, level  
**Miscellaneous:** tread depth on left rear tire - 00/32", on right rear tire - 00/32" (inspection conducted by a police officer); a witness claimed that the road was made slippery by something resembling "soap suds", but no other witnesses could confirm the claim

**LRB case number:** 10365  
**Safety check:** unknown (discrepancy: a computer check indicated that the safety check expired on 8-90; the mechanic's report indicated that the safety check would have expired on 9-91)

**Mechanic's report:** tread depth on left rear tire - 00/32", on right rear tire - 1/32"  
**Weather condition:** raining  
**Road condition:** wet asphalt (no evidence of skidding within the roadway)  
**Road alignment:** curve, grade  
**Miscellaneous:** a police report mentioned the possibility that the vehicle hydroplaned

**LRB case number:** 07119  
**Safety check:** expired (> 6 months)  
**Mechanic's report:** not available  
**Weather condition:** raining  
**Road condition:** wet asphalt (no evidence of skidding within the roadway)  
**Road alignment:** curve, grade  
**Miscellaneous:** the motorcycle's headlight was illuminated as in this model of motorcycle they are constantly illuminated and only a high/low beam switch is provided (no evidence that the headlamp had burnt out before the traffic accident)(inspection conducted by a police officer); light condition - dark (time of accident - 2045); blood alcohol concentration - 0.23%

**LRB case number:** 51085  
**Safety check:** unknown (discrepancy: a police report indicated that the safety check expired on 8-91; the mechanic's report indicated that the safety check would have expired on 8-92)  
**Mechanic's report:** the motorcycle had no front headlamp assembly or wiring for the headlamp  
**Weather condition:** raining  
**Road condition:** wet asphalt  
**Road alignment:** straight, grade  
**Miscellaneous:** light conditions - dark (time of accident - 2140); the driver of the vehicle that collided (head-on) with the motorcycle did not see the latter until it entered the vehicle's headlights (a police report indicated that the motorcycle's headlamp was not on at the time of the accident); blood alcohol concentration - 0.16

**LRB case number:** 02368  
**Safety check:** current (< 2 months)  
**Mechanic's report:** the excessive use of brakes on the downhill resulted in overheating and failure; brake pads were in satisfactory condition  
**Weather condition:** no adverse atmospheric conditions  
**Road condition:** dry asphalt  
**Road alignment:** curve, grade  
**Miscellaneous:** the driver did not downshift and "rode" the brakes

**LRB case number:** 01011  
**Safety check:** unknown (discrepancy: one police report indicated that the safety check expired on 5-91; the mechanic's report and another police report indicated that the safety check would have expired on 5-92)  
**Mechanic's report:** tread depth on right front tire - 00/32"  
**Weather condition:** no adverse atmospheric conditions



Road condition: wet asphalt (no evidence of skidding within the roadway)  
Road alignment: straight, grade  
Miscellaneous: blood alcohol concentration - 0.03%; cocaine abuse mentioned as contributing to death

LRB case number: 52162  
Safety check: current (< 8 months)  
Mechanic's report: not available  
Weather condition: no adverse atmospheric conditions  
Road condition: wet asphalt (no evidence of skidding within the roadway)  
Road alignment: curve, grade  
Miscellaneous: worn tires were mentioned in a police report, but no tread depth measurements or characterizations were provided; blood alcohol concentration - 0.22%

LRB case number: 07056  
Safety check: current (< 1 month)  
Mechanic's report: 75% of the brake shoes on the front and rear wheels were remaining; everything in adjustment -- brakes should have worked in this case  
Weather condition: no adverse atmospheric conditions  
Road condition: dry asphalt  
Road alignment: straight, grade  
Miscellaneous: blood alcohol concentration - 0.12%

LRB case number: 15011  
Safety check: current (< 4 months)  
Mechanic's report: not available  
Weather condition: raining  
Road condition: wet asphalt (no evidence of skidding within the roadway)  
Road alignment: curve, grade  
Miscellaneous: a police report indicated that a space saver spare tire was being used on the right front wheel of the vehicle; a witness mentioned that the front wheels of the vehicle were turned to the right, but the vehicle was sliding across the center line (i.e., to the left); blood alcohol concentration - 0.08%

LRB case number: 46573  
Safety check: current (< 5 months)(discrepancy: a police report indicated that the safety check would have expired in 1993, which was not possible; a computer check indicated that the safety check would have expired in 1992 of the same month)  
Mechanic's report: not available  
Weather condition: no adverse atmospheric conditions  
Road condition: dry concrete  
Road alignment: straight, grade  
Miscellaneous: the vehicle that was suspected of causing the traffic accident was not the vehicle that had a foreign object lodged in its undercarriage (i.e., an "other vehicle defect")

**LRB case number:** 48360  
**Safety check:** expired (>4 months)  
**Mechanic's report:** steering play - 5" to 6"; steering coupling worn and cracked; front tire shoulders worn out; rear tire treads borderline 3/32"  
**Weather condition:** no adverse atmospheric conditions  
**Road condition:** dry asphalt  
**Road alignment:** straight, grade  
**Miscellaneous:** worn tires were mentioned in a police report

**LRB case number:** 93093  
**Safety check:** current (<8 months)  
**Mechanic's report:** not available  
**Weather condition:** no adverse atmospheric conditions  
**Road condition:** wet asphalt (a police report documented the occurrence of skidding within the roadway)  
**Road alignment:** straight, grade  
**Miscellaneous:** a police report indicated that the vehicle was traveling more than 25 mph over the posted speed limit; worn tires were mentioned in a police report, but no tread depth measurements were provided (tread depth on left and right front tires were characterized as "poor"); blood alcohol concentration - 0.29%

**LRB case number:** 39975  
**Safety check:** current (<10 months)  
**Mechanic's report:** not available  
**Weather condition:** no adverse atmospheric conditions  
**Road condition:** dry asphalt  
**Road alignment:** curve, grade  
**Miscellaneous:** a police report indicated that the vehicle initially experienced partial brake failure, which was followed by total brake failure

**LRB case number:** 06907  
**Safety check:** current (<6 months)  
**Mechanic's report:** not available  
**Weather condition:** no adverse atmospheric conditions  
**Road condition:** dry gravel (no evidence of skidding within the roadway)  
**Road alignment:** curve, grade  
**Miscellaneous:** photograph of broken brake line mentioned in a police report; a police report indicated that high heat was generated on the brake assembly; worn tires were mentioned in a police report, but no tread depth measurements or characterizations were provided; blood alcohol concentration - 0.09%

**LRB case number:** 72905  
**Safety check:** expired (>2 months or >14 months)(discrepancy: a police report indicated that the safety check expired in 1992; the mechanic's report indicated that the safety check expired in 1991 of the same month)  
**Mechanic's report:** safety check expired; examination of the vehicle's steering was inconclusive because of severe damage to the steering system

**Weather condition:** no adverse atmospheric conditions  
**Road condition:** dry asphalt  
**Road alignment:** curve, grade  
**Miscellaneous:** brakes were mentioned, but neither the mechanic's report nor any of the police reports mentioned brake problems; the driver stated that the vehicle had steering problems; the vehicle's owner stated that the vehicle's safety sticker had expired; **blood alcohol concentration - not available because police failed to conduct the test within 3 hours of the accident**

**LRB case number:** 91977  
**Safety check:** current (<2 months)  
**Mechanic's report:** vehicle in stock running condition  
**Weather condition:** no adverse atmospheric conditions  
**Road condition:** dry asphalt  
**Road alignment:** straight, level  
**Miscellaneous:** steering mentioned in a police report; driver reached down to pick up an object then loss control of the vehicle

**LRB case number:** 14842  
**Safety check:** unknown (discrepancy: a computer check indicated that the safety check on the trailer would have expired on 6-93; a police report indicated that the safety check on the trailer expired on 6-92)  
**Mechanic's report:** not available  
**Weather condition:** no adverse atmospheric conditions  
**Road condition:** dry asphalt  
**Road alignment:** straight, grade  
**Miscellaneous:** a police report indicated that the towing vehicle was equipped with a C-type trailer hitch, but the trailer was equipped with a ball-type trailer hitch; modifications were performed on the trailer to except the hitch; citation issued for expired safety inspection

**LRB case number:** 36857  
**Safety check:** current (<9 months)  
**Mechanic's report:** not available  
**Weather condition:** no adverse atmospheric conditions  
**Road condition:** dry asphalt  
**Road alignment:** straight, level  
**Miscellaneous:** worn tires were mentioned in a police report, but no tread depth measurements or characterizations were provided; the vehicle that overheated was not the vehicle that was suspected of causing the traffic accident

**LRB case number:** 69578  
**Safety check:** unknown (discrepancy: a police report indicated that the safety check expired on 7-93; the mechanic's report indicated that the safety check would have expired on 11-94)  
**Mechanic's report:** tread depth on left front tire - 1/32", on right front tire - 00/32", on right rear tire - 1/32"  
**Weather condition:** raining

**Road condition:** wet asphalt (inconsistency between two police reports concerning the occurrence of skidding within the roadway)  
**Road alignment:** curve, grade  
**Miscellaneous:** a witness stated that the vehicle appeared to hydroplane

**LRB case number:** 40961  
**Safety check:** current (<6 months)  
**Mechanic's report:** not available  
**Weather condition:** no adverse atmospheric conditions  
**Road condition:** dry asphalt  
**Road alignment:** curve, level  
**Miscellaneous:** worn tires were mentioned in a police report, but no tread depth measurements or characterizations were provided; blood alcohol concentration - 0.14%

**LRB case number:** 93969  
**Safety check:** current (<11 months)  
**Mechanic's report:** not available  
**Weather condition:** no adverse atmospheric conditions  
**Road condition:** dry concrete  
**Road alignment:** straight, level  
**Miscellaneous:** the vehicle that was suspected of causing the traffic accident was not the vehicle that had a flat tire

**LRB case number:** 61129  
**Safety check:** current (<6 months)  
**Mechanic's report:** tread depth on left rear tire - 00/32", on right rear tire - 00/32"  
**Weather condition:** raining  
**Road condition:** wet asphalt (no evidence of skidding within the roadway)  
**Road alignment:** straight, level  
**Miscellaneous:**

**LRB case number:** 97336  
**Safety check:** current (<3 months)  
**Mechanic's report:** not available  
**Weather condition:** raining  
**Road condition:** wet asphalt (a police report documented the occurrence of skidding within the roadway)  
**Road alignment:** curve, grade  
**Miscellaneous:** worn tires were mentioned in a police report, but no tread depth measurements or characterizations were provided

## Appendix D

### DETERMINING THE NUMBER OF 1993 SAFETY CHECK CITATIONS PENDING AS OF DECEMBER 1994

No. of citations  
issued in 1993

37,489

→ No. of 1993 citations disposed in 1993:  
23,204 (61.90% of citations issued in  
1993)

DSM:	3,190
BF:	5,809
SUS:	432
FIN SUS:	565
FIN:	3,208

No. of 1993 citations  
pending as of 12/93

14,285

(30.10% of citations issued in 1993)

→ No. of 1993 citations disposed in 1994:  
4,444 (11.85% of citations issued in  
1993)

DSM:	1,545
BF:	1,580
SUS:	115
FIN SUS:	210
FIN:	994

No. of 1993 citations  
pending as of 12/94

9,841 (26.25% of citations issued in 1993)

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"BF" means the citation was uncontested and the fine was paid

"DSM" means the citation was contested and dismissed

"FIN" means the citation was contested and the fine was imposed

"FIN SUS" means the citation was contested and the fine was partially suspended

"Pending" citations included citations that (1) may have had summons, warrants, or default judgments issued, (2) may have had pending court appearances, and (3) may have been ignored

"SUS" means the citation was contested and the fine was suspended

Source: Memorandum from Jack Wong, Systems Analyst, Office of the Administrative Director of the Courts, Courts Applications Systems Branch, to Keith Fukumoto, regarding the clarification of safety check statistics reported on September 14, 1995, September 25, 1995, 2 pp.

Memorandum from Jack Wong to Keith Fukumoto, regarding the clarification of safety check statistics reported on September 14, 1995, October 4, 1995, 2 pp.

## Appendix E

### DETERMINING THE NUMBER OF 1994 SAFETY CHECK CITATIONS PENDING AS OF OCTOBER 4, 1995

No. of citations  
issued in 1994

28,289

→ No. of 1994 citations disposed in 1994:  
16,953 (59.92% of citations issued in  
1994)

DSM: 2,883  
BF: 10,395  
SUS: 273  
FIN SUS: 556  
FIN: 2,843

No. of 1994 citations  
pending as of 12/94

11,339

(40.08% of citations issued in 1994)

→ No. of 1994 citations disposed as of  
10/4/95: 2,677 (9.46% of citations  
issued in 1994)

DSM: 821  
BF: 1,026  
SUS: 55  
FIN SUS: 87  
FIN: 688

No. of 1994 citations  
pending as of 10/4/95

8,662 (30.62% of citations issued in 1994)\*

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\*Safety check violations were decriminalized as of July 1, 1994

"DF" means the citation was uncontested and the fine was paid

"DSM" means the citation was contested and dismissed

"FIN" means the citation was contested and the fine was imposed

"FIN SUS" means the citation was contested and the fine was partially suspended

"Pending" citations included citations that (1) may have had summons, warrants, or default judgments issued, (2) may have had pending court appearances, and (3) may have been ignored

"SUS" means the citation was contested and the fine was suspended

Source: Memorandum from Jack Wong, Systems Analyst, Office of the Administrative Director of the Courts, Courts Applications Systems Branch, to Keith Fukumoto, regarding the clarification of safety check statistics reported on September 14, 1995, September 25, 1995, 2 pp.

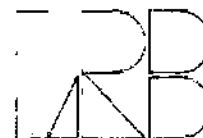
Memorandum from Jack Wong to Keith Fukumoto, regarding the clarification of safety check statistics reported on September 14, 1995, October 4, 1995, 2 pp.



Wendell K. Kimura  
Acting Director

## Appendix F

Research (808) 587-0666  
Revisor (808) 587-0670  
Fax (808) 587-0661



LEGISLATIVE REFERENCE BUREAU  
State of Hawaii  
State Capitol  
Honolulu, Hawaii 96813

November 22, 1995

5674A

Mr. Russell Arend, Director  
Institute of Police Technology  
and Management  
4567 Saint Johns Bluff Road South  
Jacksonville, Florida 32224-2645

Dear Mr. Arend:

Enclosed for your review is a confidential and preliminary draft of a report on the state Department of Transportation's motor vehicle inspection program prepared by this office at the request of the Legislature. Since the draft is subject to change, we ask that you not circulate it until a final report is released. Please feel free to make any comments, cite any errors, state any objections, or suggest any revisions to this confidential draft. Your comments and suggestions are important to us and revisions will be made if deemed appropriate.

Please mark your comments directly upon the enclosed draft and return it to us by Friday, December 8, 1995. It is not necessary to submit a formal reply.

If you have any questions regarding the draft report, please call Keith Fukumoto at (808) 587-0666.

Sincerely,

Wendell K. Kimura  
Acting Director

Enclosure

cc: Mr. Jody Hicks  
with enclosure

## Appendix G



Office of the Administrative Director of the Courts — THE JUDICIARY • STATE OF HAWAII  
417 SOUTH KING STREET • ALI'OLAN HALE • HONOLULU, HAWAII 96813-2912 • TELEPHONE (808) 539-4900 • FAX 539-4855

Sharon Y. Miyashiro  
ADMINISTRATIVE DIRECTOR  
Clyde W. Namu'o  
DEPUTY ADMINISTRATIVE DIRECTOR

December 8, 1995

Mr. Wendell K. Kimura  
Acting Director  
Legislative Reference Bureau  
State Capitol  
Honolulu, Hawaii 96813

RE: Draft of LRB Report on "Periodic Motor Vehicle  
Inspection in Hawaii: A Study of Selected Issues"

Dear Mr. Kimura:

Thank you for the opportunity to comment on the above-cited study. While the Judiciary has little involvement in the inspection of motor vehicles, it has interest in the "timely and effective enforcement mechanisms." Specifically, our concerns relate to your proposals regarding the submittal of proof and payment of fines, which would involve our district court programs, including the Traffic Violations Bureau (TVB).

Your proposals on page 42 and, more specifically, pages 55-6, of your draft report should clarify the requirements for both the courts and TVB in enforcing contested and uncontested cases as follows:

(1) Submittal of proof for contested cases:

While we understand that the intent is to have proof of a current safety check, we have some questions as to the administrative procedures for determining when a court date should be scheduled as well as the type of sanctions to be imposed should proof be unavailable.

(2) Submittal of proof for uncontested cases:

Efforts have been made to decriminalize traffic offenses with the intent to streamline and expedite payment of such fines for the convenience of the general public. Thus, most fines can now be paid by mail. What similar arrangements can be established to ensure proof of current safety check? In addition, if payment is received within proof of the safety check, should the payment be rejected?

Mr. Wendell K. Kimura  
December 8, 1995  
Page 2

(3) Non-renewal of vehicle registration for nonpayment of fines:

Even with our current traffic enforcement program, we do have need to upgrade our current information systems so that citations and clearances can be better coordinated between the state and county agencies. In order to ensure that the enforcement intent is met without undue impact on current staffing and systems, we need to establish better electronic communications between the affected agencies.

Should the above enforcement proposals be pursued, I would appreciate being notified and involved in finding workable solutions. In the interim, should you have any questions, please feel free to call me at 539-4900 or Milton Hee at 538-5595.

Very truly yours,

*Sharon Y. Miyashiro*  
Sharon Y. Miyashiro *hk*

## Appendix H

BENJAMIN J. CAYETANO  
GOVERNOR



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
869 PUNCHBOWL STREET  
HONOLULU, HAWAII 96813-5087

KAZU HAYASHIDA  
DIRECTOR

DEPUTY DIRECTORS  
JERRY M. MATSUDA  
GLENN M. OKIMOTO

IN REPLY REFER TO:  
HWY-V 9.17022  
02.03.01

December 15, 1995

### MEMORANDUM

TO: WENDELL K. KIMURA  
ACTING DIRECTOR  
LEGISLATIVE REFERENCE BUREAU

FROM: X KAZU HAYASHIDA  
DIRECTOR OF TRANSPORTATION

A handwritten signature in cursive script, appearing to read "Kazu Hayashida", written over the printed name and title.

SUBJECT: COMMENTS ON PMVI REPORT

We do not agree with the methods used in the LRB study and do not support the LRB recommendation to continue the PMVI program even though there is no evidence indicating that the program is achieving its objectives.

Although the Counties had individual PMVI programs before 1967, they apparently did not state objectives for the programs. When the Hawaii legislature passed Act 214 in 1967, it was accepting the federal rationale for a statewide program.

Judging by the quote on Page 14 of the LRB report, DOT must have been asked for a rationale for the PMVI program. The assumptions provided in the letter are far removed from the implementation date of the law. A better source of rationale would be the legislative testimony or the federal standards.

The assumptions stated by DOT really do not say anything meaningful. In the first assumption, the word "some" qualifies the number of accidents that are caused by mechanical failure. The word "some" could mean that at a minimum only two accidents were caused, although if there were only two accidents caused, the words "a couple" would probably be used. Thus, the assumption states that at least three out of who knows how many thousands of accidents referenced were caused by mechanical failure. This is a very safe statement.

The second statement has no qualifier for the word "people", so it can easily be understood to mean all people or at least a majority. Since it would take only one person to disqualify

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02.03.01

the use of "all" people, the word "people" must mean either a majority or perhaps "some" people. If the former was intended, it is a strong statement that should be backed up with evidence. In the absence of supportive evidence and in the presence of evidence to the contrary (the first page of the appendix to the attached paper lists the number of defects noted in PMVIs along with their respective percents of all vehicles inspected), the meaning of the word must be "some", even though the word "some" is not used. Again, a statement like this is very safe, especially in the absence of any quantitative data.

The third assumption is not documented with accident data. It is simply an assumption made by Mr. Hirata. Since the word "accidents" is plural, the statement means that at least two accidents (since it is an annual program, he was possibly referring to all the accidents that occur in any given year) that would have happened without the PMVI program did not happen because the program is being implemented. Again, this is a safe statement. Even without accident data a person can intuitively deduce that since vehicles wear out and periodically need repair, at least two of the more than 30,000 accidents per year could be prevented with a PMVI program.

The program should be judged by more than Mr. Hirata's assumptions. If the two accidents saved were fender benders that resulted in \$500 property damage, would it be worth the \$12 million dollar annual cost of the program?

Although NHTSA and even the GAO were unable to document that PMVI programs significantly reduce accidents, Mr. Fukumoto appears to want to take a try at it by putting together three tables of data, calling it a "study" and putting it in a chapter entitled, "DEATH ON WHEELS". The chapter title is certainly scary, even if the data prove nothing. Page 18 states that 10 of 14 "equipment-related" fatal traffic accidents involved tires. The term "equipment-related" does not mean "equipment-caused". It is possible for an accident to involve vehicles that have mechanical defects (and thus be classified as equipment-related), and yet the vehicle defects have nothing to do with causing the accident. As an extreme example, imagine a person unknowingly driving a vehicle which has such a serious brake defect that there is no braking power at all. He is going 55 mph on the freeway, has a blood clot and passes out before even attempting to apply the brakes.

On the same page, the statements about 7 of the 10 tire-related fatal traffic accidents stretches the bounds of objectivity by addressing cause. Unless the officer makes a statement of

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cause in the accident report or there is additional supportive evidence contained in the report, the accident report simply contains a listing of data elements. Many investigating officers are trained by Northwestern University, but even if they were not, in-service training in the police departments make it highly probable that the officers who wrote the accident reports were cognizant of the principles discussed in the report's appendix. Therefore, if the report lacks a statement that worn tires were the cause of the accident, it is presumptive of LRB to do so. In the 4th paragraph, Mr. Fukumoto states that Appendix B explains the events and factors he believes caused the seven accidents. Since Appendix B discusses tires and friction, it seems that we are to deduce that he believes the accidents were caused by worn tires and loss of friction. Although the information in Appendix B is based on laws of physics, it cannot be connected in a meaningful way to the data of the accident reports without additional information that is not presented in the study. For example, noting that it was raining and the vehicle had worn tires does not indicate whether or not the rubber that was on the worn tires was adequate to avoid hydroplaning. We still need to know the specific depth of tread, the amount of water on the road and the speed of the vehicle before we can conclude that the tires were the cause or a contributing factor of these accidents. Although the LRB report does not come out and say that the worn tires were the cause of the 7 accidents, the context of this section is dominated by two things: driver error and equipment failure. When LRB makes the statement in the middle of Page 19 that it "...believes that the foregoing equipment-related traffic accidents should not be attributed automatically to driver error" it subtly puts the reader in a position where it is easy to attribute cause to the other alternative. Later, on the same page, Mr. Fukumoto makes this very jump himself, "It appears that at least thirteen of these traffic accidents were caused by faulty equipment (i.e., worn tires, faulty service brakes, and loose steering) that could have been detected and corrected during the vehicles' next safety inspection." Stating that the fatal accidents were caused by defective equipment is quite different from stating that the vehicles involved in the accidents had defective equipment. Eliminating this difference is not warranted by the facts presented in the report.

Stating that the defects could have been corrected during the next PMVI does not show that the program is effective. "Could have, should have, would have" thinking doesn't make a football hero, and it doesn't make a PMVI program effective. If the program was in effect and the defects existed in spite of the fact that the PMVI decal was current, it shows that the program

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did not prevent the defects. It also shows that the person who owned the vehicle did not correct the defects on his or her own. We don't know why they were not corrected; we only know that they existed.

The LRB report notes that the average driver does not practice emergency driving maneuvers under controlled situations, is not required to give his vehicle a pre-trip inspection, or have the same physical abilities as a professional driver. Since LRB apparently assumes (very wrongly) that professional drivers do all three of these things, it concludes, "...there is no reason to expect that the average driver will be able to respond like a professional driver in an emergency situation." Somehow, Mr. Fukumoto concluded that professional drivers generally are trained to know how to handle an emergency situation, have had practice at it under controlled situations and have physical abilities that nonprofessionals lack. Although there must be at least two drivers in our state to which the statement would accurately apply, it is absolutely certain that not all professional drivers are able to successfully handle an emergency situation. If they were, there would be no accidents involving professional drivers. Neither do all professional drivers respond better than nonprofessional drivers in an emergency situation. In response to the LRB report's statement, "...given the fact that the average driver is not required to understand how a vehicle's condition can cause or contribute to a traffic accident, there is no reason to expect that the average driver will check a vehicle's condition before starting it", the DOT submits that a desire for personal safety and the safety of a person's family are two very good reasons for an average driver to ensure that his vehicle is mechanically safe. Certainly the people who drive their vehicles to a mechanic for a routine checkup (we can document that there are many people who do this even with the PMVI program in place) do not do it for the purpose of filling a couple of hours in their day. There is also much evidence (business done by part stores, for example) that many people currently do vehicle maintenance themselves.

Our final comment relates to the LRB's apparent confidence in recommendations made by AAMVA. The AAMVA has no more data than NHTSA relative to the effectiveness of a PMVI program. Its recommendations are as reasonable as those made by NHTSA when it was promoting PMVI. However, there is no evidence that incorporating AAMVA recommendations into Hawaii's PMVI program will improve the effectiveness of the program.

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02.03.01

Enclosed with this letter is a paper that expresses the DOT's position on PMVI. We came to this position after carefully reviewing both the NHTSA and GAO reports and getting input about Hawaii's program from the motoring public and the people who implement the program.

Enclosure



## Periodic Motor Vehicle Inspection Should Be Discontinued in Hawaii

Our position on periodic motor vehicle inspection (PMVI) is that if a program like this cannot be documented to be of value relative to decreasing traffic accidents, then a government should not mandate it. We are not in favor of abandoning vehicle maintenance; we favor only abandoning the mandatory inspection program. It is not axiomatic that abandoning the inspection program will result in an increase in the number of unsafe vehicles on the road. Our contention is that the general motoring public in Hawaii is able to keep its vehicles in reasonably safe operating condition without a mandatory PMVI program. This contention is based on the fact that the PMVI program is replete with problems that make it ineffective relative to reducing accidents and that the cost to solve the problems will be so high that the final product will not be worth its cost.

The following is a presentation of background information about the PMVI program and our reasons for supporting the NHTSA study and conclusion to discontinue the program and discounting the GAO study of the NHTSA study.

The PMVI program became mandatory for States in 1966, when the National Highway Safety Act was passed. From 1967 to 1972 the U.S. DOT issued 18 standards, one of which required States to conduct PMVI's. In 1973 NHTSA issued specific inspection standards, such as minimum thickness of brake linings and tire tread depth. By 1975 31 States and DC had PMVI programs. When NHTSA attempted to use funding sanctions to force three States to comply with its standards, Congress repealed the DOT's authority to implement the funding sanctions. A final rule for 23 CFR Parts 1204 and 1205 [NHTSA Docket No. 82-12; Notice 5], dated April 6, 1988 changed the mandatory nature of the State and Community Highway Safety Program to voluntary. This was done by changing the word "standard" to "guideline". When the program was no longer mandatory, ten States discontinued the PMVI program, and the controversy about PMVI's contribution toward highway safety was resumed.

In 1988 Congress had NHTSA study State inspection programs to determine whether they improve highway safety. NHTSA's 1989 report concluded that PMVI programs reduce the number of poorly maintained vehicles on the highways, but that available data did not conclusively demonstrate that PMVI programs significantly reduced accident rates. It also concluded, "...the PMVI process in detecting and correcting vehicle component failures is generally poor."<sup>1</sup> When various industry groups (with an obvious profit motive) criticized the report for alleged shortcomings and for NHTSA's lack of support for PMVI, the GAO (General Accounting Office) was asked to review the study. In July, 1990 the GAO printed its report.

The GAO focused its work on determining whether (1) NHTSA's 1989 report accurately represented the safety benefits of State inspection programs, (2) available evidence indicates that State inspection programs reduce accident rates, and (3) NHTSA appropriately carried out its legislative responsibilities toward inspection programs. Although the GAO report agrees that NHTSA met the requirements of number 3, it takes issue with numbers 1 and 2.

Unfortunately (possibly deliberately) GAO provides no substantive data with which readers of the study can objectively take a position either for or against the GAO position. The GAO study

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<sup>1</sup>. "Study of the Effectiveness of State Motor Vehicle Inspection Programs, Final Report" August, 1989, Page 65.

and results appear to be the consequences of political pressure applied by people who have more of a financial motive for PMVI programs than a highway safety motive. There are two reasons for this suspicion. One, the GAO did not obtain official NHTSA comments on the GAO draft report. An unanswered question is, why not? Second, the GAO states on page 13 of its report that it believes NHTSA focused too much attention on comparisons of state accident rates. The GAO report emphasizes mechanical condition of vehicles, but it too ultimately discusses state accident rates. The GAO claims that four studies not discussed in the NHTSA report show a correlation between PMVI and accident reductions, but GAO provides no data to support its claim.

Since NHTSA officials were asked to do research that had the potential to either permanently reduce the scope of the agency's purview or to reactivate an expanded purview, there was no agency motive to produce a report that would speak negatively about PMVI. However, since government agencies have a propensity for expansion and self-perpetuation, it could be argued that NHTSA had a motive to skew the data so as to favor the program. The fact that it recommended against continuing PMVI speaks loudly either of the report's objectivity or of the agency's desire to make Congress look like it made a good decision when it did not give PMVI priority status. On the other hand, the GAO report was made after Congress got pressure from an industry that stands to lose an easy source of income if the PMVI program is discontinued.

The GAO report opens by stating that NHTSA accurately concluded that PMVI reduces the number of poorly maintained vehicles on the roads. The GAO follows up the statement with a declaration that, "...worn or defective breaks, tires, lights, or other safety-related components are a hazard to both their owners and other motorists." There are two problems with this statement. First, the NHTSA report tends to avoid using the word "safety" in conjunction with PMVI. Instead, it uses words like "better vehicle condition." Second, the words "are a hazard" are not accurate. They are a potential hazard. Many worn components can continue to be used safely until they are completely worn out. Then they are a hazard.

The GAO also criticized NHTSA's use of fatal accident data, because it "tended to overshadow NHTSA's finding that PMVI programs improve the safety<sup>2</sup> condition of vehicles." We submit that accident data should overshadow vehicle condition data. Since it is possible for a vehicle to have mechanical problems at any time (even immediately upon exiting a PMVI station), accident data will better indicate how motorists maintain their vehicles during the period between inspections. GAO was impressed by NHTSA's finding that states with mandatory PMVI programs had fewer accidents involving defective or worn vehicle components, but GAO was disturbed by the fact that fatal accident data from states with mandatory PMVI verses states without PMVI did not always show this. The fact is, however, that fatal accident reports are more likely to contain vehicle defect data than nonfatal accident reports, because due to liability concerns, fatal accidents are investigated more thoroughly than nonfatal. However, even this closer scrutiny does not guarantee that the mechanical condition of vehicles involved is always scrutinized. "As New York officials pointed out in comments to NHTSA, police officers are not

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<sup>2</sup>. A more appropriate word than "safety" is "mechanical". Having mandatory PMVI improved the mechanical condition of vehicles but not necessarily safety. For example, if a vehicle owner, in preparation for a PMVI, changes the break pads when they are worn but not worn out or even to the extent that the warning mechanism is activated, the vehicle is said to be in better mechanical condition, because the pads are thicker. However, the vehicle has the same stopping capabilities (safety scale) in both instances.

mechanics....<sup>3</sup>

Next, GAO minimizes the value of fatal accident data by stating, "...it represents less than 1% of all accidents and may not be the type of accidents most affected by defective vehicle equipment." If we negate the defects identified in Hawaii's PMVI's that represent less than one percent of all the vehicles inspected, we can eliminate all but four of the 32 defects identified by the PMVI program. The four that remain are:

- o Tires @ 2% of 724,685 vehicles inspected
- o Other lamps @ 2% of 724,685 vehicles inspected
- o Headlamps @ 4% of 724,685 vehicles inspected
- o Registration @ 9% of 724,685 vehicles inspected.

Our response to GAO's minimizing fatal accident data because it represents only one percent of the accidents is that one percent of a fairly good (not excellent) data file is more meaningful than 99% of no data or a poor data file.

The GAO also attacked NHTSA's objective decision to negate differences in data that it considered too small to be of practical significance. In this instance, the issue was the hypothesis that the effect of inspection programs would be most evident for older vehicles. NHTSA's analysis of accidents revealed that the difference between inspection and noninspection states widened for older vehicles. However, NHTSA considered the differences too small (a maximum of 1.5% reduction for older vehicles) to be of any practical significance. GAO thinks it is of practical significance, because "police accident reports may understate the percentage of accidents caused by defective vehicle equipment." GAO's position is correct; defects may have been underreported; however, they also may have been reported accurately or overreported. Data that is not collected cannot be analyzed. NHTSA was told to do research, not guess.

GAO claims that four additional studies not discussed by NHTSA indicate that PMVI programs reduce accidents. However, these studies are discussed in general terms. For example, GAO states that Florida did two studies showing that the percentage of accidents caused by vehicle defects decreased when PMVIs were begun and increased when the law was repealed. GAO does not indicate what the percentages are, so the magnitude of the change cannot be compared with NHTSA's results.

Another example of unuseful generalities is GAO's statement that it found the reverse of NHTSA's position to be true relative to thresholds for reporting accidents in states. It would have been helpful to readers, if GAO listed the differences and settled the matter once and for all.

In short, GAO's report is simply an expression of opinion that is different than NHTSA's. Everyone has an opinion. Generally, when one opinion is assigned a higher value than another, it is because the one is supported more by facts. GAO's conclusion is that "when all the studies and analyses are considered together, even taking into account their individual limitations, their relative consistency justifies a conclusion that periodic inspection programs reduce accident rates." The words "considered together" state an opinion that if you take several imperfect items and put them in a pile, the pile will somehow make the parts become perfect. We agree with NHTSA's reasoning that imperfect parts will produce an imperfect product. In the end, even GAO admits on page 20 that none of the studies produced a reliable estimate of the magnitude of accident

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3. "Motor Vehicle Safety, NHTSA Should Resume Its Support of State Periodic Inspection Programs", July 1990, Page 17.

reduction that can be expected from a PMVI program. Since magnitude is the determining factor for judging significance, we are full circle back to a lack of evidence to document the value of the PMVI program.

To summarize, it is our judgment that the NHTSA report is an objective statement of the agency's position on PMVI. Accident data, which is the ultimate criteria for evaluating highway safety, does not demonstrate that PMVI programs significantly reduce accidents. It was only after private interest groups applied pressure that the GAO review was ordered. Page 9 of the GAO report acknowledges that NHTSA responds to pressure. The fact that NHTSA did not give an official response to the GAO report suggests that it was experiencing pressure at the time the GAO review was being conducted. Page 5 of the GAO report lists three recommendations to NHTSA, but nothing precluded NHTSA from implementing them before GAO made them. Five years after the recommendations were made we are not aware of any changes (aside from the clean air mandates) that suggest that NHTSA, Congress or the general public have an opinion different from the one expressed to Congress in July, 1977. Specifically, that opinion is,

"In the future, greater reliance must be placed upon State and local highway safety agencies to identify their most pressing problems and advance appropriate solutions to them." Subsequent to this statement, ten States repealed their PMVI laws. Eleven years later during the 1988 rulemaking process to change the federal highway safety "standards" to "guidelines", no State agency supported PMVI as a priority program. Only one commenter from the private sector recommended that PMVI be added to the priority programs.

In the absence of Hawaii accident data that is germane to PMVI, we reviewed PMVI data that reflects the activity of the PMVI stations during CY 1994. A comprehensive presentation is in the appendix. There was a total of approximately<sup>4</sup> 724,685 vehicles inspected statewide. When the 32 defects that are tracked in the program are ranked in order of frequency, it is not until you reach number 24 that the number of defects reaches 1% of the total number of vehicles inspected. As noted earlier, the most common defect is with vehicle registration, which has nothing whatsoever to do with the mechanical condition of a vehicle. The next highest defect is in headlights, which is very easy for a dishonest inspector to claim, because even if the vehicle owner was to look at the reading on the meter, he or she is very unlikely to understand what it means. Except for no-fault insurance defects, the other items in the one to two percent range are the result of owner neglect. These items can easily be checked by a person with no mechanical skill. In fact, all but four of the PMVI items (including window tint) can be checked without special equipment, and all but three require only common sense to check. Eliminating the PMVI program does not prohibit people from taking their vehicles to service stations to be checked periodically or when they notice that something is not right. Since maintenance and inspection of vehicles are necessary more than once a year, the fact that there are so few defects indicates that motorists are in fact doing the necessary maintenance and inspection. Therefore, it is in the best financial interest of motorists to discontinue the program. At \$14.70 per inspection, mandatory vehicle inspections cost motorists over ten million dollars per year. That can buy a an awful lot of tires, lamps, exhaust pipes and windshield wipers.

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<sup>4</sup>. Not all of the December data was received at the time of this writing.

## APPENDIX

## STATE TOTAL

DEFECT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	Percent Of All Vehicles
FLOOR PAN	12	10	11	23	19	15	15	10	12	14	6	0	147	0.0203%
FENDERS	18	26	27	14	30	21	26	20	13	13	3	0	215	0.0297%
HOOD LATCHES	35	35	31	21	34	23	27	22	22	33	3	0	286	0.0395%
SEAT & BELTS	29	24	25	29	23	25	23	45	29	28	6	0	286	0.0395%
SPEEDOMETER	78	57	59	30	37	23	82	38	53	26	2	0	485	0.0669%
BUMPERS	56	43	63	41	57	49	57	48	58	45	4	1	522	0.0720%
OTH ELECTRICAL	75	48	56	71	56	57	61	71	77	51	22	16	661	0.0912%
INT & FUEL SYS	83	79	87	53	54	75	65	76	65	57	6	1	701	0.0967%
WHEELS & RIMS	86	78	103	82	81	99	120	112	82	56	9	0	918	0.1267%
DOOR LATCHES	82	87	136	61	135	89	70	60	64	148	18	2	952	0.1314%
SUSPENSION	180	162	210	203	159	197	171	215	185	197	11	0	1,890	0.2608%
RR VIEW MIRROR	190	163	234	152	241	192	264	256	235	220	22	0	2,169	0.2993%
STEERING	203	199	240	215	216	243	205	218	218	237	10	0	2,204	0.3041%
ALIGNMENT	249	198	231	244	266	235	207	227	197	229	16	0	2,299	0.3172%
OTHER WINDOW	146	123	145	109	159	166	344	336	472	284	16	0	2,300	0.3174%
WINDSHIELD	244	215	219	188	214	293	284	284	281	230	25	2	2,479	0.3421%
WINDOW TINT	0	0	0	0	0	0	565	755	628	728	75	0	2,751	0.3796%
BODY ITEMS	300	271	239	221	296	268	475	416	308	234	15	0	3,040	0.4195%
PARKING BRAKES	376	404	411	321	431	358	352	379	341	375	22	6	3,776	0.5211%
SERVICE BRAKES	496	487	529	473	525	514	467	482	469	460	43	1	4,946	0.6825%
HORN	372	357	436	385	375	399	683	877	837	836	45	10	5,592	0.7716%
WINDSHLD WIPERS	712	625	684	577	592	543	455	524	547	500	27	0	5,786	0.7984%
WARNING LAMPS	611	601	579	561	654	588	527	621	544	559	54	7	5,906	0.8150%
TAIL LAMPS	740	683	812	723	751	780	624	738	735	728	70	18	7,402	1.0214%
SIGNAL LAMPS	971	849	922	822	936	911	853	899	878	900	107	26	9,074	1.2521%
NO-FAULT INS	1,035	923	1,050	874	1,089	1,072	1,189	1,263	1,201	1,223	241	7	11,167	1.5409%
STOP LAMPS	1,165	1,048	1,171	1,079	1,194	1,199	1,009	1,176	1,084	1,132	100	20	11,377	1.5699%
EXHAUST SYSTEM	1,160	1,088	1,192	991	1,180	1,216	1,142	1,148	1,093	1,088	119	19	11,438	1.5781%
TIRES	1,595	1,388	1,527	1,354	1,551	1,587	1,451	1,541	1,407	1,442	107	23	14,973	2.0661%
OTHER LAMPS	2,024	1,758	1,995	1,728	1,934	2,052	1,793	1,854	1,827	1,947	181	10	19,103	2.6360%
HEAD LAMPS	3,009	2,818	3,114	3,266	3,442	3,529	3,011	3,284	3,054	3,044	225	34	31,810	4.3895%
REGISTRATION	7,301	7,846	6,980	4,259	6,886	7,184	7,184	5,930	6,025	6,895	1,060	268	67,818	9.3583%
TOTAL	23,633	22,695	23,518	19,180	23,517	24,002	23,783	23,905	23,038	23,959	2,670	471	234,471	

## 1994 PMVI DEFECTS REPORTED

## OAHU

DEFECT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
STEERING	158	187	187	177	183	190	170	177	189	198			1,745
ALIGNMENT	183	143	180	185	177	182	184	142	124	144			1,543
SUSPENSION	133	114	144	140	105	130	138	143	120	145			1,314
TIRES	1,180	867	1,047	982	1,080	1,148	1,068	1,104	990	1,037			10,823
WHEELS & RIMS	50	47	59	48	45	47	58	73	41	38			581
EXHAUST SYSTEM	730	730	732	646	781	787	778	747	998	728			7,384
INT & FUEL SYS	65	65	53	30	33	84	50	50	30	42			487
SERVICE BRAKES	345	344	377	339	340	375	338	352	302	330			3,437
PARKING BRAKES	208	309	303	283	302	282	280	277	252	287			2,830
HEADLAMPS	2,546	2,409	2,875	2,854	3,041	3,083	2,852	2,837	2,903	2,598			27,278
STOP LAMPS	816	780	885	896	815	821	783	818	802	887			8,884
SIGNAL LAMPS	884	818	850	892	781	852	820	844	881	859			8,411
TAIL LAMPS	839	487	584	590	595	537	430	481	488	439			4,989
WARNING LAMPS	481	485	486	440	511	467	410	486	421	443			4,808
OTHER LAMPS	1,588	1,380	1,570	1,322	1,869	1,308	1,401	1,431	1,343	1,484			14,813
HORN	258	251	304	267	283	283	858	770	796	726			4,358
OTH ELECTRICAL	43	94	28	59	34	28							230
WINDSHIELD	206	174	178	183	170	220	245	228	213	178			1,964
OTHER WINDOW	130	104	118	99	120	137	301	283	428	240			1,871
WINDSHLD WIPERS	582	519	548	481	480	437	386	392	307	387			4,822
RR VIEW MIRROR	143	116	152	118	202	184	203	208	178	180			1,843
REGISTRATION	4,860	4,824	4,537	2,935	4,783	4,873	5,073	4,248	4,155	4,338			44,724
DOOR LATCHES	61	88	101	48	119	87	87	43	42	114			880
HOOD LATCHES	22	22	18	14	22	13	18	18	18	18			178
SEAT & BELTS	23	18	18	22	21	17	19	34	18	20			213
FENDERS	14	20	17	10	16	10	23	12	9	8			138
BUMPERS	40	38	42	20	87	37	40	37	37	29			343
FLOOR PAN	8	8	8	14	8	11	12	8	7	12			93
BODY ITEMS	237	212	178	181	237	222	424	383	248	197			2,498
SPEEDOMETER	72	47	83	28	30	18	74	54	38	23			415
WINDOW TINT							363	468	358	535			1,724
NO-FAULT INS	644	580	638	460	631	644	774	820	740	803			8,758
TOTAL	17,202	16,103	18,788	14,280	17,420	17,558	17,911	17,844	16,806	17,288	0	0	168,887

## HAWAII

DEFECT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
STEERING	17	10	12	12	14	18	18	8	18	12	10		144
ALIGNMENT	10	9	10	12	7	17	18	20	13	14	15		140
SUSPENSION	14	4	12	9	3	8	9	25	18	18	10		120
TIRES	80	85	84	89	109	115	88	82	88	77	83		1,014
WHEELS & RIMS	17	17	12	15	17	11	24	18	20	10	9		179
EXHAUST SYSTEM	111	103	103	81	107	139	101	93	81	100	102		1,147
INT & FUEL SYS	4	0	4	2	4	6	3	5	7	4	5		44
SERVICE BRAKES	35	31	37	38	52	42	30	26	48	39	37		498
PARKING BRAKES	16	16	30	20	49	24	58	32	31	33	18		303
HEADLAMPS	216	189	194	198	182	214	208	211	210	230	188		2,239
STOP LAMPS	111	112	108	103	115	128	111	101	148	103	83		1,215
SIGNAL LAMPS	114	102	121	120	115	121	114	113	146	114	85		1,297
TAIL LAMPS	91	57	75	80	64	73	75	80	80	82	88		787
WARNING LAMPS	87	74	89	83	88	44	87	84	87	87	47		887
OTHER LAMPS	178	108	170	174	180	178	178	151	199	109	173		1,874
HORN	55	55	53	51	56	51	52	53	85	47	27		676
OTH ELECTRICAL		0	0	0					0				0
WINDSHIELD	20	18	20	17	21	31	18	33	88	28	21		283
OTHER WINDOW	4	8	7	5	5	11	4	20	23	14	16		112
WINDSHLD WIPERS	30	23	33	22	28	28	15	31	35	24	21		260
RR VIEW MIRROR	18	15	15	22	11	15	19	20	21	18	22		197
REGISTRATION	807	812	844	844	805	801	830	881	838	833	883		8,546
DOOR LATCHES	18	7	13	8	18	8	8	7	12	14	16		117
HOOD LATCHES	4	3	5	2	3	5		1	4	8	3		86
SEAT & BELTS	2	1	8	2	2	5	1	2	2	1	5		28
FENDERS	1	2	3	3	0	5	4	4	3		3		40
BUMPERS	9	8	9	11	10	11	10	8	18	8	4		105
FLOOR PAN	2	1	3	4	3	2	2		4		6		24
BODY ITEMS	17	11	25	17	19	21	20	21	21	4	16		188
SPEEDOMETER	1	3	1	3	5	1	2	1	10	2	2		31
WINDOW TINT							84	102	88	78	75		434
NO-FAULT INS	202	184	183	208	213	190	188	218	220	195	218		2,224
TOTAL	2,099	1,784	2,085	1,981	2,088	2,120	2,011	2,201	2,414	2,078	2,063	0	22,816

## MAUI:

DEFECT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
STEERING	29	31	41	26	37	34	19	82	31	26			506
ALIGNMENT	56	46	61	67	51	66	40	55	66	71			612
SUSPENSION	30	44	50	54	51	59	30	47	45	39			448
TIRES	352	334	381	285	343	312	278	340	333	311			3,268
WHEELS & RIMS	19	14	32	29	19	40	13	21	21	6			216
EXHAUST SYSTEM	297	233	336	239	279	257	251	291	290	236			2,719
INT & FUEL SYS	24	24	30	14	17	14	12	20	19	11			165
SERVICE BRAKES	112	104	109	97	130	94	63	100	103	91			1,033
PARKING BRAKES	63	77	77	36	74	52	54	89	57	51			610
HEADLAMPS	215	203	216	180	183	236	128	190	209	191			1,949
STOP LAMPS	117	129	153	97	144	126	87	131	114	114			1,224
SIGNAL LAMPS	137	115	124	81	101	115	93	122	122	105			1,126
TAIL LAMPS	100	120	163	136	137	155	105	185	164	211			1,462
WARNING LAMPS	67	84	57	45	72	71	47	55	57	63			578
OTHER LAMPS	269	237	242	223	247	265	206	265	274	260			2,482
HORN	51	45	65	66	62	72	43	45	58	53			547
OTH ELECTRICAL	32	14	28	11	17	29	38	43	57	33			303
WINDSHIELD	17	23	18	18	21	40	18	23	27	24			230
OTHER WINDOW	12	15	22	5	17	17	38	33	24	30			214
WINDSHLD WIPERS	97	81	100	72	97	77	46	100	110	85			839
RR VIEW MIRROR	27	26	66	14	27	12	40	29	35	35			311
REGISTRATION	1,945	2,055	1,556	712	1,288	1,821	1,418	925	1,114	1,739			14,076
DOOR LATCHES	5	19	20	10	11	24	7	10	10	19			135
HOOD LATCHES	8	10	8	5	7	4	8	5	5	11			72
SEAT & BELTS	2	5	6	5		3	3	9	9	7			49
FENDERS	2	5	2	1	8	6	1	2	1	7			35
BUMPERS	7	8	12	3	10	10	7	2	5	7			69
FLOOR PAN	2	1	3	5	8	2	1	4	1	1			28
BODY ITEMS	48	48	36	23	46	25	30	30	36	33			356
SPEEDOMETER	4	6	5	2	2	2	6	3	5	1			36
WINDOW TINT			0				106	167	181	119			568
NO-FAULT INS	175	165	206	188	234	221	220	212	230	206			2,036
TOTAL	4,004	4,297	4,243	2,727	3,730	4,074	3,499	3,575	3,508	4,186	0	0	38,144

## KAUAI:

DEFECT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
STEERING	1	1			2	1	1	1	2	0			9
ALIGNMENT	1	0			1				1	0	1		4
SUSPENSION	3	0					2		1	1	1		8
TIRES	4	12	15	8	10	12	21	5	15	17	24	23	167
WHEELS & RIMS		0				1			0	0			1
EXHAUST SYSTEM	22	22	21	15	13	13	12	17	14	21	17	19	206
INT & FUEL SYS		0		1	0	1		1		0	1	1	5
SERVICE BRAKES	4	8	6	1	3	3	11	4	18	3	6	1	68
PARKING BRAKES	2	2	1	2	6		2	1	1	4	6	6	33
HEADLAMPS	32	26	29	34	26	16	25	25	32	24	39	34	343
STOP LAMPS	21	17	25	13	20	27	18	25	23	18	17	20	244
SIGNAL LAMPS	26	15	27	19	18	23	26	20	27	19	22	26	270
TAIL LAMPS	10	9	14	7	14	16	14	22	9	16	15	16	164
WARNING LAMPS	6	8	7	13	8	6	4	4	9	6	7	7	83
OTHER LAMPS	13	5	13	9	9	13	10	7	11	24	8	10	132
HORN	8	6	10	8	14	13	10	9	8	8	8	10	112
WINDOW TINT		0		1	1		22	28	20	16	22	16	128
WINDSHIELD	1	0	1		2	2	3	2	3	2	4	2	22
OTHER WINDOW		1			1	1	0		0	0			3
WINDSHLD WIPERS	3	2	6	2	1	1	6	1	5	8	6		35
RR VIEW MIRROR	2	4	1	1	1	1	2	1	0	5			19
REGISTRATION	193	255	240	68	238	69	163	96	100	215	377	288	2,392
DOOR LATCHES		2	2		1		0		0	1	2	2	10
HOOD LATCHES			0						0	0			0
SEAT & BELTS			2						0	0	1		1
FENDERS	1							1	0	0			2
BUMPERS				1		1		1	1	0		1	5
FLOOR PAN									0	0			0
BODY ITEMS						0	1		0	0			1
SPEEDOMETER	1	1				1			0	0			3
NO-FAULT INS	14	14	14	9	11	12	10	13	11	17	23	7	156
TOTAL	358	511	432	212	398	253	562	285	312	423	607	471	4,425



# **TOTAL INSPECTIONS CONDUCTED**

(County totals include rejected vehicles)

		HONOLULU	HAWAII	MAUI	KAUAI	TOTAL
1994	JANUARY	47,820	8,927	8,665	4,495	69,907
	FEBRUARY	44,014	7,751	9,366	4,176	65,307
	MARCH	46,252	8,652	8,815	4,139	67,858
	Subtotal	138,086	25,330	26,846	12,810	203,072
	APRIL	42,704	7,436	7,225	3,149	60,514
	MAY	46,479	8,136	8,315	4,222	67,152
	JUNE	48,162	8,440	9,025	4,172	69,799
	Subtotal	137,345	24,012	24,565	11,543	197,465
	JULY	46,958	8,628	8,020	4,065	67,671
	AUGUST	47,083	8,090	7,286	3,744	66,203
	SEPTEMBER	43,754	7,932	7,172	3,438	62,296
	Subtotal	137,795	24,650	22,478	11,247	196,170
	OCTOBER	46,048	8,211	7,730	3,555	65,544
	NOVEMBER	46,039	8,240	0	3,949	58,228
	DECEMBER	0	0	0	4,206	4,206
	Subtotal	92,087	16,451	7,730	11,710	127,978
<b>TOTALS</b>		<b>505,313</b>	<b>90,443</b>	<b>81,619</b>	<b>47,310</b>	<b>724,685</b>

Special Equipment or Tool required to inspect:

1. Steering: Various types of floor jacks to raise vehicle for checking of wear; dial indicator to measure the amount of wear; jack stands. (gear box, pitman arm, ball joints, tie rod ends, bearings)
2. Headlamps: Head light aimer for proper alignment.

Knowledge required for proper inspection:

1. Steering: Parts where normal wear occurs and the tolerances set by various manufacturers. (gear box, pitman arm, ball joints, tie rod ends, bearings)
2. Service Brakes: Brake pedal travel, signs of master cylinder leaks, interpret different signs as they appear in the inspections. (Master cylinder leaks, brake lines, wheel cylinders)

Non-mechanical items that are listed on inspection forms

1. Registration: Does not the safety of the vehicle it self. It helps licensing people.
2. No Fault insurance. Used only to help enforcement of no-fault laws. Does the affect the safety of the vehicle.

Items that any person may inspect with out any special knowledge or equipment.

1. Tires: worn or damaged
2. Wheels and Rims: cracks, damaged or missing lug nuts
3. Stop lamps either operates or doesn't
4. Signal Lamps: Proper operation
5. Tail Lamps on or off check
6. Warning lamps all lamps for proper operation
7. Other lamps on or off operation
8. Horn operate with proper loudness
9. Windshield damaged or cracked no visual distortion
10. Other windows cracked or obstructed
11. Windshield Wipers wear and operation
12. Rear View Mirrors required mirrors installed and not cracked
13. Registration current and used in right vehicle.
14. Door Latches both primary and secondary latch secures door
15. Hood latch able to lock and secondary latch able to hold hood in place
16. Seat and Seat Belts. Properly secured, checked for wear and proper operation.
17. Fenders in place and no sharp edges.
18. Bumpers installed with no sharp edges and proper height
19. Floor pan no holes to allow exhaust fumes to enter cabin
20. Body items. All intact with no sharp edges
21. Speedometer. Proper operation.
22. No-fault insurance. current and inspect card for proper identification.
23. Alignment: Check for tire wear pattern

24. Exhaust : Check for leaks or broken or worn parts
25. Parking brakes: Proper operation.
26. Suspension: proper attachment
27. Tint: bubbling, cracking, peeling
28. Intake and Fuel System: Check for leaks