Report on an Investigation of the High Speed Hazards of Steel Belted Radial Tires on Police Patrol Cars

Jared J. Collard

Law Enforcement Standards Laboratory
Center for Consumer Product Technology
Institute for Applied Technology
National Bureau of Standards
Washington, D. C. 20234

June 1975
Final

Prepared for
National Institute of Law Enforcement and Criminal Justice
Law Enforcement Assistance Administration
Department of Justice
Washington, D. C. 20531
REPORT ON AN INVESTIGATION OF THE HIGH SPEED HAZARDS OF STEEL BELTED RADIAL TIRES ON POLICE PATROL CARS

Jared J. Collard

Law Enforcement Standards Laboratory
Center for Consumer Product Technology
Institute for Applied Technology
National Bureau of Standards
Washington, D.C. 20234

June 1975
Final

Prepared for
National Institute of Law Enforcement and Criminal Justice
Law Enforcement Assistance Administration
Department of Justice
Washington, D.C. 20531

U.S. DEPARTMENT OF COMMERCE, Rogers C.B. Morton, Secretary
NATIONAL BUREAU OF STANDARDS, Ernest Ambler, Acting Director
The National Institute of Law Enforcement and Criminal Justice (NILECJ), in January 1975, requested the Law Enforcement Standards Laboratory (LESL) to investigate a report that a fatal accident by a trooper of the Alabama Highway Patrol was caused by a failure of a steel belted radial ply tire at high speed. This report contains the findings of the investigation, the conclusions reached, and LESL's recommendations. No actual tire testing was conducted by the National Bureau of Standards during this investigation. The use of brand names in the report in no way implies endorsement or indictment of any particular product by the National Bureau of Standards.
This report was prepared by the Law Enforcement Standards Laboratory of the National Bureau of Standards under the direction of Jared J. Collard, Acting Manager, Police Vehicles Program, and Jacob J. Diamond, Chief of LESL. The cooperation of the following organizations is gratefully acknowledged: the Law Enforcement Group of the National Association of Fleet Administrators, Inc., the International Association of Chiefs of Police, the Safety Research Laboratory of the National Highway Traffic Safety Administration, and the many cooperating police departments. The preparation of this report was sponsored by the NILECJ Office of Research Programs, Geoffrey M. Alprin, Director; Advanced Technology Division, Joseph T. Kochanski, Director.
TABLE OF CONTENTS

Preface .................................................. i
1.0 Introduction ........................................... 1
2.0 The Investigation ....................................... 1
3.0 Findings ............................................... 3
4.0 Conclusions ........................................... 5
5.0 Recommendations ...................................... 6
6.0 Postscript ............................................. 6

Table 1: Tire Failures by Construction (Data Provided by U.S. Department of Transportation) 7
Table 2: Summary of Survey by National Association of Fleet Administrators, Inc. ................. 9
Table 3: Summary of Survey by International Association of Chiefs of Police .................. 10
Table 4: Listing of Company-Certified High Speed Police Tires ........................................ 11

Attachment A: State of Alabama Traffic Accident Report
Attachment B: State of Alabama Report of Taylor County, Florida Accident
Attachment C: California Highway Patrol Test Reports
Attachment D: State of Florida Traffic Accident Report
Attachment E: Tires Company-Certified for High Speed Police Use
1.0 INTRODUCTION

In the fall of 1974, the Law Enforcement Standards Laboratory (LESL), of the National Bureau of Standards (NBS), began to receive unconfirmed reports of a fatal police accident involving the alleged failure of a steel belted radial tire. In a letter dated December 12, 1974, John M. Grow, Manager of Transportation Services for the California Highway Patrol, expressed his concern in the following manner:

"The recent loss of life in a southern state [happened] because so many people were so uninformed that a vendor sold and the state purchased steel belted radial tires for highway patrol use. Every steel belted radial tested by us has come unglued at about 105 mph to 115 mph. Why not describe what's a high speed tire? Why not test tires and publish the results to law enforcement agencies? We would probably faint if we knew how many policemen engaged in high speed pursuit or response ride on Mickey Mouse tires every hour of every day."

LESL received a request on January 2, 1975, from the National Institute of Law Enforcement and Criminal Justice (NILECJ) to conduct a quick-response investigation of the use of steel belted radial ply (SBR) tires by police. On January 24, 1975, a preliminary memorandum report was submitted to NILECJ. This document constitutes the final report of that investigation.

2.0 THE INVESTIGATION

1. Contact was made with the Department of Public Safety, State of Alabama. A copy of the report of a fatal police accident was obtained and is provided as attachment A.

2. The State of Alabama provided LESL with a copy of a report it had prepared concerning a second fatal police accident, which had occurred in Taylor County, Florida (see attachment B). LESL made telephone contact with the Sheriff's Department of Taylor County to verify the facts.

3. Contact was made with the California Highway Patrol, which has tested several brands of steel belted radial ply tires. Copies of their test results are provided as attachment C.
4. Contact was made with the Florida Highway Patrol concerning the permanent disability of one trooper. A copy of that accident investigation report is provided as attachment D.

5. Contact was made with the Office of Defects Investigation, National Highway Traffic Safety Administration (NHTSA), to discuss elements of the Alabama fatality. The NHTSA Safety Research Laboratory was contacted and supplied information concerning the performance of various tires at high speed (see tables 1a and 1b).

6. A telephone survey of ten police agencies around the country was conducted to determine the extent to which SBRs have been, or are being used or tested, and any problems experienced. This telephone survey was augmented by two larger, more detailed surveys (see 7 and 8, below).

7. The chairman of the Safety Committee of the National Association of Fleet Administrators agreed to survey the law enforcement group for user data. The results of that survey are summarized in table 2.

8. The Highway Safety Division of the International Association of Chiefs of Police was queried for user information and undertook a survey of the fifty State police organizations. A summary of the results obtained is provided in table 3.

9. The four major automobile manufacturers were contacted to ascertain company policy concerning the provision of SBRs as original or optional equipment (see Finding 2, below).

10. Several of the larger U.S. tire companies and two foreign tire companies were contacted concerning the certification and use of SBRs for law enforcement. Table 4 is a summary of attachment E, which consists of letters or announcements from several tire manufacturers listing the tires which the manufacturers have tested and certified for high speed police use. The names of the U.S. companies which manufacture high speed police tires were obtained from the Tire Industry Safety Council. This summary is provided as a convenience to the reader and does not imply endorsement or certification of the products by the National Bureau of Standards.
3.0 FINDINGS

1. The four U.S. tire industry representatives contacted by LESL stated that their companies do not recommend their standard grade SBRs for police pursuit vehicles, but that these SBRs could be, and are being, used satisfactorily on police cars where high speed is not a factor. The statement commonly heard was that U.S. steel belted radial tires "are not certified over 105 mph" (170 km/h)*. One U.S. company reportedly is developing and testing an SBR for 125 mph (200 km/h) certification, however. Several companies are beginning to produce and market Kevlar belted tires as an alternative to SBRs. The companies report that Kevlar tires have been tested and certified up to 125 mph (200 km/h). Several U.S. companies have textile belted radial tires, as well as bias ply and bias belted tires, which they will certify for high speed pursuit. At least two foreign manufacturers have certified certain sizes of SBRs for speeds of 125 mph (200 km/h), or more (see attachment E).

2. The four U.S. automobile manufacturers are not in agreement concerning the use of U.S.-made SBRs for police operations. One company will supply domestic SBRs as optional equipment, when so specified by the ordering police agency. Another company will not supply SBRs unless the local dealer obtains a waiver of responsibility from the ordering agency. The other two manufacturers will not put domestic SBRs on any patrol car purchased with a "police package." (The package consists of heavy duty suspension, brakes, cooling systems, etc.). However, if a patrol car is ordered without the package, SBRs may be provided, since there is no way to distinguish that car from any standard vehicle during the production process.

3. In 1974, one State trooper was killed in Alabama and in Florida, one Deputy Sheriff was killed and two State troopers were injured, one of them permanently disabled, in accidents caused by sudden failures of steel belted radial tires at speeds estimated to be between 100-110 mph (160-175 km/h). The Alabama Highway Patrol experienced approximately 40 other SBR tire failures, which resulted in light-to-moderate damage to some of the vehicles (see attachment A). In all, the surveys reported that five patrol cars have been totally destroyed and 16 damaged, as a result of SBR failures (see tables 2 and 3).

*Standard International metric units appear in parentheses, as a convenience to the reader. Kilometer per hour speeds are rounded to the nearest zero or 5.
4. High speed tire failures begin with small pieces of the tread being thrown off with considerable force. This is known as "chunking," and is usually made known to the experienced driver by the noise of the chunks hitting the undercarriage or the fender walls. Unless speed is gently, but immediately, reduced, these chunks will become larger and larger, and the entire tread and steel belts may peel off (see attachment C). In many cases, enough integrity may be retained by the tire to permit the vehicle to be brought to a gradual halt. In other cases, however, the tire instantly loses air pressure. At high speed, this blow-out may send the car out of control. All of the police departments LESL contacted by telephone were aware that standard-grade SBRs will not perform well at high speed, and are therefore not suitable for most patrol situations. Nevertheless, some departments are continuing to use SBRs and others are planning to switch to them because of the tire's superior treadwear, puncture resistance, and handling characteristics.

5. As can be seen from table 1a, most of the standard grade SBR's tested on a high speed test wheel by the U.S. Department of Transportation (DOT) failed at 100 or 105 mph (160-165 km/h). One SBR failure occurred at 80 mph (130 km/h); another did not fail until 110 mph (175 km/h) had been reached. This variation cannot be explained without additional testing. LESL has not discovered any Government research on this problem as it specifically relates to police tires.

Table 1a also reveals that, in the DOT laboratory tests, the SBRs, on the average, fared no better and no worse than the bias ply, bias belted, and fabric radial tires. For each type of construction, the average speed at which failure occurred was approximately 100 mph (160 km/h). None of the tires tested by DOT were rated by the manufacturers as police special or high speed tires. Table 1b lists the brands and sizes of tires tested by DOT.

6. Radial tires have inherent sidewall weaknesses, regardless of the speeds at which they are driven, and are vulnerable to damage from curbs, stones, and roadway edges. For example, it was reported by one police department that winter chains should not be used on radial tires because of possible damage to the sidewalls. Another police department reported that some car washes are putting up signs warning of possible sidewall damage from the guide rails.
7. Tire failure on the road is affected by several important variables, in addition to the variability in tire construction illustrated by table 1a. These include road surface texture, ambient temperature, age and condition of the tire, inflation pressure, load on the tire, and length of running time at high speed. The fundamental cause of tire failure is heat build-up within the tire, primarily due to the rapid flexing of the tire materials, such as the belts and cords. Of all the above causes for heat build-up, improper tire inflation and high speed are the most important.

4.0 CONCLUSIONS

1. Although some standard grade SBRs may be used safely and effectively by some jurisdictions which do not patrol freeways, or certain densely populated urban areas where extremely high speeds cannot be driven, most standard grade steel belted radial tires are not suitable for county or State police operations, because of the high probability that speeds over 90 mph (145 km/h) may be achieved.

2. The improper use of SBRs is not widespread among the police. As stated above, all of the departments contacted by LESL are aware of the high speed limitations of standard grade SBRs. Some of this knowledge has come from the tire and automobile companies; in other cases, it has been gained by bitter experience. Nevertheless, a sufficient number of police departments are using SBRs, or are planning to use them, to warrant Federal action.

3. More authoritative tire information is needed by police agencies and purchasing departments, free of the biases or advertising claims of tire manufacturers. This information should be based upon actual testing of police tires, under a variety of operating conditions, and serve as a guideline for the proper selection of tires for police use.

4. Table 1a reveals that the problem of high speed tire failures is not limited to radial tires: bias and bias-belted tires will also fail at about the same speeds. The cause of the problem is the improper selection of tires for police operations. High speed driving requires high speed tires, not the standard grade tires commonly ordered by most police departments.
5.0 RECOMMENDATIONS

1. Joint LEAA/NHTSA notices should be issued to all law enforcement agencies, tire companies and dealers, and automobile manufacturers and dealers, informing all parties of the government's concern that standard grade steel belted radial tires are being ordered, sold, and used in situations which may be hazardous.

2. Police agencies should be advised to purchase and use only those tires which the manufacturer has certified to have been tested and approved for police use at speeds up to at least 125 mph (200 km/h). This written certification should be provided to the ordering agency upon delivery of either replacement tires or patrol cars with SBR's as original equipment.

3. Tire companies and their dealers should be cautioned against selling to the police (Federal, State, county or local) any tire that has not passed the company's own high speed certification tests. The test procedures, results, and certifications should be made a standard part of a tire company's bid package.

4. All automobile manufacturers should be urged, or required, to adopt a uniform policy concerning the provision of high speed tires on new police vehicles.

6.0 POSTSCRIPT

This report has dealt with the problems encountered by police using standard grade steel belted radial tires at high speeds. This should not be construed as an indictment of the use of SBR's by the general public, as long as the posted speed limits are observed and the tires receive reasonable care and maintenance. Any tire--bias, bias belted, or radial--will fail when it is abused, which includes driving at speeds beyond the tire's design maximum. Undoubtedly, failures of non-radial tires have also occurred over the years and have caused police injuries and fatalities. While it is impossible to eliminate the occurrence of tire failures, it is possible to reduce them through the use of better performance specifications for tire procurement, as well as improved tire safety and maintenance programs.
### Table 1a
Tire Failures by Construction

<table>
<thead>
<tr>
<th>CONSTRUCTION</th>
<th>SPEED AT FAILURE</th>
<th>DID NOT FAIL</th>
<th>AVERAGE SPEED AT FAILURE</th>
<th>TOTAL NUMBER OF TIRES TESTED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mph km/h</td>
<td>80 85 90 95 100 105 110 115 120</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bias Ply</td>
<td></td>
<td>- - 1 4 14 5 1 2 - - -</td>
<td>101 mph</td>
<td>27</td>
</tr>
<tr>
<td>Bias Belted</td>
<td></td>
<td>- 2 4 6 2 4 1 3 - - -</td>
<td>101 mph (162 km/h)</td>
<td>24</td>
</tr>
<tr>
<td>Fabric Radial</td>
<td></td>
<td>- 1 - 4 2 1 3 - - -</td>
<td>100 mph (161 km/h)</td>
<td>11</td>
</tr>
<tr>
<td>Steel Radial</td>
<td></td>
<td>1 - 1 2 9 10 1 - - -</td>
<td>101 mph (162 km/h)</td>
<td>24</td>
</tr>
</tbody>
</table>

1 This analysis is based upon data provided by the Safety Research Laboratory, U.S. Department of Transportation. Tires were standard grade passenger tires selected from stocks on hand.

2 **DOT TEST PROCEDURE**

Break-in at 50 mph (80.5 km/h) for four hours; cool tires to ambient temperature (100°F or 37.8°C); run tires for 30 minutes at 75 mph (120.8 km/h); increase speed in 5 mph (8.1 km/h) increments and run for 30 minutes at each new speed until failure occurs.

3 Two tires withstood 30 minutes at 120 mph (193 km/h) without failure; the tests were suspended at that point. For averaging purposes, these were assumed to have failed at 125 mph (201 km/h).
### Table 1b

Tire Failures by Construction

Tire Brands Tested by the U.S. Department of Transportation

<table>
<thead>
<tr>
<th>Bias Ply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dunlop Gold Cup, G78-14</td>
</tr>
<tr>
<td>Firestone 500, G75-15</td>
</tr>
<tr>
<td>Firestone Delux Champion, F78-14</td>
</tr>
<tr>
<td>Goodrich Custom, G78-14</td>
</tr>
<tr>
<td>Goodyear Power Cushion 78, G78-14</td>
</tr>
<tr>
<td>Kelly Springfield 78, G78-14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bias Belted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dunlop Qualifier G/T, G70-14</td>
</tr>
<tr>
<td>Firestone 500 steel belted, F78-14</td>
</tr>
<tr>
<td>Firestone Sup-R-Belt, H73-15</td>
</tr>
<tr>
<td>General Jumbo 700, F70-14</td>
</tr>
<tr>
<td>Goodrich Silvertown, G70-14</td>
</tr>
<tr>
<td>Goodyear Custom Power Cushion, H73-14</td>
</tr>
<tr>
<td>Goodyear Custom W.T., G70-14</td>
</tr>
<tr>
<td>Kelly Springfield Super Charger, G70-14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fabric Radial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dunlop SP41, 205R14</td>
</tr>
<tr>
<td>General Jet RADAN, 205R14</td>
</tr>
<tr>
<td>Goodrich 990, FR70-14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Steel Radial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firestone V-1, GR70-14</td>
</tr>
<tr>
<td>Gislavd Veloche 116, 175SR14</td>
</tr>
<tr>
<td>Goodrich Lifesaver, GR70-14</td>
</tr>
<tr>
<td>Goodyear Custom Steel Guard, GR78-15</td>
</tr>
<tr>
<td>Michelin, 205-14</td>
</tr>
<tr>
<td>Pirelli Cinturato CN75, 205-14</td>
</tr>
<tr>
<td>Sears, 205-14</td>
</tr>
<tr>
<td>POLICE AGENCY OR DEPARTMENT</td>
</tr>
<tr>
<td>----------------------------------</td>
</tr>
<tr>
<td>Arizona Dept. of Public Safety</td>
</tr>
<tr>
<td>Baltimore County Police Dept.</td>
</tr>
<tr>
<td>Calif., Highway Patrol</td>
</tr>
<tr>
<td>Georgia Dept. of Public Safety</td>
</tr>
<tr>
<td>Illinois State Police</td>
</tr>
<tr>
<td>Illinois State Toll Highway Authority</td>
</tr>
<tr>
<td>Indianapolis, Ind. Police Dept.</td>
</tr>
<tr>
<td>Kansas Highway Patrol</td>
</tr>
<tr>
<td>Kansas City, Mo. Police Dept.</td>
</tr>
<tr>
<td>Kentucky State Police</td>
</tr>
<tr>
<td>Louisville, Ky. Police Dept.</td>
</tr>
<tr>
<td>Maine State Police</td>
</tr>
<tr>
<td>Miami, Florida Police Dept.</td>
</tr>
<tr>
<td>Nebraska State Patrol</td>
</tr>
<tr>
<td>New Jersey State Police</td>
</tr>
<tr>
<td>New Mexico State Police</td>
</tr>
<tr>
<td>New York City Police Dept.</td>
</tr>
<tr>
<td>Oakland County, Mich. Sheriffs Dept.</td>
</tr>
<tr>
<td>Ontario, Canada Provincial Police</td>
</tr>
<tr>
<td>Penn. State Police</td>
</tr>
<tr>
<td>South Carolina Highway Dept.</td>
</tr>
<tr>
<td>Texas Dept. of Public Safety</td>
</tr>
<tr>
<td>Utah Highway Patrol</td>
</tr>
</tbody>
</table>

Table 2: Summary of National Association of Fleet Administrators survey of steel belted radial tire use by police.

- Most officers report that the tires are replaced when they reach 20,000 miles, with a range of 10,000 to 30,000 miles.
- The tire pressures are typically around 32 psi, with a range of 26 to 33 psi.
- The makes and models of tires vary, with brands such as Goodyear, Firestone, and Michelin.
- Some officers report that the tires are replaced due to sidewall damage or belt separations.
- A few officers report that the tires are replaced due to air pressure loss.

Notes:
- "No answer" means that the officer did not provide a response.
- "No data" means that the data was not available or not provided.
- "Unknown" means that the data is not known or cannot be determined.

Total: 1,911 tires surveyed.
<table>
<thead>
<tr>
<th>State Police Department</th>
<th>SBIR Tires Equipped</th>
<th>No. of Vehicles Equipped</th>
<th>Nature of Featues</th>
<th>Approximate Speed (mph)</th>
<th>Est. Time Speed Maintained</th>
<th>Est. Time Pressure at Time of Accident</th>
<th>Est. No. of Miles on Tire(s)</th>
<th>Did Failures Result in Accidents or Property Damage Injuries?</th>
<th>Did Failures Result in Damage to Police Vehicle</th>
<th>Other Property Damage</th>
<th>Brand/Size of Tires</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>Discontinued use</td>
<td>40</td>
<td>Belt separations, blowouts, sidewall blisters, sidewalls collapsed</td>
<td>75-125</td>
<td>Did not specify</td>
<td>Did not specify</td>
<td>Did not specify</td>
<td>1 patriol car destroyed</td>
<td>Did not specify</td>
<td>Did not specify</td>
<td>Firestone HRB-15</td>
<td>Only used fabric radials.</td>
</tr>
<tr>
<td>Delaware</td>
<td>Only used fabric radials</td>
<td>Did not specify</td>
<td>Sidewalls</td>
<td>Did not specify</td>
<td>Did not specify</td>
<td>Did not specify</td>
<td>Did not specify</td>
<td>Did not specify</td>
<td>Did not specify</td>
<td>Did not specify</td>
<td>Did not specify</td>
<td>Firestone HRB-15</td>
</tr>
<tr>
<td>Florida</td>
<td>Discontinued use</td>
<td>325</td>
<td>Belt separations, sidewall blisters</td>
<td>60-120</td>
<td>2 or - 15 miles</td>
<td>28-32 psi</td>
<td>Various</td>
<td>2 vehicles damaged</td>
<td>None</td>
<td>None</td>
<td>Firestone HRB-15</td>
<td>Goodyear H75-15</td>
</tr>
<tr>
<td>Florida (Dept. of Criminal Law Enforcement)</td>
<td>Current using</td>
<td>120</td>
<td>Belts and sidewalls</td>
<td>Not specified</td>
<td>Not specified</td>
<td>Not specified</td>
<td>10,000</td>
<td>35 vehicles damaged</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>Firestone H75-15</td>
</tr>
<tr>
<td>Idaho</td>
<td>Currently using</td>
<td>260</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Firestone H75-15</td>
<td>Goodyear H75-15</td>
</tr>
<tr>
<td>Iowa</td>
<td>Currently using</td>
<td>410</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Firestone H75-15</td>
<td>Goodyear H75-15</td>
</tr>
<tr>
<td>Kansas</td>
<td>Discontinued use</td>
<td>6</td>
<td>Belt separations</td>
<td>120</td>
<td>3 minutes</td>
<td>30 psi</td>
<td>8,000</td>
<td>1 vehicles damaged</td>
<td>None</td>
<td>None</td>
<td>Goodyear H75-15</td>
<td>Goodyear H75-15</td>
</tr>
<tr>
<td>Maine</td>
<td>Discontinued use</td>
<td>4</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Goodyear H75-15</td>
<td>Goodyear H75-15</td>
</tr>
<tr>
<td>Nebraska</td>
<td>Currently using</td>
<td>11</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Goodyear H75-15</td>
<td>Michelin H75-15</td>
</tr>
<tr>
<td>New Mexico</td>
<td>Using experimentally</td>
<td>10</td>
<td>Belt separations</td>
<td>55-100</td>
<td>Unknown</td>
<td>Mfr recomm</td>
<td>10,000-20,000</td>
<td>4 vehicles damaged</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>Michelin H75-15</td>
</tr>
<tr>
<td>Darien, Canada</td>
<td>Currently using</td>
<td>12</td>
<td>Belt separation</td>
<td>114</td>
<td>Unkown</td>
<td>26 psi</td>
<td>150</td>
<td>No</td>
<td>No</td>
<td>None</td>
<td>Goodyear, Firestone, Uniroyal, H. G. F.</td>
<td></td>
</tr>
<tr>
<td>Oregon</td>
<td>Discontinued use</td>
<td>100</td>
<td>Belt separations not maintained</td>
<td>Unknown</td>
<td>Unknown</td>
<td>32 psi</td>
<td>&quot;Almost new&quot;</td>
<td>Statistics not maintained</td>
<td>No</td>
<td>No</td>
<td>None</td>
<td>Goodyear H75-15</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>Currently using</td>
<td>120</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Firestone HRB-15</td>
<td>Goodyear H75-15</td>
</tr>
<tr>
<td>Vermont</td>
<td>Formerly treated</td>
<td>2</td>
<td>Tread disintegrations</td>
<td>Did not specify</td>
<td>Did not specify</td>
<td>Did not specify</td>
<td>1  minor injuries to driver</td>
<td>1 police car destroyed</td>
<td>Did not specify</td>
<td>Firestone V-1, size not specified</td>
<td>Both failures occurred same time of day, within one mile of each other. One tree maintained on. Improper inflation may have contributed to failures</td>
<td></td>
</tr>
<tr>
<td>West Virginia</td>
<td>Formerly used</td>
<td>10</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Firestone JRB-15</td>
<td>Goodyear JRB-15</td>
</tr>
<tr>
<td>Wyoming</td>
<td>Currently using</td>
<td>155</td>
<td>Sidewalls</td>
<td>&quot;Patrol speed&quot;</td>
<td>Unknown</td>
<td>30 psi</td>
<td>1 nee, 1 with 15,000 miles</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>Goodrich H90-15</td>
<td>Goodyear H75-15</td>
</tr>
</tbody>
</table>

Note: The comments column indicates the specific details about the tires and their performance.
<table>
<thead>
<tr>
<th>Company Name</th>
<th>Tire Description</th>
<th>Construction</th>
<th>Tire Size</th>
<th>Company-Certified Speed Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>mph</td>
<td>km/h</td>
</tr>
<tr>
<td>Armstrong</td>
<td>Pursuit 70, Bias Ply</td>
<td>Nylon</td>
<td>G70-15</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>200</td>
</tr>
<tr>
<td>Dunlop</td>
<td>RS Patrol</td>
<td>Nylon</td>
<td>G, H78-15</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td>Elite RS Patrol</td>
<td>Polyester/Kevlar/</td>
<td>HR 78-15</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nylon</td>
<td></td>
<td>200</td>
</tr>
<tr>
<td>Firestone</td>
<td>Super 125, Bias Ply</td>
<td>Nylon</td>
<td>G, H78-15</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td>Super 125, Radial</td>
<td>Polyester/Kevlar</td>
<td>HR78-15</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>200</td>
</tr>
<tr>
<td>Goodrich, B. F.</td>
<td>Pursuit Radial</td>
<td>Rayon</td>
<td>GR, HR, JR70-15</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>200</td>
</tr>
<tr>
<td>Goodyear</td>
<td>Police Special Bias</td>
<td>Nylon</td>
<td>G, H, J78-15</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td>Ply</td>
<td>Polyester/</td>
<td></td>
<td>200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fiberglass</td>
<td>G, H, L78-15</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>DR70-14;GR, HR70-15</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>200</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>HR, JR, LR78-15</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>200</td>
</tr>
<tr>
<td>Michelin</td>
<td>Radial</td>
<td>Steel</td>
<td>205 HR14 XVS</td>
<td>130</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>215 HR15 XVS</td>
<td>130</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>210</td>
</tr>
<tr>
<td>Pirelli</td>
<td>Radial</td>
<td>Steel</td>
<td>215-15 (HR78-15)</td>
<td>130</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>235-15 (LR78-15)</td>
<td>130</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>210</td>
</tr>
</tbody>
</table>
August 8, 1974

Mr. Carlos Garza
Office of Standards Enforcement
National Highway Traffic Administration
Department of Transportation
#2100 Second Street, S. W.
Washington, D. C. 20590

Dear Mr. Garza:

The Alabama Department of Public Safety has run a survey of the Firestone tires which the troopers have been using for the past seven months and the following facts are noted. There was a total of 19 Firestone tires HR 70 x 15 issued throughout the state with a total of 20 failures. The serial number of these failures was VCU 7 VHU 303 with a total of 14 failures. One of these involved an accident in which one of our troopers was killed. The other HR 70s that failed were two (2) with a serial number VCU 7 VHU 293.

The other tire that we've had a good many failures with was the Firestone HR 78. The serial number VDVY FNJ 443 series had nine (9) failures, the VDVY FNJ 373 had five (5) failures, the VDVY FNJ 313 had five (5) failures, VDUY FNR 353 (2) failures, VDVY FNR 383, two (2) failures and several other serial numbers with one failure.

What we consider failures are blowouts, bubbles in tires, blisters, and separations.

We are sending the two testing laboratories tires with VCU YHU 303, HR 70, VDVY FNJ 373, HR 78, VDVY FNJ 443, HR 78, VDVY FNG 313, HR 78 and VBU 9 XMV 053, JR 70 numbers. These tires should be shipped to the testing laboratories the latter part of this week.

We hope to have some results from the testing laboratories in the next few weeks.

I trust this is the information you needed. If I can be of further assistance, please give us a call.

Sincerely yours,

W. J. Smith, Lieutenant
Planning and Research Unit

WJS/kh
Vehicle #1 was traveling South on I-65 at a high rate of speed. Approximately 100 to 110 miles per hour. The right rear tire on vehicle #1 blew out. Vehicle #1 traveled 600 feet on the pavement after the tire blew out leaving rubber on the pavement from the ruptured tire. At this point the driver lost control and skidded into the grass median. Vehicle #1 careened up side down, after skidding and overturning for 300 feet. The vehicle overturned two and one half times.
2.30 miles South to Evergreen

I-65

Paved Shoulder

Right rear tire blew out here

Paved Shoulder

Grass Median

Paved Shoulder

Paved Shoulder

Diagram Scale 1 inch = (20 feet)
(10 feet)

Location  Interstate # 65
2.30 miles South to Evergreen in Conecuh County

Signature of Reporting Officer(s)
Sgt. J. T. Smalley

Badge No.  904

Reporting Police Agency  Alabama State Troopers

Time  1:40 P.M.

DATE  Month 05  Day 27  Year 71
MEMORANDUM

To: Staff

From: Lieutenant Harold Hammond

Sub: Tire Failure-Perry County, Florida Sheriff's Office

As a result of a news article found in the August 8, 1974 issue of the Perry News-Herald reporting the death of Taylor County Deputy Sheriff Victor J. MacDonald on Sunday August 4, 1974, Sheriff Maurice Linton was contacted for further details (Area Code 904, 584-4225).

According to reports, Deputy MacDonald was out of his patrol vehicle at a service station when a speeding car went by on US-19. The deputy ran to his patrol car and pursued the car at speeds in excess of 100 MPH. The road was wet during the pursuit but no rain was falling at the time. Sheriff Linton reported that the tread on the right rear tire separated from the body of the tire and "rolled into a ball". The tire was a Goodyear steel-guard radial and had been mounted on the patrol car on July 26, 1974. The sheriff estimated that the tire had less than 2,000 miles on it at the time of the failure. The sheriff said a combination rollbar and shield kept the car's top up even though the car overturned several times. He was of the opinion that the deputy would have lived if he had fastened his seatbelt and remained in the car. He stated the department planned no action against Goodyear Tire and Rubber Company but he believed the deputy's family planned legal proceedings.

An insurance adjustor had attempted to secure the tire which failed for the purpose of returning it to Goodyear for tests. Instead the sheriff has released the tire to the Florida Highway Patrol with the understanding that they permit an independent laboratory to inspect it and issue a report.

The sheriff was unable to advise how many Goodyear tires were in service on the wrecked vehicle and also he stated his department had no established regulation governing tire air pressure. The amount of air pressure required is determined by the driver of the vehicle.

HJH/ggb
DEATH CAR....Pictured above is the car in which Taylor County Deputy Sheriff "Skip" MacDonald went to his death Sunday night after the car blew a tire as MacDonald pursued a speeder on US 10 South.

'Skip' MacDonald Dies In Crash Sunday Night

Taylor County Deputy Sheriff Victor J. "Skip" MacDonald died instantly of head injuries received Sunday evening when his patrol car overturned after blowing a tire as the deputy pursued a speeding motorist at more than 100 miles per hour on US 10 south of Salem.

Witnesses said MacDonald was at a service station in the area when the speeding vehicle went by and that he hurried to his parked cruiser to give chase.

The blowout was caused, it was reported, by separation of the tread of a rear tire. Sheriff Maurice Lanton said Monday that the tire in question had been put on the car only about two weeks before the accident and that he was unable to understand its failure.

"MacDonald's car turned over several times it was reported. The officer died instantly of "massive head injuries" it was reported."
MICHELIN ROADABILITY TEST

On April 3, 1968, handling tests were conducted with two 1966 Dodge Class A vehicles equipped with the Michelin Radial Tires. One vehicle had zero camber; the other negative. The testing location consisted of turns of varying radii and corresponding speeds.

Testing began with air pressures of 36 p.s.i. At approximately 20 miles of testing, tread chunking at the outer edges of the front tires appeared. With both camber settings, there was an extreme understeer characteristic until cornering forces became such to cause the tire to roll upon the sidewall. At this point, extreme oversteer took place.

Air pressures were reduced to manufacturers recommendation of 27 p.s.i. and testing duplicated. Handling was the same as with the higher pressures except that the lag between understeer and oversteer was shorter.

With both air pressures at speeds of 90 to 100 m.p.h., the tires caused a lateral oscillating effect.

Tire spin on acceleration in tight turns was minimal indicating good rectilinear cohesion.

At the conclusion of testing, an inspection of the tires indicated excessive tire tread "chunking" and sidewall wear.

AUTHOR'S NOTE:

The model of tire used in these 1968 tests are no longer in production, according to the Michelin Corp. Current model Michelin standard grade, steel belted radial tires were included in the DOT tests summarized in Table 1a.
Training Division

As instructed, the Academy has completed testing of Firestone steel radial tires.

The tires, two sets of HR 78-15 Steel Belt Radial 500's and one set of HR 70-15 Steel Belt Radial V1's, have been returned to Motor Transport Section.

All testing was conducted on the Academy high speed course in the presence of Mr. F. W. Weller, Firestone Tire and Rubber Company. Prior to testing, each set of tires was driven a minimum of 50 break-in miles at normal highway speeds.

The results of our tests are as follows:

**Firestone Steel Radial 500-HR 78-15**

Testing was conducted on September 26, 1973. The tire is 4 ply (2 polyester - 2 steel) with 2 ply polyester side walls. Tire pressures were at factory specification - 32 p.s.i.

The handling characteristics of the tires were erratic with predominant understeer. This is typical with radial tires during hard cornering. Chunking occurred at the outer shoulder of the right front tire after 14 miles of testing.

**Firestone Steel Radial V-1-HR 70-15**

Testing was conducted on October 1, 1973. The tire is 7 ply (6 rayon - 1 steel) with 2 ply rayon side walls. Tire pressures were at factory specification - 32 p.s.i.

The handling characteristics were typically erratic with radial tires although improving with wear. The tires were tested for 40 miles without the presence of abnormal wear or failure. Testing was terminated with the appearance of a chunking about the size of a quarter on the right front tire. This was probably caused by a stone cut, but could be a separation at the tire splice point. The tire is far superior to other radial tires tested by our staff to date.
Firestone Steel Radial 500-HR 7R-15

Testing was conducted on October 4, 1973. The tire is identical to the steel radial 500 tested on September 25, 1973. Tire pressure was increased to 36 p.s.i. for this test.

Handling characteristics were the same as previous tests. Chinking appeared after 10 miles.

Attached are photographs taken of the tires after testing.

H. D. FARGO, Captain
Commander

Enclosure
Academy
July 24, 1973
31.6176.A2820
PIRELLI CINTURATO CN 75
RADIAL TIRF TEST

Skill Development Unit

On July 17 and 19, 1973, the E.V.O.C. staff conducted a series of tests designed to evaluate the handling characteristics and durability of the Pirelli Cinturato CN 75 radial tire. The tire is a 4 ply tread, 2 rayon, 2 steel, with 2 ply, rayon sidewall.

The tires used in the evaluation were mounted on a 1972 Dodge Polara, (B8655) assigned to the Academy E.V.O.C. unit as a high speed training vehicle. The tires were mounted by Jack's Shell and the front end aligned by Swift Dodge to specifications requested by the Bruces Tire Company.

After 60 miles of street driving the tires were subjected to high speed testing on the E.V.O.C. course. Twelve laps were completed counterclockwise. The first 5 laps were at moderate speeds with the last 7 laps at high speeds. At the completion of the 12th lap (18 miles) the right front tire was warped to the point of being unusable. The right front tire was replaced and testing continued. At the end of 13-1/2 laps clockwise the entire tread peeled off the casing of the left front tire. This occurred as the vehicle entered a constant radius turn to the right at a speed of 100 mph. The tire failure caused the vehicle to leave the roadway at this point. Total mileage on the 5 tires was 120 miles.

The tires were inflated to 36 p.s.i. as specified by Bruces Tire Company. The handling characteristics was completely unsuitable for enforcement driving purposes. If moderate to hard acceleration was attempted while hard cornering, excessive understeer occurred. If no acceleration was attempted an exaggerated oversteer was present.

Although one tire warped and another separated, it was noted that no chunking of the outer tread was present, as has been the case with some previous radial tires tested.
The consensus of the two test drivers is that the Pirelli Cinturato CN 75 radial tire is unpredictable performance-wise and lacks the durability to be effective on enforcement vehicles.

J. R. McDaniel, I.D. #6176
State Traffic Officer
SUBJECT: Accident Involving Trooper T. L. Sullivan - FHP-1047 - 9/24/73

TO: Colonel J. E. Beach, Director

ATTENTION: Major W. R. Kaufman

Please find attached complete investigation by Sergeant T. A. Pace on an accident involving Trooper T. L. Sullivan while operating FHP-1047.

Trooper Sullivan was responding to a call to assist Trooper R. W. Aderholt who had received a "hit" on an automobile from NCIC and this car was occupied by five runaways. Trooper Sullivan was proceeding south on SR-93 at approximately 100 MPH when his left rear tire, Firestone Steel Belted Radial HR-70 completely separated from the tread but did not lose all its air, causing Trooper Sullivan to lose control. He skidded sideways through the median strip, across two northbound lanes, at the emergency strip started turning over and turned over four times, coming to rest upon a fence against a small tree on his side, driver's side down. Trooper Sullivan has a broken right leg and is now confined to the Alachua General Hospital and in all probability will be off about three months.

I personally went to the scene before Trooper Sullivan was placed in the ambulance and observed all the evidence at the scene and it is my opinion that the entire cause of the accident was the Firestone tire separating at high speed.

FHP-1047 was a total loss and attached find three bids for salvage and I recommend we accept Mott Chrysler Plymouth, Inc. Live Oak, Florida, bid for $300.00 for this wrecked vehicle.

We have not received a written statement from Trooper Sullivan because of his injury but will get one.
Accident Involving Trooper T. L. Sullivan - FHP-1047 - 9/24/73

when he is able and a homicide report will follow.

As Trooper Sullivan was enroute to assist another trooper in the performance of his duties, I do not feel he was negligent and recommend no disciplinary action whatsoever.

T. C. Hodges
T. C. Hodges, Captain
Commander - Troop B

TCH/fg
Encls.
Subject: Accident involving FHP # 1047
Trooper T. L. Sullivan, ID # 586

To: Captain T. C. Hodges

VIA: Lieutenant J. E. Love

On Monday, 9/24/73, at approximately 7:45 A.M., I was advised that Trooper T. L. Sullivan had been involved in an automobile accident. Upon arriving on the scene and completeing an investigation of the accident, I found the following had occurred.

Trooper R. W. Aderholt requested the FHP Station to check for wanted on a Georgia tag, LAR715. The Station advised Trooper Aderholt the car was wanted and should be occupied by several runaways.

Trooper Sullivan, upon hearing this radio transmission, advised the Station that he was enroute to assist Trooper Aderholt. Trooper Sullivan was proceeding south on SR # 93 (I-75) at a high rate of speed when the left rear tire on FHP 1047 completely separated, causing Trooper Sullivan to lose control of his vehicle. Trooper Sullivan skidded across the median and north bound lanes of SR # 93, before turning over four times.

My investigation revealed that while speed was a factor, the major cause of this accident was a defective tire.

Due to Trooper Sullivan responding to a call for assistance from Trooper Aderholt, I do not feel he was negligent in any way.

T. A. Pace, Sergeant
Troop B - Lake City
## Florida Traffic Accident Report

**Date:** 9/24/73  
**Location:** Columbia, None  
**Type of Accident:** Dr. Sedan  
**Vehicle License Plate No.:** FLIP-1047  
**Owner:** Dories Paint & Body  
**Driver:** Trooper  
**Reported To: Florida Highway Patrol, Tallahassee, Florida  
**Driver's License Number:** S4158124134722  
**OCCUPANTS:** None  

### Details

**DECLARATION:** The undersigned understands the provisions of Chapter 316, Revised Statutes of Florida, and declares that the information contained herein is true and correct.

**Signature:** L. A. Lee  
**Rank:** S-97  
**Department:** PHP  
**Date:** 9/24/73

### Accident Summary

- **Year:** 1973  
- **Make:** Dodge  
- **Type:** Dr. Sedan  
- **License Plate No.:** FLIP-1047

### VEHICLE 1

- **OCCUPANTS:** None
- **Driver:** Trooper  
- **License Number:** S4158124134722

### Accident Details

- **Total Motor Vehicles Involved:** 15
- **Damage Scale:** 3
- **Amount:** $3500.00
- **Vehicle Removed:** Yes
- **Owner:** Dories Paint & Body
- **Driver:** Trooper

### Florida Highway Patrol

- **Address:** Rt. 6 Box 678, Lake City, Florida 32055
- **Sgt. Neil Kirkman Bldg., Tallahassee, Florida**

### Florida Department of Transportation

- **Address:** Lake City, Florida 32055
- **Sgt. L. A. Lee**

---

**Note:** This document contains information on the traffic accident, including details about the vehicles involved, the accident scene, and the responsible parties.
Vehicle #1 traveling south on SR #93 at a high rate of speed. The left rear tire came apart causing the driver to lose control. Vehicle #1 skidded 295' across median, 100' more across northbound lanes of SR #93 and then 196' turning over four times and came to rest on left side heading east.

**VEHICLE DEFECTS:** Defective Tires.

**WHAT VEHICLES WERE DOING BEFORE ACCIDENT**

<table>
<thead>
<tr>
<th>VEHICLE No. 1</th>
<th>Traveling On SR #93</th>
<th>M.P.H.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Approximately 100</td>
<td>M.P.H.</td>
</tr>
</tbody>
</table>

**WHAT PEDESTRIAN WAS DOING**

<table>
<thead>
<tr>
<th>PEDESTRIAN was</th>
<th>Walking or Slowly Walking</th>
<th>Color of Clothing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Slowed or Stopping</td>
<td>Dark</td>
</tr>
</tbody>
</table>

**ACCIDENT CHARACTERISTICS**

<table>
<thead>
<tr>
<th>LIGHTING CONDITION</th>
<th>ROAD DEFECTS</th>
<th>TRAFFIC CONTROL</th>
<th>TRAFFIC LANE</th>
<th>TRAFFIC CHARACTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>1</td>
</tr>
</tbody>
</table>

**WITNESSES OTHER THAN OCCUPANTS**

- Wilkin Robbins Jr., 123 Bullock St., Apt. 133, Atlanta, Ga.
- Earl Snowden, Rt. 5 Box 243, Lake City, Florida

**LAKE CITY RESCUE SQUAD**

**LAKE SHORE HOSPITAL/LAKE CITY RESCUE UNIT**

**ARREST**

None

**POSSIBLE INJURED PEOPLE**

Yes

** chemical test: **

- Yes

**test results: **

- Yes
The G70-15 High Speed Pursuit 70 in a 4 ply nylon construction was tested on Armstrong's extended version of the FMVSS 109 stepped high speed wheel test.

Each of three tires tested achieved 1/2 Hr. @ 125 MPH without failure.

The wheel test conditions were as follows:

1) 30 PSI cold inflation pressure at start of test.
2) Constant 1,380 Lbs. Load throughout test.
3) Wheel room temperature of 100°F.
4) Speeds:
   1 HR. @ 50 MPH (Break-In)
   1/2 HR. @ 75 MPH
   1/2 HR. @ 80 MPH
   1/2 HR. @ 85 MPH
   - - - - FMVSS 109 Minimum
   Then increase the speed 5 MPH for each succeeding half hour test increment.

I would like to add that in any comparison between indoor wheel and road high speed testing, the wheel testing must be considered, by far, the most severe due to the high ambient temperature required and lack of air circulation.

Outdoor track testing is forthcoming and these results will be forwarded to you upon receipt.

A.R. Colborne
Project Engineer, Research & Development
June 4, 1975

Mr. Jared J. Collard
Standards Lab
National Bureau of Standards
Washington, D. C. 20234

Dear Mr. Collard:

Enclosed is the certificate of Dunlop Elite RS Radial Patrol tire and specifications. This letter and the information attached has been sent to the various state agencies interested in this tire.

We also have a G78-15 and H78-15 nylon 4 ply Dunlop RS Patrol certified for 125 miles per hour of sustained speeds.

If any other information is necessary, please contact me.

Very truly yours,

DUNLOP TIRE AND RUBBER CORPORATION

B. P. Klyza, Assistant to the Senior Vice President

BPK/bb

Encls.
CERTIFICATION OF TESTING AND TEST RESULTS

STATE OF TEXAS  X
COUNTY OF REEVES  X

That on this 16th day of July, 1974, personally appeared before me, a Notary Public, in and for said County and State, VICTOR F. SPRINGER, known to me to be the President of the Corporation that executed the foregoing instrument, who upon oath did depose that he is the Officer of said Corporation as above designated; that he is acquainted with the seal of said Corporation and that the seal affixed to said instrument is the Corporation seal of said Corporation; that the signature to said instrument was made by the Officer of said Corporation as indicated after said signature; that the same Corporation executed the said instrument freely and voluntarily and for the uses and purposes therein mentioned.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year in this certificate first above mentioned.

SEAL

______________________________
LETHA E. COATS, NOTARY PUBLIC
IN AND FOR REEVES COUNTY, TEXAS
I hereby certify that the tests reported below were conducted at Automotive Proving Grounds Incorporated on July 13, 1974.

Tires were two (2) Dunlop Radial HR78-15, Identified as EAVYAA 1204, Numbers Bl & B2.

Tests were conducted under the following conditions:

1. Test tires on two front wheels of vehicles
2. Cold Inflation - 30 psi
3. Load - 1510 lbs per tire
4. Rim - 6.50 JJ
5. Test Surface - Automotive Proving Grounds High Speed Track
6. Break-in - 54 miles @ 60 MPH
7. Test - 54 miles @ 90 MPH
   - 54 miles @ 105 MPH
   - 54 miles @ 115 MPH
   - 50 miles @ 125 MPH

The test was conducted under the above conditions on the (9) nine mile asphalt test track located at Automotive Proving Grounds, Incorporated, Pecos, Texas.

This track was built for testing of tires and was constructed to simulate turnpike conditions.

At the end of the test, the tires were inspected and no visible defects or failures of any nature could be found.

Ambient temperature for the tests was 73°F at start and 81°F at finish.

The tachograph chart made during the test is attached.

SEAL

Signed: __________ (signature)  
Victor F. Springer, President
April 1, 1975

Mr. Jared J. Collard, Acting Mgr.
Police Vehicle Programs
Law Enforcement Stds. Laboratory
Room B-150, Physics Building
National Bureau of Standards
Washington, D.C. 20234

Dear Mr. Collard:

Our Washington Office has referred your inquiry concerning the sizes and types of tires which Firestone has certified as suitable for high speed patrol and pursuit tire application to us. These are listed below. Those sizes and types listed in Group 1 were sent to you attached to my letter of January 22, 1975. Group 2 lists additional sizes and types certified for this usage since my letter and Group 3 lists additional sizes which are in process of being tested. The latter will be certified when successful tests are completed.

<table>
<thead>
<tr>
<th>Size</th>
<th>Description</th>
<th>Cord Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1. HR78-15</td>
<td>Super 500 Radial Tubeless</td>
<td>Polyester/Kevlar</td>
</tr>
<tr>
<td></td>
<td>G78-15</td>
<td>Super 500 Sup-R-Belt Tubeless</td>
</tr>
<tr>
<td></td>
<td>H78-15</td>
<td>Super 500 Sup-R-Belt Tubeless</td>
</tr>
<tr>
<td></td>
<td>G78-15</td>
<td>Super 500 Nylon Tubeless</td>
</tr>
<tr>
<td></td>
<td>H78-15</td>
<td>Super 500 Nylon Tubeless</td>
</tr>
<tr>
<td></td>
<td>J78-15</td>
<td>Super 500 Nylon Tubeless</td>
</tr>
<tr>
<td>Group 2. HR78-15</td>
<td>Super 125 Radial Tubeless</td>
<td>Polyester/Kevlar</td>
</tr>
<tr>
<td></td>
<td>JR78-15</td>
<td>Super 125 Radial Tubeless</td>
</tr>
<tr>
<td></td>
<td>GR70-15</td>
<td>Super 125 Radial Tubeless</td>
</tr>
<tr>
<td></td>
<td>G78-15</td>
<td>Super 125 Nylon Tubeless</td>
</tr>
<tr>
<td></td>
<td>H78-15</td>
<td>Super 125 Nylon Tubeless</td>
</tr>
<tr>
<td>Group 3. FR70-14</td>
<td>Super 125 Radial Tubeless</td>
<td>Polyester/Kevlar</td>
</tr>
<tr>
<td></td>
<td>HR70-15</td>
<td>Super 125 Radial Tubeless</td>
</tr>
<tr>
<td></td>
<td>LR78-15</td>
<td>Super 125 Radial Tubeless</td>
</tr>
</tbody>
</table>

The Super 125 Radial line has recently been announced. Attached is a news release covering this line.

Very truly yours,

A. J. DiMaggio
QUALITY ASSURANCE

AJD:3
att.
April 10, 1975

FIRESTONE DEALERS AND STORES:

SUBJECT: USE OF NORMAL RADIAL PASSENGER CAR TIRES AS HIGH SPEED "Pursuit" TIRES

The National Highway Traffic Safety Administration and the Law Enforcement Assistance Administration have recently cautioned against the dangerous practice of some highway patrol police organizations using normal radial passenger car tires in extra-legal high speed "pursuit" driving. Firestone concurs in this caution and re-emphasizes the following to its stores and dealers who sell tires to local governmental organizations.

Most tires procured by government agencies will be used in normal passenger car service. In such case, our Steel Radial 500 tire represents the most economical all-purpose tire for this application. However, the Steel Radial 500 is not a "pursuit" tire. In the interest of safety, it should be confined to speeds under 100 mph where permitted by local law. When used at extra-legal speeds, it is imperative that cold tire inflation pressures be maintained daily at 32 PSI.

Emergency vehicles, such as highway patrol police vehicles which are customarily required to drive at speeds in the 100 mph to 125 mph range, should always be equipped with manufacturer's certified "pursuit" tires. The following three (3) tires are certified by Firestone as "pursuit" tires and should be used exclusively in such application:

- Super 125 Nylon (Previously Super 500 Nylon)
- Super 125 Radial (Previously Super 500 Radial)
- Super 500 SRB (Now discontinued)

As it is impossible to know whether tires sold to police organizations will be mounted on vehicles employed in routine police service, or as extra-high speed "pursuit" vehicles, we have advised all stores and dealers that effective January 21, 1975, they may sell only manufacturer's certified "pursuit" tires to police organizations.

Special attention should be given to cases in which the procurement is of a general nature, but there is a possibility that some of the tires procured will or may be used on police pursuit or other emergency vehicles. In such cases, the above information should be carefully reviewed with the governmental procurement office or purchasing agent with a view to obtaining the correct tire for the specific use or application intended.

(over)
Customers who have purchased radial passenger car tires for a use which may not be proper under the above guidelines should be contacted and advised to remove such tires from emergency vehicles and place them on normal passenger service vehicles belonging to their organization. You should then attempt to sell them one of the two Super 125 "pursuit" tires listed above for emergency vehicles use. You should also re-emphasize to all of your customers the necessity of daily maintenance of cold tire inflation pressures at 32 PSI for driving at extra-legal speeds. This will be particularly critical during the forthcoming Summer months.

If you have any questions on the above, please contact your district manager or district truck tire manager.

THE FIRESTONE TIRE & RUBBER COMPANY
B.F.GOODRICH TIRE COMPANY RECOMMENDS PURSUIT RADIAL, STOCK SERIES 302, FOR USE ON ALL TYPE POLICE VEHICLES

B.F.Goodrich Tire Company manufactures three sizes of Pursuit Radial Tires: Sizes GR, HR, and JR70-15. These tires are constructed of rayon belts and carcasses and have been tested and certified to be capable of driving up to 125 MPH.

B.F.Goodrich Tire Company strongly recommends that no other tire, bias, bias belted or radial steel, be offered for use on Police vehicles where the operator could be caused to drive that vehicle in excess of 100 MPH.

W. A. Kester,
Director of Field Sales

TAKE FOLLOWING ACTION

1. File in P&PM
2. Keep until Revised
3. File in your Manual Passenger Section After Page
4. Remove from the following:

B.F.Goodrich Tire Company
a Division of The B.F.Goodrich Company
GOVERNMENT WARNS POLICE: USE ONLY HIGH SPEED TIRES ON PURSUIT VEHICLES

Steel belted radial passenger tires recently received national news coverage when statements were issued by both the Department of Justice and the Department of Transportation. Highlights of the statements are:

1. A number of accidents, including two fatalities, have recently resulted when steel belted radials failed during pursuit in excess of 90 miles per hour. (No B.F.Goodrich tires are involved.)

2. Police agencies should purchase only tires designed for high speed pursuit for patrol vehicles that exceed 90 miles per hour.

3. Steel belted radials, in consumer use, "provide superior performance in many aspects of vehicle handling and tire durability."

B.F.Goodrich Recommendation

The B.F.Goodrich recommendation was originally stated in Product and Price Bulletin 74-65 sent to all retailers in mid-1974. This recommendation is emphasized as follows:

"B.F.Goodrich Tire Company manufactures three sizes of Pursuit Radial Tires (stock series 302-): sizes GR, HR, and JR 70-15. These tires are constructed of rayon belts and carcasses and have been tested and certified to be capable of driving up to 125 mph."

"B.F.Goodrich Tire Company strongly recommends that no other tire, bias, bias belted, or radial steel, be offered for use on police vehicles where the operator could be caused to drive that vehicle in excess of 90 mph."

B.F.Goodrich Tire Company

TAKE FOLLOWING ACTION


3. File in your Manual Section After Page

4. Remove from the following:

B.F.Goodrich Tire Company

a Division of The B.F.Goodrich Company

LITHO IN U.S.A.
June 5, 1975

United States Department of Commerce
National Bureau of Standards
Washington, DC 20234

Attention: Jared J Collard, Acting Manager
Police Vehicle Program
Law Enforcement Standards Laboratory

Subject: High Speed Tires
for Police Vehicles

Gentlemen:

In reply to your letter of May 30, 1975 to Mr J W Timmons of our company, we are furnishing the information requested on police tires manufactured by Goodyear.

Following is a list of available police tires which, at this time, we have tested and certified up to a minimum speed of 125 mph.

I. Bias Type (Rib Design)

<table>
<thead>
<tr>
<th>Size</th>
<th>Brand Name</th>
<th>Construction</th>
<th>Certified Speed Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>G78-15</td>
<td>Police Special Nylon</td>
<td>4 plies nylon body</td>
<td>125 mph</td>
</tr>
<tr>
<td>H78-15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J78-15</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

II. Bias Belted Type (Rib Design)

<table>
<thead>
<tr>
<th>Size</th>
<th>Brand Name</th>
<th>Construction</th>
<th>Certified Speed Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>G78-15</td>
<td>Police Special Polyglas</td>
<td>4 plies polyester body + 2 fiberglass belts</td>
<td>125 mph</td>
</tr>
<tr>
<td>H78-15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L78-15</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### III. Radial Tires (Rib Design)

<table>
<thead>
<tr>
<th>Size</th>
<th>Brand Name</th>
<th>Construction</th>
<th>Certified Speed Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR70-14</td>
<td>Police Special Radial</td>
<td>2 plies polyester body + 4 rayon belts</td>
<td>125 mph</td>
</tr>
<tr>
<td>GR70-15</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>HR70-15</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>HR78-15</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>JR78-15</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>LR78-15</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
</tbody>
</table>

In addition to the above rib design tires, a line of winter tread tires is also available, which have been tested and certified up to a minimum speed of 115 mph which is the standard test for Goodyear.

Note: All of the above listed rib and winter tires are supplied in load range B (4 ply rating) construction.

Enclosed is a brochure covering our police special line of tires which provides engineering data for each size.

Very truly yours,

C T Wig

Manager
Government Sales Department

C T Wig
evk
This is to certify that the following Michelin radial steel-belted tires are designed for maximum speeds up to 130 mph and for handling performance as required in applications such as police pursuit cars.

<table>
<thead>
<tr>
<th>Tire Size Designation</th>
<th>Rims</th>
<th>Overall Width</th>
<th>Overall Diameter</th>
<th>Loaded Radius</th>
<th>Mile Load</th>
<th>Revs</th>
<th>Max. Tube PSI</th>
<th>Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>205HR14XVS</td>
<td>5, 5½, 6, 6½, 7, 7½</td>
<td>8.2</td>
<td>27.0</td>
<td>12.2</td>
<td>773</td>
<td>1730</td>
<td>36 14H913</td>
<td></td>
</tr>
<tr>
<td>215HR15XVS</td>
<td>5, 5½, 6, 6½, 7, 7½</td>
<td>8.6</td>
<td>28.5</td>
<td>13.1</td>
<td>726</td>
<td>1860</td>
<td>36 15H913</td>
<td></td>
</tr>
</tbody>
</table>

JBW:abb
April 2, 1975

PIRELLI TIRES CERTIFIED FOR POLICE USE

Pirelli makes available tires certified for Police use in sizes 215-15 (replaces HR78-15) and 235-15 (replaces LR78-15). The tires are suitable for applications requiring high speed capabilities, such as Police Pursuit cars, and have:
- black sidewall
- load range B
- max. air pressure 32 P.S.I.
- max. speed rating 130 M.P.H.
Two police fatalities and one permanent disability have been caused by catastrophic failures of steel belted radial ply tires during high speed police operations. More than 200 other failures were reported by one State highway patrol department. The report recommends that police departments use caution in selecting tires for patrol cars, and that tire manufacturers be required to provide evidence that the tires sold for police use have been tested and certified at speeds of at least 125 miles per hour.