

**MOTOR CARRIER INDUSTRY PROFILE:
SAFETY PERFORMANCE DIFFERENCES AMONG MAJOR SEGMENTS**

**PROJECT TITLE:
MEASURING EXPOSURE IN THE DIVERSE MOTOR CARRIER INDUSTRY**

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May 2000**

**Prepared for the
Federal Motor Carrier Safety Administration
U.S. Department of Transportation
Washington, D.C.
DTFH61-98-X-00006**

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Introduction

This report is the result of a contract (Measuring Exposure in the Diverse Motor Carrier Industry) between the Federal Highway Administration and the Supply Chain Management Center of the Robert H. Smith School of Business. The report constitutes a profile of the safety performance of the motor-carrier industry and its significant operating segments. The measurement of carrier safety performance relies on the motor carrier safety status (SafeStat) analysis methodology developed to support an improved process for motor carrier safety fitness determination for the Federal Highway Administration's (FHWA) Office of Motor Carrier and Highway Safety.¹

The SafeStat methodology provides a number of safety performance indicators based on the results of a carrier's roadside inspections, compliance reviews (CRs), enforcement cases, and crashes. This study evaluates the performance of motor carriers grouped into individual segments based both on type of operation (for-hire and private) and major commodity handled. Each segment is compared across a series of individual performance measurements. The report includes both an overall summary section comparing across all the individual segments as well as a separate discussion of the safety performance of each individual segment.

The study draws on SafeStat data compiled in September of 1998 and covering all available data on carriers included in the Motor Carrier Census file. In total, over 400,000 individual carriers are reviewed. Most carriers have incomplete safety records. The results reported here include all available safety performance information from the entire set of motor carriers included in the Census file. Careful documentation is included on the number of observations that form the basis of the reported safety performance measures. There is wide variation across the segments and across the measures in the number of observations. As a result, there are instances in which the reported results are not robust due to an inadequate number of observations.

The report provides a systematic review of motor carrier safety performance across a wide variety of specific dimensions in all the major motor carrier segments. There is specific emphasis on the differences in safety performance between for-hire and private carriers as well as an emphasis on differences across commodity-based segments. It is anticipated that the identification of good safety performance will constitute a basis for further examination of the specific policies and procedures of each segment's safety leaders. Establishing the reference points of safety leaders will assist in efforts by other carriers in each segment to enhance their safety performance.

¹ Volpe National Transportation Systems Center, Economic Analysis Division, **SafeStat: Motor Carrier Safety Status Measurement System**, Methodology: Version 6.1, Cambridge, Mass., October 1998, Prepared for Federal Motor Carrier Safety Administration.

Overall Safety Performance Results

Introduction

This section provides a summary of the safety performance of carriers across all the individual segments in the industry. It includes summaries for both for-hire and private carriers, respectively, in each segment and is drawn from measures that are collected as part of the SafeStat algorithm. The summary discussion is divided into three sections and gives results for the private and for-hire firms, separately, across all the segments. The initial section compares the industry's segments (for-hire and private firms separately) based on the overall Compliance Review (CR) data for a carrier's most recent review, regardless of when it occurred. There is a separate comparison across the industry's segments for only those CRs conducted in the 18 months prior to the development of the database (July 1998). The second section compares across the industry's segments the detailed components of CRs conducted in the 18-month period prior to the database construction. Finally, there is an overall perspective of driver and vehicle safety performance, based on CR results and roadside inspections, across the industry's segments.

Overall Compliance Review Summary Results

Figure 1 in Appendix A summarizes the results of the most recent CRs for the for-hire and private carriers in each of the industry's segments. In six industry segments, over 70 percent of the for-hire carriers received a satisfactory rating on their most recent CR. The industry segments involved are: building materials, moving/household goods, general freight (including both TL & LTL), intermodal freight, passenger freight, and tank truck operations. In sharp contrast, among the private carriers, only those in the tank segment had over 70 percent of the rated carriers receiving a satisfactory score on their most recent CR. Furthermore, in eight industry segments, private carriers had over 30 percent of the rated firms receiving a conditional score on their most recent review. The segments with private carriers having a high percentage of firms obtaining conditional ratings include: building materials, moving/household goods, general freight, heavy equipment, produce, intermodal, passenger, and bulk commodities. In contrast, the only segment in which at least 30 percent of the for-hire firms received a conditional score is the tank carrier segment. Finally, there were only three industry segments in which 10 percent or more of the firms received an unsatisfactory rating on their most recent CR. These segments, all involving private carriers, are moving/household goods, heavy equipment, and passenger freight.

Figure 2 in Appendix A summarizes results from only those CRs conducted in the 18 months (January 1997 - June 1998) prior to the development of the database. These recent CRs reflect a concerted effort to target at-risk carriers in the CR process. Thus, direct comparison of these results with overall CR results should proceed with caution since the most recent CRs should have a higher proportion of unsatisfactory and/or conditional ratings due to targeting of "unsafe" carriers. Indeed, Figure 2 results show very few segments in which 70 percent or more of the carriers received satisfactory ratings, whereas in Figure 1, a number of segments achieved this level of performance. In fact, only firms in the for-hire passenger and private tank segments had 70 percent or more the firms obtaining a satisfactory CR score. Furthermore, the number of segments in which at least 10 percent of the rated firms received an unsatisfactory rating were much higher based on CRs conducted 18 months prior to the database development. When the universe consisted of the most recent CR, regardless of when it was conducted, very few segments met this criterion of poor performance.

Based on results from the CRs conducted in the 18 months prior to the database development, private carriers fared better in comparison to the for-hire carriers than they did on the non time-restricted CRs (Figure 1). In these recent CRs, private firms in six industry segments had at least fifty percent of their reviewed carriers getting a satisfactory rating while for-hire firms in only three segments received this level of satisfactory performance. The private carrier segments are building materials, moving/household goods, general freight, heavy equipment, passenger, and bulk commodities. The for-hire segments are: general freight, heavy equipment, and bulk commodities.

Overall, based on results from CRs conducted in the 18 months prior to the database development, the fall off in performance from the summary of non time-restricted CRs for the for-hire carriers was greater than it was for the private carriers. Based solely on results displayed in Figure 2, the private carriers outperform the for-hire carriers in terms of percentage of firms with satisfactory ratings. However, as noted above, these reported differences may reflect the results of CR targeting rather than reflect fundamental changes in the safety performance of the different segments.

Detailed Compliance Review Results

This section summarizes a set of indices developed from detailed information compiled as part of the CR process. Only data from CRs conducted in the 18 months prior to the development of the database are included in this discussion. The following indices are discussed: the Recordable Crash Rate (RCR), the Driver Safety Review Measure (DRM), the Vehicle Safety Review Measure (VRM), the Safety Management Review Measure (SMRM), and the Enforcement Severity Measure (ESM).

Recordable Crash Rate

The RCR indicates the number of crashes per million VMT as reported in the CR. Results of the performance of the various industry segments on this dimension are displayed in Figure 3 (Appendix A). As shown, there are seven industry segments in which the crash rate exceeds 1.5 recordable crashes per million VMT. Of these seven, five represent private segments and two consist of for-hire carriers. The private carrier segments consist of building materials, heavy equipment, produce, refrigerated, and bulk carriers, while the for-hire segments are building materials and intermodal. At the other end of the spectrum, there are four industry segments in which the average crash rate among firms was less than 1.0. Three of these segments involved private carriers, while only one involved the for-hire carriers. The private carrier segments achieving this low crash rate are moving/household goods, intermodal, and passenger. The only for-hire segment with the low average crash rate is the passenger segment. There is a strong caution, however, in interpreting these results for low crash rates. In each of the three private carrier segments with these low rates, the results are based upon CRs conducted among fewer than twenty carriers. Clearly, this represents an insufficient amount of data to base any generalization upon.

The results displayed in Figure 3 provide evidence supporting the notion that there is a wide variation among the industry segments in terms of recordable crashes per million VMT. In fact, the crash rate varies from a low of 0.13 crashes per million miles to a high of 2.89 crashes per million miles. There is a concentration of high rates among the private firms as evidenced by the five segments in which the private firms averaged 1.5 or more crashes per million VMT.

Driver Safety Review Measure

The DRM is based on the driver-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Figure 4 in Appendix A illustrates the results of the DRM for each of the industry segments based on CRs conducted in the 18 months prior to the development of this database.

Figure 4 provides the percentage of firms in each industry segment (private and for-hire) that had no driver safety violations uncovered during the CR. As shown, there are eight industry segments in which at least 80 percent of the reviewed firms had no driver safety violations. Of these eight segments, seven were private firms, while only one involved for-hire firms. The private firm segments with superior driver records based on CRs are building materials, moving/household goods, general freight, heavy equipment, produce, tank carriers, and bulk materials. The only for-hire segment with similar excellent performance is the passenger carrier group. In sharp contrast to this positive performance, there are two for-hire segments (produce and refrigerated foods) in which 60 percent or less of the examined firms have no driver violations. Furthermore, across all industry segments, the DRM for carriers with violations ranges from an average low of 1.8 to an average high of 15.7. In fact, the segments in which the carriers had the highest average violation score are the for-hire produce and refrigerated foods segments.

These results demonstrate superior performance on the DRM for private segments. The number of segments with over 80 percent of the firms having no driver violations are overwhelmingly concentrated among private carrier segments. At the other end of the spectrum, there are two industry segments (both for-hire firms) in which significant driver problems exist. Thus, on this measure, the private firms exhibit significantly better performance than do the for-hire firms.

Vehicle Safety Review Measure

The VRM is based on the vehicle-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Of all the industry segments, the highest average score for carriers with violations is 2.2.

Consistently across the for-hire and private segments, the overall performance on the VRM is universally strong, as seen in Figure 4 (Appendix A). In most instances, almost all of the reviewed carriers had no instances of critical or acute vehicle violations uncovered during CRs performed in the 18 months prior to the database development. The weakest segments on this measure are the private produce and refrigerated haulers. In these two segments, approximately 1.5 percent of the firms had vehicle violations and, among those with violations, the average score for this measure was approximately 2.0. Otherwise, the performance of carriers on this measure was very strong and almost universally free of violations.

Safety Management Review Measure

The SMRM is based on the safety management-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations

(depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Across all industry segments, the measure for carriers with violations ranges from an average low of 9.0 to an average high of 36.1.

As displayed in Figure 5 in Appendix A, a much higher percentage of firms had one or more safety management violations uncovered during CRs conducted in the 18 month period prior to the database construction in comparison to the percentage of firms with any vehicle violations. Indeed, there were eight individual industry segments in which the percentage of firms with no safety management violations was 50 percent or less. However, seven of these segments involve private carriers and only one consists of for-hire firms. Fifty percent or less of private firms in the building materials, moving/household goods, general freight, heavy equipment, intermodal, passenger, and bulk materials segments had no acute or critical violations of safety management regulations. Only one for-hire segment (moving/household goods) had 50 percent or less of the firms with no safety management violations. In addition, there are five industry segments in which the firms with safety management violations had scores of 30 or more on the Safety Management Review Measure. Four of these segments (building materials, heavy equipment, produce, and bulk products) involve private carriers, while only one (moving/household goods) consists of for-hire firms.

There are five industry segments in which 60 percent of the firms had no safety management violations. Of these segments four involve for-hire carriers, while only one (tank carriers) is comprised of private carriers. The for-hire firms represent the building materials, passenger, refrigerated, and tank segments. Clearly, for-hire firms have significantly higher levels of compliance than do private firms.

Enforcement Severity Measure

The ESM focuses on closed enforcement case data. An enforcement case is the result of one or more major violations discovered during a CR. The enforcement severity measure requires that a carrier has had at least one enforcement case that was initiated and closed within the 30-month period prior to the compilation of the database. The measure combines a time weighting factor for case initiation along with a severity weight (based on the number of the different violations cited in the case) to produce an overall score. Across all industry segments with closed enforcement cases, the average rating is 2.5.

Figure 6 in Appendix A focuses on the percent of firms in each industry segment without any closed enforcement cases. As shown, a very high percentage of all firms in the segments have no closed enforcement cases. However, in eight for-hire segments the level of carriers with no closed cases is less than 80 percent. In contrast, none of the private carrier segments have less than 80 percent of their firms with no closed cases. The for-hire segments that do not meet the 80 percent cutoff level are building materials, moving/household goods, general freight, produce, intermodal, refrigerated, tank, and bulk commodities. In contrast, there are two private carrier segments (intermodal and passenger) in which 90 percent or more of the firms have no closed enforcement cases. Clearly, private carriers have superior performance on the dimension of closed enforcement cases than do for-hire carriers.

Comprehensive Driver and Vehicle Safety Evaluation Results

Figures 7 and 8 in Appendix A report the Driver and Vehicle Safety Evaluation scores (SEA) for each of the industry's segments (for-hire and private carriers reported separately). The Vehicle and Driver SEAs combine data from the roadside inspections with data from the most recent compliance review (if it occurred 18 months prior to compilation of the database). In addition, the Driver SEA includes a moving violation measure (based on moving violation citations issued to a carrier's drivers), where available. The Vehicle and Driver SEAs are converted to a percentile with 100 representing the highest or worst performance. The Vehicle and Driver SEAs are based entirely on inspection data if the carrier had no CR in the period 18 months prior to the database construction. Since most carriers have not had a review in this time period, the Vehicle and Driver SEAs are heavily influenced by roadside inspections.

Across all industry segments, Vehicle SEAs range from an average low of 28.6 to an average high of 64.6. There are seven segments in which the average score on this indicator is 50 or below. Five of these segments involve private firms, while only two consist of for-hire carriers. The leading private segments for the Vehicle SEA are household goods, general freight, produce, refrigerated, and tank carriers segments. The leading for-hire segments are passenger and tank carriers. At the other end of the spectrum, however, there are three segments in which the firms had an average Vehicle SEA of 60 or above. Two of these segments involve private carriers, while one consists of for-hire carriers. The private segments with the worst average Vehicle SEA are heavy equipment and passenger operations. The only for-hire segment with this high level of average score is the intermodal segment. Thus, while there is a concentration of industry segments with low average scores on this dimension among private carriers, there are also several private carrier segments with high scores on this dimension.

Across all industry segments, the Driver SEA ranges from a low of 23.0 to an average high of 65.3. There are six segments in which the average score is 40 or below. Five of these segments are private carrier segments, while only one is a for-hire segment. The leading private carrier segments are building materials, intermodal, refrigerated, tank, and bulk commodities. The only for-hire segment that achieved this threshold level of performance on the driver dimension is the passenger segment. At the other end of the scale, there are two for-hire segments in which the firms had an average Driver SEA of at least 60. These segments are produce and refrigerated products. Indeed, in the Driver SEA, private carriers perform significantly better than do the for-hire firms.

Summary

Overall, this analysis provides an opportunity to compare safety performance in the different industry segments with a special emphasis on performance differences between for-hire and private carriers as well as among the different commodity-based segments. In comparing the performance of for-hire carriers with that of private carriers across the industry segments, there are some mixed signals with private carriers achieving higher safety performance than for-hire carriers on some performance indicators, while the opposite is true on other indicators.

Private carriers have significantly better performance than do for-hire carriers on the Vehicle and Driver SEAs. As noted above on the Vehicle SEA, five of the seven industry segments in which the carriers have an average score of 50 or below are private carriers. Furthermore, five of the six industry segments in which the carriers have an average score of 40 or below on the Driver SEA are private carriers. This private carrier leadership extends also to the DRM indicator where

seven private carrier industry segments had 80 percent of their carriers with no driver regulation acute or critical violations uncovered in CRs conducted in the 18 month period prior to the development of the database. Only one for-hire industry segment achieved this performance threshold. The private carrier advantage also extends to the ESM, although this indicator may be biased against for-hire carriers who are likely to have more enforcement cases initiated against them by shippers than are the private carriers, who, by definition, ship for themselves.

Countering these advantages for private carriers are the advantages to for-hire carriers on two important safety performance indicators: the SMRM and RCR. For example, only one for-hire segment has 50 percent or less of its carriers with no safety management acute or critical violations uncovered in CRs conducted 18 months prior to the development of the database. In contrast, seven private carrier segments have 50 percent or less of their carriers with no safety management critical or acute violations. Furthermore, on the crash rate dimension, there are five private carrier segments in which the carriers average 1.5 or more recordable crashes per million VMT, while there are only two for-hire segments in which the carriers reach this average recordable crash rate threshold. Although it might be expected that private carriers would have achieved better performance on the crash rate indicator given their performance on the Driver and Vehicle SEA, it should be noted that the Driver and Vehicle SEAs are driven by roadside inspections, primarily, while the RCR data base is restricted to carriers who have received a CR in the 18 months prior to the development of the database. As indicated earlier, the selection process for CRs is biased in favor of conducting CRs on carriers who are "at risk." Thus, the crash rate indicator may be biased by the tendency to over-represent "at risk" carriers.

A review of carrier performance emphasizing differences across commodity segments shows that two segments (for-hire passenger carriers and private household goods carriers) stand out for their leading-edge performance across the array of safety indicators. Examining the performance of for-hire passenger carriers across the safety indicators reveals that these carriers have one of the highest rates of satisfactory performance on their most recent CR as well as on CRs conducted in the 18-month period prior to the database development. The private moving/household goods carriers also have one of lowest crash rates reported by any of the segments. It should be noted, however, that the crash rate record for the private household goods carriers is based on fewer than 20 CRs conducted in the 18 months prior to the development of the database. The private moving/household goods carriers also performed well on both the Driver and Safety Evaluation scores with an average driver score of 50 and an average vehicle score of 40. Finally, over 80 percent of the private household goods carriers with CRs in the 18 month period prior to the database development had no acute or critical violations of driver safety regulations.

A second commodity-based segment notable for its performance leadership across a range of safety performance indicators is the for-hire passenger segment. This segment has the highest level of performance on CRs in terms of percentage of its carriers receiving a satisfactory rating. Furthermore, for-hire passenger carriers average less than 1.0 crashes per million VMT. Carriers in this segment also are leaders in the Vehicle, Driver, Safety Management, and Enforcement Severity measures. For the Vehicle and Driver measures, over 80 percent of the for-hire passenger carriers had no violations; in the case of the ESM, there were no closed enforcement cases. Furthermore, on both the Vehicle and Driver SEAs, for-hire passenger carriers had an average score of less than 30, clearly a leadership position across all the industry segments.

At the other end of the spectrum, there are several commodity-based segments that can be singled out for particularly troublesome safety performance. For example, the private heavy equipment carriers have one of the highest average Vehicle SEA (over 60) combined with a crash rate average of more than 2.0 recordable crashes per million miles. Also, the intermodal for-hire

carriers have an average Vehicle Safety Evaluation score of more than 60 together with a crash rate average of more than 2.0 recordable crashes per million VMT.

Clearly, the examination of safety performance across segments with an emphasis on differences based on carrier type as well as commodity provides an important tool for the safety community. It provides signals regarding where potential problem spots exist as well as where centers of excellence reside. This segmentation and analysis is a critical component of an overall plan to identify carriers with excellent safety performance. The management practices and safety programs of these identified leaders could serve as benchmarks for other carriers in the relevant segments to emulate.

Building Materials Safety Performance Results

Introduction

Figures 9 through 14 in Appendix A show summary measures of the safety performance of carriers in the building materials segment. It includes summaries for both for-hire and private carriers, respectively, and is drawn from measures that are collected as part of the SafeStat algorithm. We divide the discussion into three sections and give results for the private and for-hire firms, individually, in each section. The initial section presents the overall Compliance Review (CR) data for a carrier's most recent CR, regardless of when it occurred, as well as a separate summary for CRs conducted in the 18 months prior to the development of the database (July 1998). The second section discusses and summarizes the detailed components of CRs conducted in the 18-month period prior to the database construction. Finally, an overall perspective of driver and vehicle safety performance, based on CR results and roadside inspections, is shared.

Overall Compliance Review Results

Figure 9 indicates the results of the most recent CRs for 3,947 for-hire carriers. 71.9% received a satisfactory evaluation, 23.3% received a conditional evaluation, and 4.8% received an unsatisfactory overall rating. The results of the most recent CRs for the 7,332 private carriers indicate that only 55.6% received a satisfactory evaluation with 35.5% obtaining a conditional evaluation and 8.9% getting an unsatisfactory overall rating.

In the 18 months (January 1997 - June 1998) prior to the development of the database, 679 for-hire carriers and 233 private carriers had reviews. These more recent CRs (see Figure 10) reflect a concerted effort to target at-risk carriers in the CR process. Thus, direct comparison of these results with overall CR results should proceed with caution since the most recent CRs should have a higher proportion of unsatisfactory and/or conditional ratings due to targeting of "unsafe" carriers. The results of these current reviews show that 50.0% of the for-hire carriers received a satisfactory evaluation, 34.2% received a conditional evaluation, and 15.8% received an unsatisfactory overall rating. These results reflect a decline in satisfactory evaluations for the for-hire carriers with a corresponding increase in both conditional and unsatisfactory evaluations.

Of the most recent private carrier CRs, 55.8% received a satisfactory evaluation with 28.3% obtaining a conditional evaluation, and 15.9% getting an unsatisfactory overall rating. These results reflect a significant increase from 8.9% to 15.9% in the percentage of private carriers with unsatisfactory evaluations. However, they show no decline in the percentage with satisfactory ratings as might have been expected due to targeting

Detailed Compliance Review Results

This section summarizes a set of indices developed from detailed information compiled as part of the CR process. Only data from CRs conducted in the 18 months prior to the development of the database are included in this discussion. The following indices are discussed: the Recordable Crash Rate (RCR), the Driver Safety Review Measure (DRM), the Vehicle Safety Review Measure (VRM), the Safety Management Review Measure (SMRM), and the Enforcement Severity Measure (ESM).

Recordable Crash Rate

The RCR indicates the number of crashes per million VMT as reported in the CR. For-hire carriers average 1.52 crashes per million VMT while the comparable rate for private carriers is 1.64. This average rate ranges from a minimum of 0.13 to a maximum of 2.89 crashes per million VMT across all industry segments. See Figure 11.

Driver Safety Review Measure

The DRM is based on the driver-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Across all industry segments, the measure for carriers with violations ranges from an average low of 1.8 to an average high of 15.7.

For carriers in the building materials segment with CR data collected 18 months prior to database development, 66.3% of the for-hire and 88.0% of the private carriers had no acute or critical driver violations discovered during the CR. Of the for-hire carriers with violations, the mean score is 12.4. In contrast, the private fleet operators with violations had an average driver measure score of only 4.4. See Figure 12.

Vehicle Safety Review Measure

The VRM is based on the vehicle-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Of all the industry segments, the highest average score for carriers with violations is 2.2.

For carriers in the building materials segment with CR data collected 18 months prior to database development, 99.6% of the for-hire and all of the private carriers had no acute or critical vehicle violations discovered during the CR. Of the for-hire carriers with violations, the mean score is 0.15. Please refer to Figure 12.

Safety Management Review Measure

The SMRM is based on the safety management-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Across all industry segments, the measure for carriers with violations ranges from an average low of 9.0 to an average high of 36.1.

For carriers in the building materials segment with CR data collected 18 months prior to database development, 59.5% of the for-hire and 45.5% of the private carriers had no acute or critical safety management violations discovered during the CR. Of the for-hire carriers with violations, the mean score was 18.0. In contrast, the private fleet operators with violations had an average SMRM of 31.5. Please refer to Figure 13.

Enforcement Severity Measure

The ESM focuses on closed enforcement case data. An enforcement case is the result of one or more major violations discovered during a CR. The ESM requires that a carrier has had at least one enforcement case that was initiated and closed within the 30-month period prior to the compilation of the database. The measure combines a time weighting factor for case initiation along with a severity weight (based on the number of the different violations cited in the case) to produce an overall score. Across all industry segments with closed enforcement cases, the average rating is 2.5.

See Figure 14 for a summary of data for the Building Materials segment. For carriers in this segment with CR data collected 18 months prior to database development, 75.1% of the for-hire and 85.0% of the private carriers had no closed enforcement cases. Of the for-hire carriers with closed enforcement cases, the average enforcement severity measure is 1.9, while the comparable measure for private carriers is 1.2.

Comprehensive Driver and Vehicle Safety Evaluation Results

Safestat reports data on the following variables: Vehicle and Driver Inspection Indicators as well as Driver and Vehicle Safety Evaluation scores (SEA). The Vehicle and Driver Inspector Indicators are based entirely on roadside inspections performed 30 months prior to the compilation of the database. They focus on the percentage of the company's vehicles/drivers placed out-of-service along with the number of out-of-service violations found during the inspection. In addition, a time-weighting factor is employed to place greater importance on the more recent inspections. A carrier's score is ranked from lowest to highest and is converted to a percentile score with 100 representing the highest or worst performance.

The Vehicle and Driver SEAs combine data from the roadside inspections with data from the most recent compliance review (if it occurred 18 months to the database construction). In addition, the Driver SEA includes a moving violation measure (based on moving violation citations issued to a carrier's drivers), where available. Like the vehicle and driver inspection indicators, the Vehicle and Driver SEAs are converted to a percentile with 100 representing the highest or worst performance. The Vehicle and Driver SEAs are based entirely on the inspection data if the carrier had no CR in the period 18 months prior to the database construction. Since most carriers have not had a review in this time period, the Vehicle and Driver SEAs are influenced heavily by roadside inspections and are highly correlated with Vehicle and Driver Inspection Indicator scores. We will focus discussion on Vehicle and Driver SEAs.

Across all industry segments, the Vehicle SEAs range from an average low of 28.6 to an average high of 64.6 and the Driver SEAs range from an average low of 23.0 to an average high of 65.3.

In the building materials segment, the mean Vehicle SEA for for-hire carrier is 56.5, while it is 54.3 for private carriers. Regarding the Driver SEA, for-hire carriers average 53.7, while the private carriers average is only 32.3.

Summary

This section gives a summary comparison of the overall safety performance between for-hire building material carriers and private fleet operators in this segment. Based on CRs administered in the 18 month period prior to database development, for-hire carriers had a significant decline in

the proportion of their reviews that are satisfactory compared with the full set of CRs and a corresponding increase in conditional and unsatisfactory CRs. While private fleets maintained the proportion of their reviews with an overall satisfactory rating, there is an increase in the proportion of unsatisfactory reviews from 8.9% to 15.9% for the period 18 months prior to database construction.

While the for-hire and private building material fleets have comparable recordable crash rates, private fleets have clear advantages in their driver performance results. Indeed, 88% of recent CRs found private fleets with no driver acute or critical regulation violations. This contrasts with the experience of for-hire fleets where only 66.3% had no driver acute or critical regulation violations. Furthermore, the overall driver safety evaluation score for private fleets is significantly better than the score for for-hire fleets.

One area that the for-hire fleets have the advantage over private fleets is in safety management policies and procedures. Among private fleets, 45.5% have no critical or acute regulation violations in the safety management area. This contrast with the for hire fleets among whom 59.5 have no safety management violations. This may suggest less knowledge by private fleets in safety management policies and procedures.

Moving/Household Goods Safety Performance Results

Introduction

Figures 15 through 20 in Appendix A show summary measures of the safety performance of carriers in the moving/household goods segment. It includes summaries for both for-hire and private carriers, respectively, and is drawn from measures that are collected as part of the SafeStat algorithm. We divide the discussion into three sections and give results for the private and for-hire firms, individually, in each section. The initial section presents the overall Compliance Review data, regardless of when it occurred, as well as a separate summary for CRs conducted in 18 months prior to development of the database (January 1997 - June 1998). The second section discusses and summarizes the detailed components of CRs conducted in the time period prior to database construction. Finally, an overall perspective of driver and vehicle safety performance, based on CR results and roadside inspections, is shared.

Overall Compliance Review Results

Figure 15 indicates the results of the most recent CR for 696 for-hire carriers. 78.4% received a satisfactory evaluation, 18.1% received a conditional evaluation, and 3.5% received an unsatisfactory overall rating. The results of the most recent CRs for the 122 private carriers indicate that only 48.6% received a satisfactory evaluation with 39.2% obtaining a conditional evaluation, and 12.2% getting an unsatisfactory overall rating.

In the 18 months (January 1997 - July 1998) prior to the development of the database, 139 for-hire carriers and 16 private carriers had reviews. These are displayed graphically in Figure 16. These more recent CRs reflect a concerted effort to target at-risk carriers in the CR process. Thus, direct comparison of these results with overall CR results should proceed with caution since the most recent CRs should have a higher proportion of unsatisfactory and/or conditional ratings due to targeting of "unsafe" carriers. The results of these current reviews show that 43.9% of the for-hire carriers received a satisfactory evaluation, 35.9% received a conditional evaluation, and 20.2% received an unsatisfactory overall rating. These results reflect a significant decline in satisfactory evaluations for the for-hire carriers with a corresponding increase in unsatisfactory evaluations.

Of the recent private carrier CRs, 50.0% received a satisfactory evaluation with 43.8% obtaining a conditional evaluation, and 6.3% getting an unsatisfactory overall rating. This distribution is based on only 16 recent CRs. However, these results reflect a decline from 12.2% to 6.3% in the percentage of private carriers with unsatisfactory evaluations. This result is contrary to what is expected as a result of a policy to target CRs among at-risk carriers.

Detailed Compliance Review Results

This section summarizes a set of indices developed from detailed information compiled as part of the CR process. Only data from CRs conducted in the 18 months prior to the development of the database are included in this discussion. The following indices are discussed: the Recordable Crash Rate (RCR), the Driver Safety Review Measure (DRM), the Vehicle Safety Review Measure (VRM), the Safety Management Review Measure (SMRM), and the Enforcement Severity Measure (ESM).

Recordable Crash Rate

The RCR, displayed in Figure 17, indicates the number of crashes per million VMT as reported in the CR. For-hire carriers average 1.35 crashes per million VMT, while the comparable rate for private carriers is only 0.18. This average rate ranges from a minimum of 0.13 to a maximum of 2.89 crashes per million VMT across all industry segments. Thus, private moving/household goods fleets have an average crash rate that is close to the minimum average across all industry segments.

Driver Safety Review Measure

The DRM is based on the driver-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Across all industry segments, the measure for carriers with violations ranges from an average low of 1.8 to an average high of 15.7.

For carriers in the moving/household goods segment with CR data collected 18 months prior to database development, 71.2% of the for-hire and 81.3% of the private carriers had no acute or critical driver violations discovered during the CR. Of the for-hire carriers with violations, the mean score is 9.7. In contrast, the private fleet operators with violations had an average driver measure score of 5.3. See Figure 18.

Vehicle Safety Review Measure

The VRM is based on the vehicle-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Of all the industry segments, the highest average score for carriers with violations is 2.2.

For carriers in the moving/household goods segment with CR data collected 18 months prior to database development, all of the private and for-hire carriers had no acute or critical vehicle violations discovered during the CR. Please refer to Figure 18.

Safety Management Review Measure

The SMRM, displayed in Figure 19, is based on the safety management-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Across all industry segments, the measure for carriers with violations ranges from an average low of 9.0 to an average high of 36.1.

For carriers in the moving/household goods segment with CR data collected 18 months prior to database development, 50.4% of the for-hire and 43.8% of the private carriers had no acute or critical safety management violations discovered during the CR. Of the for-hire carriers with

violations, the mean score was 31.9. In contrast, the private fleet operators with violations had an average SMRM of 27.4.

Enforcement Severity Measure

The ESM, shown in Figure 20, focuses on closed enforcement case data. An enforcement case is the result of one or more major violations discovered during a CR. The enforcement severity measure requires that a carrier has had at least one enforcement case that was initiated and closed within the last 30-month period prior to the compilation of the database. The measure combines a time weighting factor for case initiation along with a severity weight (based on the number of the different violations cited in the case) to produce an overall score. Across all industry segments with closed enforcement cases, the average rating is 2.5.

For carriers in the moving/household goods segment with CR data collected 18 months prior to database development, 76.3% of the for-hire and 87.5% of the private carriers had no closed enforcement cases. Of the for-hire carriers with closed enforcement cases, the average ESM is 2.3, while the comparable measure for private carriers is only 0.8.

Comprehensive Driver and Vehicle Safety Evaluation Results

Safestat reports data on the following variables: Vehicle and Driver Inspection Indicators as well as Driver and Vehicle Safety Evaluation scores (SEA). The Vehicle and Driver Inspector Indicators are based entirely on roadside inspections performed 30 months prior to the compilation of the database. They focus on the percentage of the company's vehicles/drivers placed out-of-service along with the number of out-of-service violations found during the inspection. In addition, a time-weighting factor is employed to place greater importance on the more recent inspections. A carrier's score is ranked from lowest to highest and is converted to a percentile score with 100 representing the highest or worst performance.

The Vehicle and Driver SEAs combine data from the roadside inspections with data from the most recent compliance review (if it occurred 18 months to the database construction). In addition, the Driver SEA includes a moving violation measure (based on moving violation citations issued to a carrier's drivers), where available. Like the vehicle and driver inspection indicators, the Vehicle and Driver SEAs are converted to a percentile with 100 representing the highest or worst performance. The Vehicle and Driver SEAs are based entirely on the inspection data if the carrier had no CR in the period 18 months prior to the database construction. Since most carriers have not had a review in this time period, the Vehicle and Driver SEAs are influenced heavily by roadside inspections and are highly correlated with Vehicle and Driver Inspection Indicator scores. We will focus discussion on Vehicle and Driver SEA.

Across all industry segments, the Vehicle SEA ranges from an average low of 28.6 to an average high of 64.6 and the Driver SEA ranges from an average low of 23.0 to an average high of 65.3.

In the moving/household goods segment, the mean Vehicle SEA for for-hire carriers is 52.7, while it is only 39.8 for private carriers. Regarding the Driver SEA, for-hire carriers average 56.4 and private carriers average 49.8.

Summary

This section provides a summary comparison of the overall safety performance between for-hire and private fleet operators in the moving/household goods segment. Based on CRs administered in the 18 month period prior to database development, for-hire carriers had a steep decrease (from 78.4% to 43.9%) in the proportion of reviews that are satisfactory over the full set of CRs and a corresponding significant increase in unsatisfactory CRs. While private fleets essentially maintained the proportion of reviews in each evaluation category, only 16 CRs were completed in the 18 months prior to construction of the database.

The private carriers have a significantly lower average RCR than do the for-hire carriers, although the private fleet results reflect only 16 CRs. The private fleets have clear advantages over the for-hire fleet in the overall Driver and Vehicle SEAs. Indeed, private fleets had an average Driver SEA of 49.8 and Vehicle SEA of 39.8 in contrast to the comparable rates of 56.4 and 52.7, respectively, for for-hire carriers.

General Freight (TL & LTL) Safety Performance Results

Introduction

Figures 21 through 26 in Appendix A illustrate summary measures of the safety performance of carriers in the general freight segment including both Truckload (TL) and Less-than-Truckload (LTL) carriers. It includes summaries for both for-hire and private carriers, respectively, and is drawn from measures that are collected as part of the SafeStat algorithm. We divide the discussion into three sections and give results for the private and for-hire firms, individually, in each section. One presents the overall Compliance Review (CR) results for a carrier's most recent CR, regardless of when it occurred, as well as a separate summary for CRs conducted only in the 18 months prior to development of the database (July 1998). The second section discusses and summarizes the detailed components of the CR for each segment. Finally, an overall perspective of driver and vehicle safety performance, based on CR results and roadside inspections, is shared.

Overall Compliance Review Results

Figure 21 indicates the results of the most recent CR for 15,104 for-hire carriers. 73.6% received a satisfactory evaluation, 21.8% received a conditional evaluation, and 4.6% received an unsatisfactory overall rating. The results of the most recent CRs for the 369 private carriers indicate that 61.7% received a satisfactory evaluation with 31.3% obtaining a conditional evaluation and 7.0% earning an unsatisfactory overall rating.

In the 18 months (January 1997 - July 1998) prior to the development of the database, 2,626 for-hire carriers and 100 private carriers had reviews. The results of these reviews are indicated in Figure 22. These more recent CRs reflect a concerted effort to target at-risk carriers in the CR process. Thus, direct comparison of these results with overall CR results should proceed with caution since the most recent CRs should have a higher proportion of unsatisfactory and/or conditional ratings due to targeting of "unsafe" carriers. The results of these current reviews show that 50.7% of the for-hire carriers received a satisfactory evaluation, 35.0% received a conditional evaluation, and 14.3% received an unsatisfactory overall rating. These results reflect a significant decline in satisfactory evaluations for the for-hire carriers with a corresponding increase in both conditional and unsatisfactory evaluations.

Of the recent private carrier CRs, 55.0% received a satisfactory evaluation with 33.0% obtaining a conditional evaluation and 12.0% getting an unsatisfactory overall rating. These results reflect an increase from 7.0% to 12.0% in the percentage of private carriers with unsatisfactory evaluations.

Detailed Compliance Review Results

This section summarizes a set of indices developed from detailed information compiled as part of the CR process. Only data from CRs conducted in the 18 months prior to the development of the database are included in this discussion. The following indices are discussed: the Recordable Crash Rate (RCR), the Driver Safety Review Measure (DRM), the Vehicle Safety Review Measure (VRM), the Safety Management Review Measure (SMRM), and the Enforcement Severity Measure (ESM).

Recordable Crash Rate

The RCR indicates the number of crashes per million VMT as reported in the CR. For-hire carriers average 1.24 crashes per million VMT while the comparable rate for private carriers is 1.47. This average rate ranges from a minimum of 0.13 to a maximum of 2.89 crashes per million VMT across all industry segments. See Figure 23.

Driver Safety Review Measure

The DRM is based on the driver-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Across all industry segments, the measure for carriers with violations ranges from an average low of 1.8 to an average high of 15.7.

For carriers in the general freight segment with CR data collected 18 months prior to database development, 67.1% of the for-hire and 88.0% of the private carriers had no acute or critical driver violations discovered during the CR. Of the for-hire carriers with violations, the mean score is 12.1. In contrast, the private fleet operators with violations had an average driver measure score of only 4.8. Please refer to Figure 24.

Vehicle Safety Review Measure

The VRM is based on the vehicle-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Of all the industry segments, the highest average score for carriers with violations is 2.2.

For carriers in the general freight segment with CR data collected 18 months prior to database development, 99.6% of the for-hire and all of the private carriers had no acute or critical vehicle violations discovered during the CR. Of the for-hire carriers with violations, the mean score is 0.14. These are displayed in Figure 24.

Safety Management Review Measure

The SMRM is based on the safety management-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Across all industry segments, the measure for carriers with violations ranges from an average low of 9.0 to an average high of 36.1.

For carriers in the general freight segment with CR data collected 18 months prior to database development, 58.8% of the for-hire and 47.0% of the private carriers had no acute or critical safety management violations discovered during the CR. Of the for-hire carriers with violations, the mean score was 19.3. In contrast, the private fleet operators with violations had an average SMRM of 29.3. See Figure 25.

Enforcement Severity Measure

The ESM focuses on closed enforcement case data. An enforcement case is the result of one or more major violations discovered during a CR. The enforcement severity measure requires that a carrier has had at least one enforcement case that was initiated and closed within the last 30-month period prior to the compilation of the database. The measure combines a time weighting factor for case initiation along with a severity weight (based on the number of the different violations cited in the case) to produce an overall score. Across all industry segments with closed enforcement cases, the average rating is 2.5.

As displayed in Figure 26, for carriers in the general freight segment with CR data collected 18 months prior to database development, 75.1% of the for-hire and 89.0% of the private carriers had no closed enforcement cases. Of the for-hire carriers with closed enforcement cases, the average ESM was 2.0, while the comparable measure for private carriers was 0.8.

Comprehensive Driver and Vehicle Safety Evaluation Results

Safestat reports data on the following variables: Vehicle and Driver Inspection Indicators as well as Driver and Vehicle Safety Evaluation scores (SEA). The Vehicle and Driver Inspector Indicators are based entirely on roadside inspections performed 30 months prior to the compilation of the database. They focus on the percentage of the company's vehicles/drivers placed out-of-service along with the number of out-of-service violations found during the inspection. In addition, a time-weighting factor is employed to place greater importance on the more recent inspections. A carrier's score is ranked from lowest to highest and is converted to a percentile score with 100 representing the highest or worst performance.

The Vehicle and Driver SEAs combine data from the roadside inspections with data from the most recent compliance review (if it occurred 18 months to the database construction). In addition, the driver Safety Evaluation score includes a moving violation measure (based on moving violation citations issued to a carrier's drivers), where available. Like the vehicle and driver inspection indicators, the Vehicle and Driver SEAs are converted to a percentile with 100 representing the highest or worst performance. The Vehicle and Driver SEAs are based entirely on the inspection data if the carrier had no CR in the period 18 months prior to the database construction. Since most carriers have not had a review in this time period, the Vehicle and Driver SEA is influenced heavily by roadside inspections and are highly correlated with Vehicle and Driver Inspection Indicator scores. We will focus discussion on Vehicle and Driver SEAs.

Across all industry segments, Vehicle SEAs range from an average low of 28.6 to an average high of 64.6 and Driver SEAs range from an average low of 23.0 to an average high of 65.3.

In the general freight segment, the mean Vehicle Safety Evaluation score for for-hire carrier is 54.9, while it is 47.6 for private carriers. Regarding the Driver Safety Evaluation score, for-hire carriers average 57.6 and private carriers average only 40.3.

Summary

This section provides a summary comparison of the overall safety performance between for-hire general freight carriers and private fleet operators in this segment. Based on CRs administered in the 18 month period prior to database development, for-hire carriers had a significant decline in

the proportion of reviews that are satisfactory compared to the full set of CRs and a corresponding increase in conditional and unsatisfactory CRs. Private fleets also have recently shown a decline in their compliance rates, though to a lesser extent. Historically, for-hire carriers had better compliance rates than did the private fleets in this segment. The results of the most recent CRs show only slight differences between for-hire and private fleets.

For-hire carriers have a moderately better recordable crash rate than private general freight fleets. However, private fleets have other advantages in their driver performance results. Indeed, 88% of recent CRs found private fleets with no driver acute or critical regulation violations. This contrasts with the experience of for-hire fleets where only 67.1% had no driver acute or critical regulation violations. Furthermore, the overall Driver SEA for private fleets is significantly better than the score for for-hire fleets.

One area that the for-hire fleets have the advantage over private fleets is in safety management policies and procedures. Among private fleets, 47.0% had no critical or acute regulation violations in the safety management area. This contrast with the for hire fleets among whom 58.8% had no safety management violations. This may suggest less knowledge by private fleets in safety management policies and procedures.

Heavy Equipment Safety Performance Results

Introduction

Figures 27 through 32 in Appendix A provides summary measures of the safety performance of carriers in the heavy equipment segment. It includes summaries for both for-hire and private carriers, respectively, and is drawn from measures that are collected as part of the SafeStat algorithm. We divide the discussion into three sections and give results for the private and for-hire firms, individually, in each section. One presents the overall Compliance Review (CR) data for a carrier's most recent CR, regardless of when it occurred, as well as a separate summary for CRs conducted in the 18 months prior to the development of the database (July 1998). The second section discusses and summarizes the detailed components of the CR for each segment. Finally, an overall perspective of driver and vehicle safety performance, based on CR results and roadside inspections, is shared.

Overall Compliance Review Results

Figure 27 indicates the results of the most recent CR for 670 for-hire carriers. 69.6% received a satisfactory evaluation, 25.0% received a conditional evaluation, and 5.4% received an unsatisfactory overall rating. The results of the most recent CRs for the 3,215 private carriers indicate that only 47.8% received a satisfactory evaluation with 41.6% obtaining a conditional evaluation and 10.6% earning an unsatisfactory overall rating.

In the 18 months (January 1997 - July 1998) prior to the development of the database, 488 for-hire carriers and 315 private carriers had reviews. Figure 28 summarizes the results. These more recent CRs reflect a concerted effort to target at-risk carriers in the CR process. Thus, direct comparison of these results with overall CR results should proceed with caution since the most recent CRs should have a higher proportion of unsatisfactory and/or conditional ratings due to targeting of "unsafe" carriers. The results of these current reviews show that 50.9% of the for-hire carriers received a satisfactory evaluation, 36.1% received a conditional evaluation, and 13.1% received an unsatisfactory overall rating. These results reflect a significant decline in satisfactory evaluations for the for-hire carriers with a corresponding increase in both conditional and unsatisfactory evaluations.

Of the recent private carrier CRs, 57.4% received a satisfactory evaluation with 27.9% obtaining a conditional evaluation, and 14.6% getting an unsatisfactory overall rating. These results indicate a recent shift from conditional evaluations to either a satisfactory or unsatisfactory condition with most of the shift to satisfactory. This is contrary to the expectation that targeting will lead to an increase in the portion of reviews with an unsatisfactory or conditional rating.

Detailed Compliance Review Results

This section summarizes a set of indices developed from detailed information compiled as part of the CR process. Only data from CRs conducted in the 18 months prior to the development of the database are included in this discussion. The following indices are discussed: the Recordable Crash Rate (RCR), the Driver Safety Review Measure (DRM), the Vehicle Safety Review Measure (VRM), the Safety Management Review Measure (SMRM), and the Enforcement Severity Measure (ESM).

Recordable Crash Rate

The RCR indicates the number of crashes per million VMT as reported in the CR. For-hire carriers average 1.07 crashes per million VMT while the comparable rate for private carriers is 2.33. This average rate ranges from a minimum of 0.13 to a maximum of 2.89 crashes per million VMT across all industry segments. Please refer to Figure 29.

Driver Safety Review Measure

The DRM is based on the driver-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Across all industry segments, the measure for carriers with violations ranges from an average low of 1.8 to an average high of 15.7.

For carriers in the heavy equipment segment with CR data collected 18 months prior to database development, 67.2% of the for-hire and 86.0% of the private carriers had no acute or critical driver violations discovered during the CR. Of the for-hire carriers with violations, the mean score is 11.6. In contrast, the private fleet operators with violations had an average driver measure score of only 5.2. See Figure 30.

Vehicle Safety Review Measure

The VRM is based on the vehicle-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Of all the industry segments, the highest average score for carriers with violations is 2.2.

For carriers in the heavy equipment segment with CR data collected 18 months prior to database development, 99.4% of the for-hire and 99.7% of the private carriers had no acute or critical vehicle violations discovered during the CR. Of the for-hire carriers with violations, the mean score is 0.22; the corresponding value for private carriers is 0.13. Please refer to Figure 30.

Safety Management Review Measure

The SMRM is based on the safety management-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Across all industry segments, the measure for carriers with violations ranges from an average low of 9.0 to an average high of 36.1.

For carriers in the heavy equipment segment with CR data collected 18 months prior to database development, 58.2% of the for-hire and 44.4% of the private carriers had no acute or critical safety management violations discovered during the CR. Of the for-hire carriers with violations, the mean score is 18.8. In contrast, the private fleet operators with violations had an average SMRM of 29.9. These are displayed in Figure 31.

Enforcement Severity Measure

The ESM focuses on closed enforcement case data. An enforcement case is the result of one or more major violations discovered during a CR. The enforcement severity measure requires that a carrier has had at least one enforcement case that was initiated and closed within the last 30-month period prior to the compilation of the database. The measure combines a time weighting factor for case initiation along with a severity weight (based on the number of the different violations cited in the case) to produce an overall score. Across all industry segments with closed enforcement cases, the average rating is 2.5.

For carriers in the heavy equipment segment with CR data collected 18 months prior to database development, 78.9% of the for-hire and 86.3% of the private carriers had no closed enforcement cases. Of the for-hire carriers with closed enforcement cases, the average enforcement severity measure is 1.6, while the comparable measure for private carriers is 1.0. See Figure 32.

Comprehensive Driver and Vehicle Safety Evaluation Results

Safestat reports data on the following variables: Vehicle and Driver Inspection Indicators as well as Driver and Vehicle Safety Evaluation scores (SEA). The Vehicle and Driver Inspector Indicators are based entirely on roadside inspections 30 months prior to the compilation of the database. They focus on the percentage of the company's vehicles/drivers placed out-of-service along with the number of out-of-service violations found during the inspection. In addition, a time-weighting factor is employed to place more importance on the more recent inspections. A carrier's score is ranked from lowest to highest and is converted to a percentile score with 100 representing the highest or worst performance.

The Vehicle and Driver SEAs combine data from the roadside inspections with data from the most recent compliance review (if it occurred 18 months to the database construction). In addition, the Driver SEA includes a moving violation measure (based on moving violation citations issued to a carrier's drivers), where available. Like the vehicle and driver inspection indicators, the Vehicle and Driver SEAs are converted to a percentile with 100 representing the highest or worst performance. The Vehicle and Driver SEAs are based entirely on the inspection data if the carrier had no CR in the period 18 months prior to the database construction. Since most carriers have not had a review in this time period, the Vehicle and Driver SEA is influenced heavily by roadside inspections and are highly correlated with Vehicle and Driver Inspection Indicator scores. We will focus discussion on Vehicle and Driver SEAs.

Across all industry segments, Vehicle SEAs range from an average low of 28.6 to an average high of 64.6 and Driver SEAs range from an average low of 23.0 to an average high of 65.3.

In the heavy equipment segment, the mean Vehicle Safety Evaluation score for for-hire carriers is 57.8, while it is 64.6 for private carriers. Regarding the Driver Safety Evaluation score, for-hire carriers average 53.2 and private carriers average only 42.5.

Summary

This section provides a summary comparison of the overall safety performance between for-hire heavy equipment carriers and private fleet operators in this segment. Based on CRs administered in the 18 month period prior to database development, for-hire carriers had a significant decline in

the proportion of reviews that are satisfactory compared to the full set of CRs and a corresponding increase in conditional and unsatisfactory CRs. Private fleets, on the other hand, have recently had more satisfactory and unsatisfactory reviews, with a significant drop in conditional reviews.

For-hire carriers have a much better RCR than do private heavy equipment fleets (1.07 vs. 2.33). However, private fleets have other advantages in their driver performance results. Indeed, 86.0% of recent CRs found private fleets with no driver acute or critical regulation violations. This contrasts with the experience of for-hire fleets where only 67.2% having no driver acute or critical regulation violations. Furthermore, the overall Driver SEA for private fleets is significantly better than the score for for-hire fleets.

On the other hand, for-hire fleets have the advantage over private fleets in safety management policies and procedures. Among private fleets, 44.4% have no critical or acute regulation violations in the safety management area. This contrasts with the for-hire fleets among whom 58.2% have no safety management violations. This may suggest less knowledge by private fleets

Produce Safety Performance Results

Introduction

Figures 33 through 38 in Appendix A provide summary measures of the safety performance of carriers in the produce segment. It includes summaries for both for-hire and private carriers, respectively, and is drawn from measures that are collected as part of the SafeStat algorithm. We divide the discussion into three sections and give results for the private and for-hire firms, individually, in each section. One presents the overall Compliance Review (CR) data for a carrier's most recent CR, regardless of when it occurred, as well as a separate summary for CRs conducted in the 18 months prior to the development of the database (July 1998). The second section discusses and summarizes the detailed components of the CR for each segment. Finally, an overall perspective of driver and vehicle safety performance, based on CR results and roadside inspections, is shared.

Overall Compliance Review Results

Figure 33 indicates the results of the most recent CR for 1,419 for-hire carriers. 64.4% received a satisfactory evaluation, 29.2% received a conditional evaluation, and 6.4% received an unsatisfactory overall rating. The results of the most recent CRs for the 482 private carriers indicate that 57.5% received a satisfactory evaluation with 34.2% obtaining a conditional evaluation and 8.3% earning an unsatisfactory overall rating.

The most recent CRs are displayed in Figure 34. In the 18 months (January 1997 - July 1998) prior to the development of the database, 837 for-hire carriers and 59 private carriers had reviews. These more recent CRs reflect a concerted effort to target at-risk carriers in the CR process. Thus, direct comparison of these results with overall CR results should proceed with caution since the most recent CRs should have a higher proportion of unsatisfactory and/or conditional ratings due to targeting of "unsafe" carriers. The results of these current reviews show that 43.2% of the for-hire carriers received a satisfactory evaluation, 38.6% received a conditional evaluation, and 18.2% received an unsatisfactory overall rating. These results reflect a significant decline in satisfactory evaluations for the for-hire carriers with a corresponding increase in both conditional and unsatisfactory evaluations.

Of the recent private carrier CRs, 42.3% received a satisfactory evaluation with 35.6% obtaining a conditional evaluation, and 22.1% getting an unsatisfactory overall rating. These results again reflect a significant decline in satisfactory evaluations for the for-private carriers with a corresponding increase in both conditional and unsatisfactory evaluations.

Detailed Compliance Review Results

This section summarizes a set of indices developed from detailed information compiled as part of the CR process. Only data from CRs conducted in the 18 months prior to the development of the database are included in this discussion. The following indices are discussed: the Recordable Crash Rate (RCR), the Driver Safety Review Measure (DRM), the Vehicle Safety Review Measure (VRM), the Safety Management Review Measure (SMRM), and the Enforcement Severity Measure (ESM).

Recordable Crash Rate

The RCR indicates the number of crashes per million VMT as reported in the CR. For-hire carriers average 1.25 crashes per million VMT, while the comparable rate for private carriers is 2.89. This average rate ranges from a minimum of 0.13 to a maximum of 2.89 crashes per million VMT across all industry segments. See Figure 35.

Driver Safety Review Measure

The DRM is based on the driver-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Across all industry segments, the measure for carriers with violations ranges from an average low of 1.8 to an average high of 15.7.

For carriers in the produce segment with CR data collected 18 months prior to database development, 58.8% of the for-hire and 81.4% of the private carriers had no acute or critical driver violations discovered during the CR. Of the for-hire carriers with violations, the mean score is 15.7. In contrast, the private fleet operators with violations had an average driver measure score of only 5.4. See Figure 36.

Vehicle Safety Review Measure

The VRM is based on the vehicle-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Of all the industry segments, the highest average score for carriers with violations is 2.2.

Figure 36 graphically represents the data for the produce segment. For these carriers with CR data collected 18 months prior to database development, 99.5% of the for-hire and 98.3% of the private carriers had no acute or critical vehicle violations discovered during the CR. Of the for-hire carriers with violations, the mean score is 0.16; the corresponding value for private carriers is 2.19.

Safety Management Review Measure

The SMRM is based on the safety management-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Across all industry segments, the measure for carriers with violations ranges from an average low of 9.0 to an average high of 36.1.

For carriers in the produce segment with CR data collected 18 months prior to database development, 52.8% of the for-hire and 50.8% of the private carriers had no acute or critical safety management violations discovered during the CR. Of the for-hire carriers with violations,

the mean score is 22.4. In contrast, the private fleet operators with violations had an average SMRM of 35.7. Please refer to Figure 37.

Enforcement Severity Measure

The ESM focuses on closed enforcement case data. An enforcement case is the result of one or more major violations discovered during a CR. The enforcement severity measure requires that a carrier has had at least one enforcement case that was initiated and closed within the last 30-month period prior to the compilation of the database. The measure combines a time weighting factor for case initiation along with a severity weight (based on the number of the different violations cited in the case) to produce an overall score. Across all industry segments with closed enforcement cases, the average rating is 2.5.

For carriers in the produce segment with CR data collected 18 months prior to database development, 71.6% of the for-hire and 83.1% of the private carriers had no closed enforcement cases. Of the for-hire carriers with closed enforcement cases, the average ESM is 2.5, while the comparable measure for private carriers is 1.3. These results are displayed in Figure 38.

Comprehensive Driver and Vehicle Safety Evaluation Results

Safestat reports data on the following variables: Vehicle and Driver Inspection Indicators as well as Driver and Vehicle Safety Evaluation scores (SEAs). The Vehicle and Driver Inspector Indicators are based entirely on roadside inspections 30 months prior to the compilation of the database. They focus on the percentage of the company's vehicles/drivers placed out-of-service along with the number of out-of-service violations found during the inspection. In addition, a time-weighting factor is employed to place more importance on the more recent inspections. A carrier's score is ranked from lowest to highest and is converted to a percentile score with 100 representing the highest or worst performance.

The Vehicle and Driver SEAs combine data from the roadside inspections with data from the most recent CR (if it occurred 18 months to the database construction). In addition, the driver SEA includes a moving violation measure (based on moving violation citations issued to a carrier's drivers), where available. Like the vehicle and driver inspection indicators, the Vehicle and Driver SEAs are converted to a percentile with 100 representing the highest or worst performance. The Vehicle and Driver SEAs are based entirely on the inspection data if the carrier had no CR in the period 18 months prior to the database construction. Since most carriers have not had a review in this time period, the Vehicle and Driver SEAs are influenced heavily by roadside inspections and are highly correlated with Vehicle and Driver Inspection Indicator scores. We will focus discussion on Vehicle and Driver SEAs.

Across all industry segments, the Vehicle SEAs range from an average low of 28.6 to an average high of 64.6 and the Driver SEAs range from an average low of 23.0 to an average high of 65.3.

In the produce segment, the mean Vehicle SEA for for-hire carriers is 52.8, while it is 43.5 for private carriers. Regarding the Driver SEA, for-hire carriers average 65.3 while private carriers average only 39.9.

Summary

This section provides a summary comparison of the overall safety performance between for-hire produce carriers and private fleet operators in this segment. Based on CRs administered in the 18 month period prior to database development, both for-hire and private carriers had a significant decline in the proportion of reviews that are satisfactory compared to the full set of CRs and a corresponding increase in conditional and unsatisfactory CRs.

For-hire carriers have a much better RCR than do private produce fleets (1.25 vs. 2.89). However, private fleets have other advantages in their driver performance results. Indeed, 81.4% of recent CRs found private fleets with no driver acute or critical regulation violations. This contrasts with the experience of for-hire fleets where only 58.8% having no driver acute or critical regulation violations. Furthermore, the overall driver safety evaluation score for private fleets is significantly better than is the score for for-hire fleets.

On the other hand, for-hire fleets have the advantage over private fleets in safety management policies and procedures. Both groups have a similar percentage of carriers with no violations but the average number of violations of those with at least one violation is much greater in private fleets. This may suggest less knowledge by private fleets in safety management policies and procedures.

Intermodal Safety Performance Results

Introduction

Figures 39 through 44 in Appendix A provide summary measures of the safety performance of carriers in the intermodal segment. It includes summaries for both for-hire and private carriers, respectively, and is drawn from measures that are collected as part of the SafeStat algorithm. We divide the discussion into three sections and give results for the private and for-hire firms, individually, in each section. One presents the overall Compliance Review (CR) data for a carrier's most recent CR, regardless of when it occurred, as well as a separate summary for CRs conducted in the 18 months prior to the development of the database (July 1998). The second section discusses and summarizes the detailed components of the CR for each segment. Finally, an overall perspective of driver and vehicle safety performance, based on CR results and roadside inspections, is shared.

Overall Compliance Review Results

Figure 39 indicates the results of the most recent CR for 376 for-hire carriers. 72.9% received a satisfactory evaluation, 20.2% received a conditional evaluation, and 6.8% received an unsatisfactory overall rating. The results of the most recent CRs for the 13 private carriers indicate that only 57.5% received a satisfactory evaluation with 34.2% obtaining a conditional evaluation and 8.3% earning an unsatisfactory overall rating.

In the 18 months (January 1997 - July 1998) prior to the development of the database, 254 for-hire carriers and 4 private carriers had reviews. Please see these results in Figure 40. These more recent CRs reflect a concerted effort to target at-risk carriers in the CR process. Thus, direct comparison of these results with overall CR results should proceed with caution since the most recent CRs should have a higher proportion of unsatisfactory and/or conditional ratings due to targeting of "unsafe" carriers. The results of these current reviews show that 46.5% of the for-hire carriers received a satisfactory evaluation, 34.7% received a conditional evaluation, and 18.9% received an unsatisfactory overall rating. These results reflect a substantial decline in satisfactory evaluations for the for-hire carriers with a corresponding increase in both conditional and unsatisfactory evaluations.

Of the recent private carrier CRs, 25.0% received a satisfactory evaluation with 75.0% obtaining a conditional evaluation, and none getting an unsatisfactory overall rating. Since there are only 4 CRs in this category, it is difficult to draw any conclusions.

Detailed Compliance Review Results

This section summarizes a set of indices developed from detailed information compiled as part of the CR process. Only data from CRs conducted in the 18 months prior to the development of the database are included in this discussion. The following indices are discussed: the Recordable Crash Rate (RCR), the Driver Safety Review Measure (DRM), the Vehicle Safety Review Measure (VRM), the Safety Management Review Measure (SMRM), and the Enforcement Severity Measure (ESM).

Recordable Crash Rate

The RCR indicates the number of crashes per million VMT as reported in the CR. For-hire carriers average 2.31 crashes per million VMT while the comparable rate for private carriers is 0.41. This average rate ranges from a minimum of 0.13 to a maximum of 2.89 crashes per million VMT across all industry segments. Please refer to Figure 41.

Driver Safety Review Measure

The DRM is based on the driver-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Across all industry segments, the measure for carriers with violations ranges from an average low of 1.8 to an average high of 15.7.

For carriers in the intermodal segment with CR data collected 18 months prior to database development, 71.3% of the for-hire and 75.0% of the private carriers had no acute or critical driver violations discovered during the CR. Of the for-hire carriers with violations, the mean score is 10.9. The private fleet operators with violations had an average driver measure score of 13.1. Please see Figure 42.

Vehicle Safety Review Measure

The VRM is based on the vehicle-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Of all the industry segments, the highest average score for carriers with violations is 2.2.

VRM ratings for carriers in the intermodal segment are displayed in Figure 42. For these carriers with CR data collected 18 months prior to database development, 99.2% of the for-hire and all of the private carriers had no acute or critical vehicle violations discovered during the CR. Of the for-hire carriers with violations, the mean score is 0.26.

Safety Management Review Measure

The SMRM is based on the safety management-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Across all industry segments, the measure for carriers with violations ranges from an average low of 9.0 to an average high of 36.1.

For carriers in the intermodal segment (see Figure 43) with CR data collected 18 months prior to database development, 57.5% of the for-hire and 50.0% of the private carriers had no acute or critical safety management violations discovered during the CR. Of the for-hire carriers with violations, the mean score is 23.0. In contrast, the private fleet operators with violations had an average SMRM of only 9.0.

Enforcement Severity Measure

The ESM focuses on closed enforcement case data. An enforcement case is the result of one or more major violations discovered during a CR. The enforcement severity measure requires that a carrier has had at least one enforcement case that was initiated and closed within the last 30-month period prior to the compilation of the database. The measure combines a time weighting factor for case initiation along with a severity weight (based on the number of the different violations cited in the case) to produce an overall score. Across all industry segments with closed enforcement cases, the average rating is 2.5.

For carriers in the intermodal segment with CR data collected 18 months prior to database development, 72.0% of the for-hire and all of the private carriers had no closed enforcement cases. Of the for-hire carriers with closed enforcement cases, the average ESM is 2.2. Please refer to Figure 44.

Comprehensive Driver and Vehicle Safety Evaluation Results

Safestat reports data on the following variables: Vehicle and Driver Inspection Indicators as well as Driver and Vehicle Safety Evaluation scores (SEA). The Vehicle and Driver Inspector Indicators are based entirely on roadside inspections 30 months prior to the compilation of the database. They focus on the percentage of the company's vehicles/drivers placed out-of-service along with the number of out-of-service violations found during the inspection. In addition, a time-weighting factor is employed to place more importance on the more recent inspections. A carrier's score is ranked from lowest to highest and is converted to a percentile score with 100 representing the highest or worst performance.

The Vehicle and Driver SEAs combine data from the roadside inspections with data from the most recent CR (if it occurred 18 months to the database construction). In addition, the Driver SEA includes a moving violation measure (based on moving violation citations issued to a carrier's drivers), where available. Like the vehicle and driver inspection indicators, the Vehicle and Driver SEAs are converted to a percentile with 100 representing the highest or worst performance. The Vehicle and Driver SEAs are based entirely on the inspection data if the carrier had no CR in the period 18 months prior to the database construction. Since most carriers have not had a review in this time period, the Vehicle and Driver SEAs are influenced heavily by roadside inspections and are highly correlated with Vehicle and Driver Inspection Indicator scores. We will focus discussion on Vehicle and Driver SEAs.

Across all industry segments, the Vehicle SEAs range from an average low of 28.6 to an average high of 64.6 and the Driver SEAs range from an average low of 23.0 to an average high of 65.3.

In the intermodal segment, the mean Vehicle SEA for for-hire carriers is 62.7, while it is 53.1 for private carriers. Regarding the Driver SEA, for-hire carriers average 46.1 and private carriers average only 34.1.

Summary

This section provides a summary comparison of the overall safety performance between for-hire intermodal carriers and private fleet operators in this segment. Based on CRs administered in the 18-month period prior to database development, for-hire carriers had a significant decline in the proportion of reviews that are satisfactory compared to the full set of CRs and a corresponding

increase in conditional and unsatisfactory CRs. Conclusions cannot be drawn from the recent private fleets because only 4 carriers received reviews in the last 18 months prior to database construction.

Private carriers have a much better RCR than do for-hire intermodal fleets (0.41 vs. 2.31). This is one of only two industry segments where the private rate is superior to the for-hire rate. However, great caution must be exercised in interpreting these results since they are based on a very small number of observation. However, the Vehicle and Driver SEAs, based on a much larger number of carriers, show advantages for private fleet operators as well. The private fleets have a lower average Vehicle SEA than do the for-hire fleets (53.1 vs. 62.7). In addition, they have a lower average Driver SEA than do the for-hire fleets (34.1 vs. 46.1).

On the other hand, for-hire fleets have the advantage over for-hire fleets in safety management policies and procedures. Among private fleets, 50.0% have no critical or acute regulation violations in the safety management area. This contrasts with the for-hire fleets among whom 57.5% have no safety management violations

Passenger Transportation Safety Performance Results

Introduction

Figures 45 through 50 in Appendix A provide summary measures of the safety performance of carriers in the passenger transportation segment. It includes summaries for both for-hire and private carriers, respectively, and is drawn from measures that are collected as part of the SafeStat algorithm. We divide the discussion into three sections and give results for the private and for-hire firms, individually, in each section. One presents the overall Compliance Review (CR) data for a carrier's most recent CR, regardless of when it occurred, as well as a separate summary for CRs conducted in the 18 months prior to the development of the database (July 1998). The second section discusses and summarizes the detailed components of the CR for each segment. Finally, an overall perspective of driver and vehicle safety performance, based on CR results and roadside inspections, is shared.

Overall Compliance Review Results

Figure 45 indicates the results of the most recent CR for 1,098 for-hire carriers. 82.2% received a satisfactory evaluation, 16.2% received a conditional evaluation, and 1.6% received an unsatisfactory overall rating. The results of the most recent CRs for the 20 private carriers indicate that only 70.0 received a satisfactory evaluation with 20.0% obtaining a conditional evaluation and 10.0% earning an unsatisfactory overall rating.

In the 18 months (January 1997 - July 1998) prior to the development of the database, 433 for-hire carriers and 6 private carriers had reviews. These more recent CRs, summarized in Figure 46, reflect a concerted effort to target at-risk carriers in the CR process. Thus, direct comparison of these results with overall CR results should proceed with caution since the most recent CRs should have a higher proportion of unsatisfactory and/or conditional ratings due to targeting of "unsafe" carriers. The results of these current reviews show that 77.2% of the for-hire carriers received a satisfactory evaluation, 21.0% received a conditional evaluation, and 1.9% received an unsatisfactory overall rating. These results reflect a small decline in satisfactory evaluations for the for-hire carriers with a corresponding increase in both conditional and unsatisfactory evaluations.

Of the recent private carrier CRs, 66.7% received a satisfactory evaluation with 16.7% obtaining a conditional evaluation, and 16.7% getting an unsatisfactory overall rating. Since there are only 6 CRs in this category, it is difficult to draw any conclusions.

Detailed Compliance Review Results

This section summarizes a set of indices developed from detailed information compiled as part of the CR process. Only data from CRs conducted in the 18 months prior to the development of the database are included in this discussion. The following indices are discussed: the Recordable Crash Rate (RCR), the Driver Safety Review Measure (DRM), the Vehicle Safety Review Measure (VRM), the Safety Management Review Measure (SMRM), and the Enforcement Severity Measure (ESM).

Recordable Crash Rate

The RCR indicates the number of crashes per million VMT as reported in the CR. For-hire carriers average 0.91 crashes per million VMT while the comparable rate for private carriers is 0.13. This average rate ranges from a minimum of 0.13 to a maximum of 2.89 crashes per million VMT across all industry segments. See Figure 47.

Driver Safety Review Measure

The DRM is based on the driver-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Across all industry segments, the measure for carriers with violations ranges from an average low of 1.8 to an average high of 15.7.

For carriers in the Passenger segment with CR data collected 18 months prior to database development, 94.0% of the for-hire and 66.7% of the private carriers had no acute or critical driver violations discovered during the CR. Of the for-hire carriers with violations, the mean score is 1.8. The private fleet operators with violations had an average DRM of 14.7. See Figure 48.

Vehicle Safety Review Measure

The VRM is based on the vehicle-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Of all the industry segments, the highest average score for carriers with violations is 2.2.

For carriers in the Passenger segment with CR data collected 18 months prior to database development, 99.8% of the for-hire and all of the private carriers had no acute or critical vehicle violations discovered during the CR. Of the for-hire carriers with violations, the mean score is 0.08. Please refer to Figure 48.

Safety Management Review Measure

The SMRM is based on the safety management-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Across all industry segments, the measure for carriers with violations ranges from an average low of 9.0 to an average high of 36.1.

For carriers in the Passenger segment with CR data collected 18 months prior to database development, 64.0% of the for-hire and 50.0% of the private carriers had no acute or critical safety management violations discovered during the CR. Please refer to Figure 49 of this report. Of the for-hire carriers with violations, the mean score is 16.2. Similarly, the private fleet operators with violations had an average safety management measure score of 16.5.

Enforcement Severity Measure

The ESM focuses on closed enforcement case data. An enforcement case is the result of one or more major violations discovered during a CR. The enforcement severity measure requires that a carrier has had at least one enforcement case that was initiated and closed within the last 30-month period prior to the compilation of the database. The measure combines a time weighting factor for case initiation along with a severity weight (based on the number of the different violations cited in the case) to produce an overall score. Across all industry segments with closed enforcement cases, the average rating is 2.5.

For carriers in the Passenger segment with CR data collected 18 months prior to database development, graphically represented in Figure 50, 87.5% of the for-hire and all of the private carriers had no closed enforcement cases. Of the for-hire carriers with closed enforcement cases, the average ESM is 0.8.

Comprehensive Driver and Vehicle Safety Evaluation Results

Safestat reports data on the following variables: Vehicle and Driver Inspection Indicators as well as Driver and Vehicle Safety Evaluation scores (SEA). The Vehicle and Driver Inspector Indicators are based entirely on roadside inspections 30 months prior to the compilation of the database. They focus on the percentage of the company's vehicles/drivers placed out-of-service along with the number of out-of-service violations found during the inspection. In addition, a time-weighting factor is employed to place more importance on the more recent inspections. A carrier's score is ranked from lowest to highest and is converted to a percentile score with 100 representing the highest or worst performance.

The Vehicle and Driver SEAs combine data from the roadside inspections with data from the most recent compliance review (if it occurred 18 months to the database construction). In addition, the Driver SEA includes a moving violation measure (based on moving violation citations issued to a carrier's drivers), where available. Like the vehicle and driver inspection indicators, the Vehicle and Driver SEAs are converted to a percentile with 100 representing the highest or worst performance. The Vehicle and Driver SEAs are based entirely on the inspection data if the carrier had no CR in the period 18 months prior to the database construction. Since most carriers have not had a review in this time period, Vehicle and Driver SEAs are heavily influenced by roadside inspections and are highly correlated with Vehicle and Driver Inspection Indicator scores. We will focus discussion on Vehicle and Driver SEAs.

Across all industry segments, the Vehicle SEAs range from an average low of 28.6 to an average high of 64.6 and the Driver SEAs range from an average low of 23.0 to an average high of 65.3.

In the Passenger segment, the mean Vehicle SEA for for-hire carriers is 28.6, while it is 64.0 for private carriers. Regarding the Driver SEA, for-hire carriers average 23.0 and private carriers average only 55.7.

Summary

This section provides a summary comparison of the overall safety performance between for-hire Passenger carriers and private fleet operators in this segment. Based on CRs administered in the 18-month period prior to database development, for-hire carriers had a small decline in the proportion of reviews that are satisfactory compared to the full set of CRs and a corresponding

increase in conditional and unsatisfactory CRs. Conclusions cannot be drawn from the recent private fleets because only 6 carriers received reviews in the last 18 months prior to database construction.

Private carriers have a much better RCR than do for-hire passenger fleets (0.13 vs. 0.91). In fact, 0.13 is the lowest RCR of all the industry segments. However, great caution must be exercised in interpreting these results since they are based on a very small number of observations. In contrast, the Vehicle and Driver SEAs, based on a much larger number of carriers, show substantial advantages for for-hire fleet operators. The for-hire fleets have a lower average Vehicle SEA than do the private fleets (28.6 vs. 64.0). In addition, they have a lower average Driver SEA than do the for-hire fleets (23.0 vs. 55.7). The DRM also indicates an advantage for for-hire fleets.

Refrigerated (non-produce) Safety Performance Results

Introduction

Figures 51 through 56 in Appendix A provide summary measures of the safety performance of carriers in the refrigerated (non-produce) products segment. It includes summaries for both for-hire and private carriers, respectively, and is drawn from measures that are collected as part of the SafeStat algorithm. We divide the discussion into three sections and give results for the private and for-hire firms, individually, in each section. One presents the overall Compliance Review (CR) data for a carrier's most recent CR, regardless of when it occurred, as well as a separate summary for CRs conducted in the 18 months prior to the development of the database (July 1998). The second section discusses and summarizes the detailed components of the CR for each segment. Finally, an overall perspective of driver and vehicle safety performance, based on CR results and roadside inspections, is shared.

Overall Compliance Review Results

Figure 51 indicates the results of the most recent CR for 1,143 for-hire carriers. 69.6% received a satisfactory evaluation, 24.6% received a conditional evaluation, and 5.8% received an unsatisfactory overall rating. The results of the most recent CRs for the 983 private carriers indicate that 68.4% received a satisfactory evaluation with 26.5% obtaining a conditional evaluation and 5.1% earning an unsatisfactory overall rating.

Figure 52 indicates the results of only those carriers to receive reviews in the 18 months (January 1997 - July 1998) prior to the development of the database. In this set, 700 for-hire carriers and 68 private carriers had reviews. These more recent CRs reflect a concerted effort to target at-risk carriers in the CR process. Thus, direct comparison of these results with overall CR results should proceed with caution since the most recent CRs should have a higher proportion of unsatisfactory and/or conditional ratings due to targeting of "unsafe" carriers. The results of these current reviews show that 48.7% of the for-hire carriers received a satisfactory evaluation, 35.5% received a conditional evaluation, and 15.8% received an unsatisfactory overall rating. These results reflect a substantial decline in satisfactory evaluations for the for-hire carriers with a corresponding increase in both conditional and unsatisfactory evaluations.

Of the recent private carrier CRs, 48.5% received a satisfactory evaluation with 32.3% obtaining a conditional evaluation, and 19.1% getting an unsatisfactory overall rating. Similar to the results for the for-hire carriers, these results reflect a substantial decline in satisfactory evaluations for the private carriers with a corresponding increase in both conditional and unsatisfactory evaluations.

Detailed Compliance Review Results

This section summarizes a set of indices developed from detailed information compiled as part of the CR process. Only data from CRs conducted in the 18 months prior to the development of the database are included in this discussion. The following indices are discussed: the Recordable Crash Rate (RCR), the Driver Safety Review Measure (DRM), the Vehicle Safety Review Measure (VRM), the Safety Management Review Measure (SMRM), and the Enforcement Severity Measure (ESM)

Recordable Crash Rate

The RCR indicates the number of crashes per million VMT as reported in the CR. For-hire carriers average 1.02 crashes per million VMT while the comparable rate for private carriers is 1.87. This average rate ranges from a minimum of 0.13 to a maximum of 2.89 crashes per million VMT across all industry segments. Please refer to Figure 53.

Driver Safety Review Measure

The DRM is based on the driver-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Across all industry segments, the measure for carriers with violations ranges from an average low of 1.8 to an average high of 15.7.

For carriers in the Refrigerated segment with CR data collected 18 months prior to database development, 59.4% of the for-hire and 70.6% of the private carriers had no acute or critical driver violations discovered during the CR. Of the for-hire carriers with violations, the mean score is 15.2. The private fleet operators with violations had an average DRM of 11.7. Please refer to Figure 54.

Vehicle Safety Review Measure

The VRM is based on the vehicle-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Of all the industry segments, the highest average score for carriers with violations is 2.2.

For carriers in the Refrigerated segment with CR data collected 18 months prior to database development, 99.7% of the for-hire and 98.5% of the private carriers had no acute or critical vehicle violations discovered during the CR. Of the for-hire carriers with violations, the mean score is 0.09, while the corresponding score for private carriers is 1.90. Figure 54 graphically represents these results.

Safety Management Review Measure

The SMRM is based on the safety management-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Across all industry segments, the measure for carriers with violations ranges from an average low of 9.0 to an average high of 36.1.

Please refer to Figure 55 for carriers in the Refrigerated segment with CR data collected 18 months prior to database development. In this data set, 59.7% of the for-hire and 58.8% of the private carriers had no acute or critical safety management violations discovered during the CR.

Of the for-hire carriers with violations, the mean score is 19.2. The private fleet operators with violations had an average SMRM of 26.4.

Enforcement Severity Measure

The ESM focuses on closed enforcement case data. An enforcement case is the result of one or more major violations discovered during a CR. The enforcement severity measure requires that a carrier has had at least one enforcement case that was initiated and closed within the last 30-month period prior to the compilation of the database. The measure combines a time weighting factor for case initiation along with a severity weight (based on the number of the different violations cited in the case) to produce an overall score. Across all industry segments with closed enforcement cases, the average rating is 2.5. Please see Figure 56.

For carriers in the Refrigerated segment with CR data collected 18 months prior to database development, 72.7% of the for-hire and 82.4% of the private carriers had no closed enforcement cases. Of the for-hire carriers with closed enforcement cases, the average ESM is 2.3 while the score for private carriers is 1.3.

Comprehensive Driver and Vehicle Safety Evaluation Results

Safestat reports data on the following variables: Vehicle and Driver Inspection Indicators as well as Driver and Vehicle Safety Evaluation scores (SEA). The Vehicle and Driver Inspector Indicators are based entirely on roadside inspections 30 months prior to the compilation of the database. They focus on the percentage of the company's vehicles/drivers placed out-of-service along with the number of out-of-service violations found during the inspection. In addition, a time-weighting factor is employed to place more importance on the more recent inspections. A carrier's score is ranked from lowest to highest and is converted to a percentile score with 100 representing the highest or worst performance.

The Vehicle and Driver SEAs combine data from the roadside inspections with data from the most recent compliance review (if it occurred 18 months to the database construction). In addition, the Driver SEA includes a moving violation measure (based on moving violation citations issued to a carrier's drivers), where available. Like the vehicle and driver inspection indicators, the Vehicle and Driver SEAs are converted to a percentile with 100 representing the highest or worst performance. The Vehicle and Driver SEAs are based entirely on the inspection data if the carrier had no CR in the period 18 months prior to the database construction. Since most carriers have not had a review in this time period, the Vehicle and Driver SEAs are influenced heavily by roadside inspections and are highly correlated with Vehicle and Driver Inspection Indicator scores. We will focus discussion on Vehicle and Driver SEAs.

Across all industry segments, the Vehicle SEAs range from an average low of 28.6 to an average high of 64.6 and the Driver SEAs range from an average low of 23.0 to an average high of 65.3.

In the Refrigerated products segment, the mean Vehicle SEA for for-hire carriers is 50.0, while it is only 38.0 for private carriers. Regarding the Driver SEA, for-hire carriers average 62.9 and private carriers average only 33.8.

Summary

This section provides a summary comparison of the overall safety performance between for-hire Refrigerated carriers and private fleet operators in this segment. Based on CRs administered in the 18 month period prior to database development, both for-hire carriers and private carriers had a substantial decline in the proportion of reviews that are satisfactory compared to the full set of CRs and a corresponding increase in conditional and unsatisfactory CRs.

For-hire carriers have a much better RCR than do private Refrigerated fleets (1.02 vs. 1.87). In contrast, the Vehicle and Driver SEAs show substantial advantages for the private fleet operators. In addition, the ESM indicates better performance by private fleets. Other than the RCR, the only measure that indicates better performance by for-hire carriers is the SMRM. This may suggest less knowledge by private fleets in safety management policies and procedures.

Tank Safety Performance Results

Introduction

Figures 57 through 62 in Appendix A provide summary measures of the safety performance of carriers in the tank carriers segment. It includes summaries for both for-hire and private carriers, respectively, and is drawn from measures that are collected as part of the SafeStat algorithm. We divide the discussion into three sections and give results for the private and for-hire firms, individually, in each section. One presents the overall Compliance Review (CR) data for a carrier's most recent CR, regardless of when it occurred, as well as a separate summary for CRs conducted in the 18 months prior to the development of the database (July 1998). The second section discusses and summarizes the detailed components of the CR for each segment. Finally, an overall perspective of driver and vehicle safety performance, based on CR results and roadside inspections, is shared.

Overall Compliance Review Results

Figure 57 indicates the results of the most recent CR for 1,378 for-hire carriers. 83.0% received a satisfactory evaluation, 15.4% received a conditional evaluation, and 1.6% received an unsatisfactory overall rating. The results of the most recent CRs for the 2,984 private carriers indicate that 77.6% received a satisfactory evaluation with 20.5% obtaining a conditional evaluation and 1.9% earning an unsatisfactory overall rating.

In the 18 months (January 1997 - July 1998) prior to the development of the database, 536 for-hire carriers and 442 private carriers had reviews. These reviews are reflected in Figure 58. These more recent CRs reflect a concerted effort to target at-risk carriers in the CR process. Thus, direct comparison of these results with overall CR results should proceed with caution since the most recent CRs should have a higher proportion of unsatisfactory and/or conditional ratings due to targeting of "unsafe" carriers. The results of these current reviews show that 61.6% of the for-hire carriers received a satisfactory evaluation, 33.1% received a conditional evaluation, and 5.4% received an unsatisfactory overall rating. As expected, these results reflect a substantial decline in satisfactory evaluations for the for-hire carriers with a corresponding increase in both conditional and unsatisfactory evaluations.

Of the recent private carrier CRs, 74.0% received a satisfactory evaluation with 21.9% obtaining a conditional evaluation, and 4.1% getting an unsatisfactory overall rating. These results reflect only a very slight decline in satisfactory evaluations for the private carriers with a corresponding increase in both conditional and unsatisfactory evaluations.

Detailed Compliance Review Results

This section summarizes a set of indices developed from detailed information compiled as part of the CR process. Only data from CRs conducted in the 18 months prior to the development of the database are included in this discussion. The following indices are discussed: the Recordable Crash Rate (RCR), the Driver Safety Review Measure (DRM), the Vehicle Safety Review Measure (VRM), the Safety Management Review Measure (SMRM), and the Enforcement Severity Measure (ESM).

Recordable Crash Rate

The RCR indicates the number of crashes per million VMT as reported in the CR. Figure 59 indicates that for-hire carriers average 0.94 crashes per million VMT while the comparable rate for private carriers is 1.05. This average rate ranges from a minimum of 0.13 to a maximum of 2.89 crashes per million VMT across all industry segments.

Driver Safety Review Measure

The DRM is based on the driver-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Across all industry segments, the measure for carriers with violations ranges from an average low of 1.8 to an average high of 15.7.

For carriers in the Tank segment with CR data collected 18 months prior to database development, 75.4% of the for-hire and 89.4% of the private carriers had no acute or critical driver violations discovered during the CR. Of the for-hire carriers with violations, the mean score is 9.1. The private fleet operators with violations had an average driver measure score of 3.2. Please see Figure 60.

Vehicle Safety Review Measure

The VRM is based on the vehicle-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Of all the industry segments, the highest average score for carriers with violations is 2.2.

For carriers in the tank carriers segment with CR data collected 18 months prior to database development, 99.6% of the for-hire and all of the private carriers had no acute or critical vehicle violations discovered during the CR. Of the for-hire carriers with violations, the mean score is 0.12. Please refer to Figure 60.

Safety Management Review Measure

The SMRM is based on the safety management-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Across all industry segments, the measure for carriers with violations ranges from an average low of 9.0 to an average high of 36.1.

For carriers in the tank carriers segment with CR data collected 18 months prior to database development, 67.2% of the for-hire and 65.2% of the private carriers had no acute or critical safety management violations discovered during the CR. Of the for-hire carriers with violations, the mean score is 12.7. The private fleet operators with violations had an average SMRM of 14.8. Please see Figure 61.

Enforcement Severity Measure

The ESM focuses on closed enforcement case data. An enforcement case is the result of one or more major violations discovered during a CR. The enforcement severity measure requires that a carrier has had at least one enforcement case that was initiated and closed within the last 30-month period prior to the compilation of the database. The measure combines a time weighting factor for case initiation along with a severity weight (based on the number of the different violations cited in the case) to produce an overall score. Across all industry segments with closed enforcement cases, the average rating is 2.5.

Refer to Figure 62 for a summary of enforcement data for carriers in the Tank segment with CR data collected 18 months prior to database development. 77.1% of the for-hire and 84.4% of the private carriers had no closed enforcement cases. Of the for-hire carriers with closed enforcement cases, the average ESM is 2.0 while the score for private carriers is 1.1.

Comprehensive Driver and Vehicle Safety Evaluation Results

Safestat reports data on the following variables: Vehicle and Driver Inspection Indicators as well as Driver and Vehicle Safety Evaluation scores (SEA). The Vehicle and Driver Inspector Indicators are based entirely on roadside inspections 30 months prior to the compilation of the database. They focus on the percentage of the company's vehicles/drivers placed out-of-service along with the number of out-of-service violations found during the inspection. In addition, a time-weighting factor is employed to place more importance on the more recent inspections. A carrier's score is ranked from lowest to highest and is converted to a percentile score with 100 representing the highest or worst performance.

The Vehicle and Driver SEAs combine data from the roadside inspections with data from the most recent compliance review (if it occurred 18 months to the database construction). In addition, the Driver SEA includes a moving violation measure (based on moving violation citations issued to a carrier's drivers), where available. Like the vehicle and driver inspection indicators, the Vehicle and Driver SEAs are converted to a percentile with 100 representing the highest or worst performance. The Vehicle and Driver SEAs are based entirely on the inspection data if the carrier had no CR in the period 18 months prior to the database construction. Since most carriers have not had a review in this time period, Vehicle and Driver SEAs are heavily influenced by roadside inspections and are highly correlated with Vehicle and Driver Inspection Indicator scores. We will focus discussion on Vehicle and Driver SEAs.

Across all industry segments, Vehicle SEAs range from an average low of 28.6 to an average high of 64.6 and the Driver SEAs range from an average low of 23.0 to an average high of 65.3.

In the Tank segment, the mean Vehicle SEA for for-hire carriers is 48.1, while it is 46.5 for private carriers. Regarding the Driver SEA, for-hire carriers average 42.9 and private carriers average only 26.3.

Summary

This section gives a summary comparison of the overall safety performance between for-hire tank carriers and private fleet operators in this segment. Based on CRs administered in the 18 month period prior to database development, for-hire carriers had a significant decline in the proportion

of their reviews that are satisfactory compared with the full set of CRs and a corresponding increase in conditional and unsatisfactory CRs. Private fleets essentially maintained the proportion of their reviews in each category. In fact, the overall results indicate better performance by the for-hire carriers while the recent (18 months prior to database development) CRs indicate better performance by the private carriers.

While the for-hire and tank carriers fleets have comparable RCR, private fleets have clear advantages in their driver performance results. Indeed, 89.4% of recent CRs found private fleets with no driver acute or critical regulation violations. This contrasts with the experience of for-hire fleets where only 75.4% had no driver acute or critical regulation violations. Furthermore, the overall Driver SEA for private fleets is significantly better than the score for for-hire fleets.

The only clear area that the for-hire fleets have the advantage over private fleets is in the overall review rating and this advantage is reversed when reviewing only those CRs concluded in the most recent 18-month period prior to database construction.

Bulk Materials (non-tank) Safety Performance Results

Introduction

Figures 63 through 68 in Appendix A provide summary measures of the safety performance of carriers in the Bulk Materials (non-tank) segment. It includes summaries for both for-hire and private carriers, respectively, and is drawn from measures that are collected as part of the SafeStat algorithm. We divide the discussion into three sections and give results for the private and for-hire firms, individually, in each section. One presents the overall Compliance Review (CR) data for a carrier's most recent CR, regardless of when it occurred, as well as a separate summary for CRs conducted in the 18 months prior to the development of the database (July 1998). The second section discusses and summarizes the detailed components of the CR for each segment. Finally, an overall perspective of driver and vehicle safety performance, based on CR results and roadside inspections, is shared.

Overall Compliance Review Results

Figure 63 indicates the results of the most recent CR for 2,010 for-hire carriers. 62.3% received a satisfactory evaluation, 30.4% received a conditional evaluation, and 7.3% received an unsatisfactory overall rating. The results of the most recent CRs for the 1,481 private carriers indicate that 53.2% received a satisfactory evaluation with 38.9% obtaining a conditional evaluation and 7.9% earning an unsatisfactory overall rating.

In the 18 months (January 1997 - July 1998) prior to the development of the database, 693 for-hire carriers and 146 private carriers had reviews. These results are displayed in Figure 64. These more recent CRs reflect a concerted effort to target at-risk carriers in the CR process. Thus, direct comparison of these results with overall CR results should proceed with caution since the most recent CRs should have a higher proportion of unsatisfactory and/or conditional ratings due to targeting of "unsafe" carriers. The results of these current reviews show that 51.3% of the for-hire carriers received a satisfactory evaluation, 33.7% received a conditional evaluation, and 15.0% received an unsatisfactory overall rating. As expected, these results reflect a decline in satisfactory evaluations for the for-hire carriers with a corresponding increase in both conditional and unsatisfactory evaluations.

Of the recent private carrier CRs, 53.5% received a satisfactory evaluation with 28.0% obtaining a conditional evaluation, and 18.5% getting an unsatisfactory overall rating. Rather than a shift from satisfactory to conditional and unsatisfactory, these results reflect a substantial decline in conditional evaluations for the private carriers with a corresponding increase in the number of unsatisfactory evaluations.

Detailed Compliance Review Results

This section summarizes a set of indices developed from detailed information compiled as part of the CR process. Only data from CRs conducted in the 18 months prior to the development of the database are included in this discussion. The following indices are discussed: the Recordable Crash Rate (RCR), the Driver Safety Review Measure (DRM), the Vehicle Safety Review Measure (VRM), the Safety Management Review Measure (SMRM), and the Enforcement Severity Measure (ESM).

Recordable Crash Rate

The RCR indicates the number of crashes per million VMT as reported in the CR. Figure 65 indicates that for-hire carriers average 1.46 crashes per million VMT while the comparable rate for private carriers is 2.82. This average rate ranges from a minimum of 0.13 to a maximum of 2.89 crashes per million VMT across all industry segments.

Driver Safety Review Measure

The DRM is based on the driver-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Across all industry segments, the measure for carriers with violations ranges from an average low of 1.8 to an average high of 15.7.

Figure 66 summarizes the data for carriers in the Bulk materials (non-tank) segment with CR data collected 18 months prior to database development. 70.9% of the for-hire and 82.2% of the private carriers had no acute or critical driver violations discovered during the CR. Of the for-hire carriers with violations, the mean score is 10.3. The private fleet operators with violations had an average driver measure score of 6.7.

Vehicle Safety Review Measure

The VRM is based on the vehicle-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Of all the industry segments, the highest average score for carriers with violations is 2.2.

For carriers in the bulk materials (non-tank) segment with CR data collected 18 months prior to database development, 99.9% of the for-hire and 97.9% of the private carriers had no acute or critical vehicle violations discovered during the CR. Of the for-hire carriers with violations, the mean score is 0.05, while for private carriers, the mean score is 1.39. Please refer to Figure 66.

Safety Management Review Measure

The SMRM is based on the safety management-related acute and critical violations of regulations discovered during a CR. The measure attaches a severity weight of 1 or 2 to critical violations (depending on whether they are compliance/paperwork or performance oriented, respectively) and a value of 3 for all acute violations. The measure combines the severity weight and frequency of occurrence, while controlling for the number of records checked. Across all industry segments, the measure for carriers with violations ranges from an average low of 9.0 to an average high of 36.1.

For carriers in the Bulk Materials (non-tank) segment with CR data collected 18 months prior to database development, 55.0% of the for-hire but only 41.1% of the private carriers had no acute or critical safety management violations discovered during the CR. Of the for-hire carriers with violations, the mean score is 21.5. The private fleet operators with violations had an average SMRM of 36.1. This data is displayed in Figure 67.

Enforcement Severity Measure

The ESM focuses on closed enforcement case data. An enforcement case is the result of one or more major violations discovered during a CR. The enforcement severity measure requires that a carrier has had at least one enforcement case that was initiated and closed within the last 30-month period prior to the compilation of the database. The measure combines a time weighting factor for case initiation along with a severity weight (based on the number of the different violations cited in the case) to produce an overall score. Across all industry segments with closed enforcement cases, the average rating is 2.5.

For carriers in the Bulk Materials (non-tank) segment with CR data collected 18 months prior to database development, 77.6% of the for-hire and 87.7% of the private carriers had no closed enforcement cases. Of the for-hire carriers with closed enforcement cases, the average ESM is 1.8 while the score for private carriers is 0.8. Please see Figure 68.

Comprehensive Driver and Vehicle Safety Evaluation Results

Safestat reports data on the following variables: Vehicle and Driver Inspection Indicators as well as Driver and Vehicle Safety Evaluation scores (SEA). The Vehicle and Driver Inspector Indicators are based entirely on roadside inspections 30 months prior to the compilation of the database. They focus on the percentage of the company's vehicles/drivers placed out-of-service along with the number of out-of-service violations found during the inspection. In addition, a time-weighting factor is employed to place more importance on the more recent inspections. A carrier's score is ranked from lowest to highest and is converted to a percentile score with 100 representing the highest or worst performance.

The Vehicle and Driver SEAs combine data from the roadside inspections with data from the most recent compliance review (if it occurred 18 months to the database construction). In addition, the Driver SEA includes a moving violation measure (based on moving violation citations issued to a carrier's drivers), where available. Like the vehicle and driver inspection indicators, the Vehicle and Driver SEAs are converted to a percentile with 100 representing the highest or worst performance. The Vehicle and Driver SEAs are based entirely on the inspection data if the carrier had no CR in the period 18 months prior to the database construction. Since most carriers have not had a review in this time period, Vehicle and Driver SEAs are heavily influenced by roadside inspections and are highly correlated with Vehicle and Driver Inspection Indicator scores. We will focus discussion on Vehicle and Driver SEAs.

Across all industry segments, the Vehicle SEAs range from an average low of 28.6 to an average high of 64.6 and the Driver SEAs range from an average low of 23.0 to an average high of 65.3.

In the Bulk Materials (non-tank) segment, the mean Vehicle SEA for for-hire carriers is 55.0, while it is 56.4 for private carriers. Regarding the Driver SEA, for-hire carriers average 52.3 and private carriers average only 36.0.

Summary

This section gives a summary comparison of the overall safety performance between for-hire Bulk Materials (non-tank) carriers and private fleet operators in this segment. Based on CRs administered in the 18 month period prior to database development, for-hire carriers had a

significant decline in the proportion of their reviews that are satisfactory compared with the full set of CRs and a corresponding increase in conditional and unsatisfactory CRs. Private fleets maintained the percentage of reviews rated satisfactory. However, the percentage of conditional ratings decreased while unsatisfactory increased.

For-hire fleets have much better RCRs (1.46 versus 2.82). However, private fleets have clear advantages in their driver performance results. Indeed, 82.2% of recent CRs found private fleets with no driver acute or critical regulation violations. This contrasts with the experience of for-hire fleets where only 70.9% had no driver acute or critical regulation violations. Furthermore, the overall Driver SEA for private fleets is significantly better than the score for for-hire fleets.

One area that the for-hire fleets have the advantage over private fleets is in safety management policies and procedures. Among private fleets, 41.1% have no critical or acute regulation violations in the safety management area. This contrast with the for hire fleets among whom 55.0 have no safety management violations. This may suggest less knowledge by private fleets in safety management policies and procedures.

Figure 1
Overall Safety Review Rating: Most Recent CR

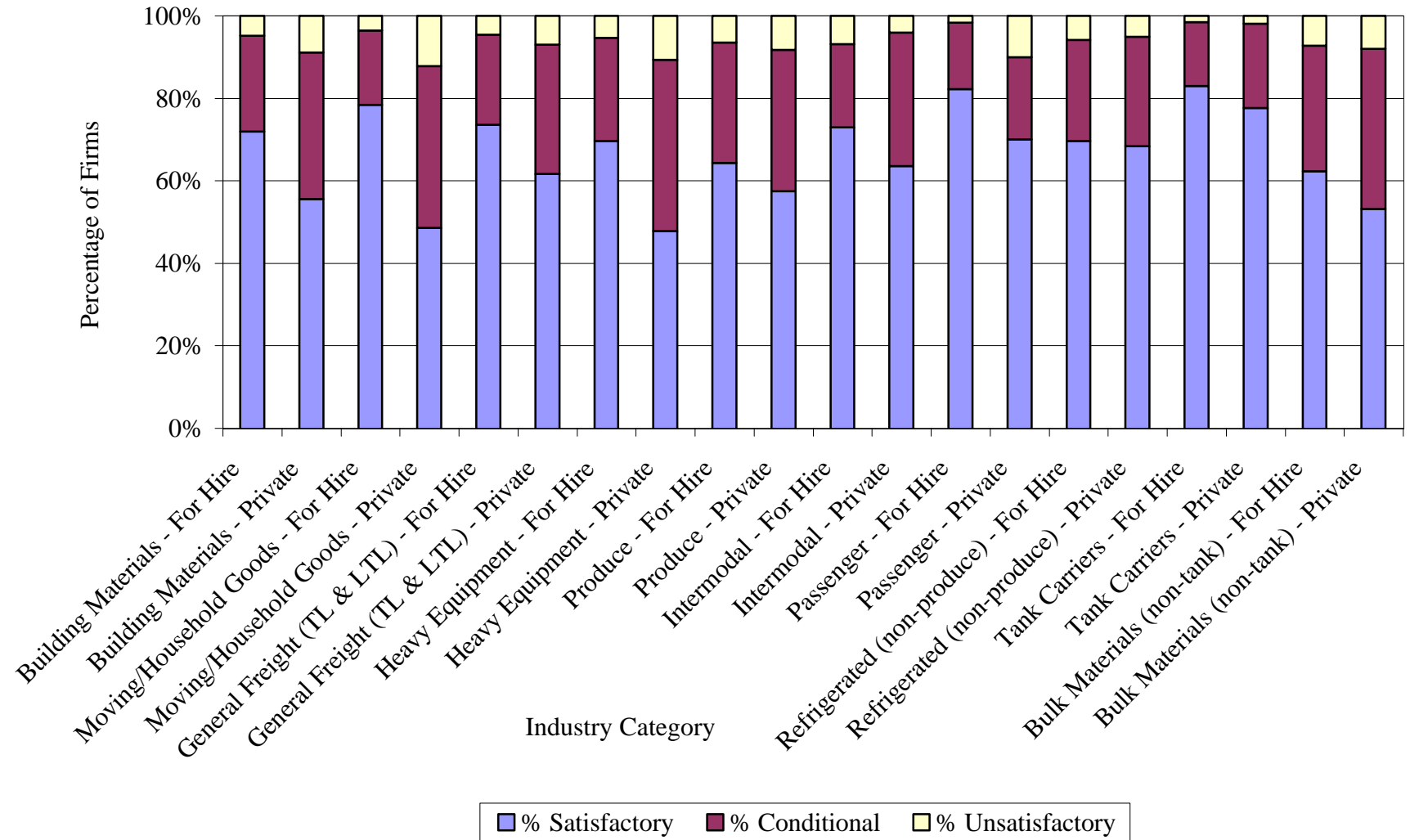


Figure 2
CR Results: 18 Months Prior to Database Development

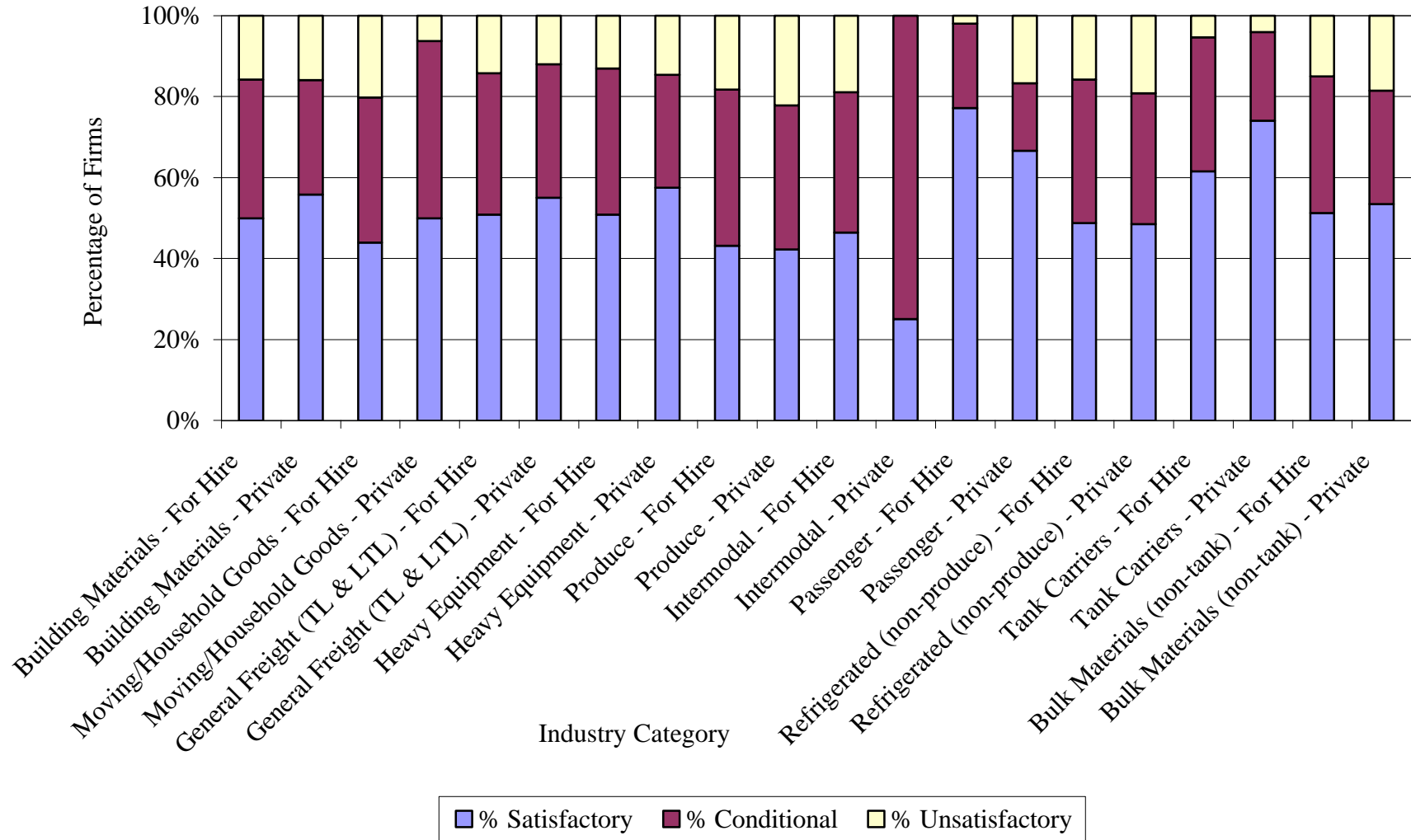


Figure 3
Recordable Crash Rate Comparison

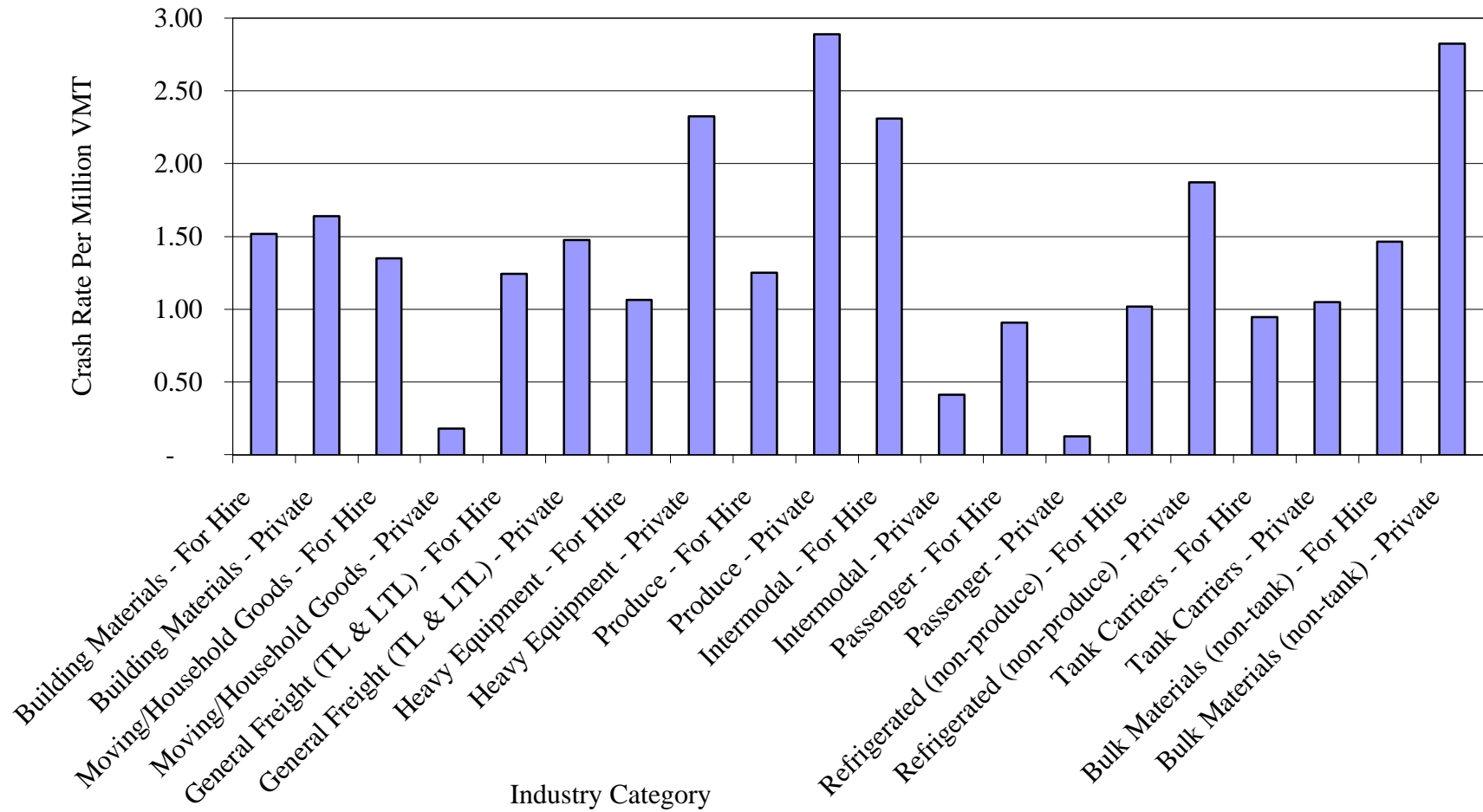


Figure 4
Driver and Vehicle Safety Review Measure

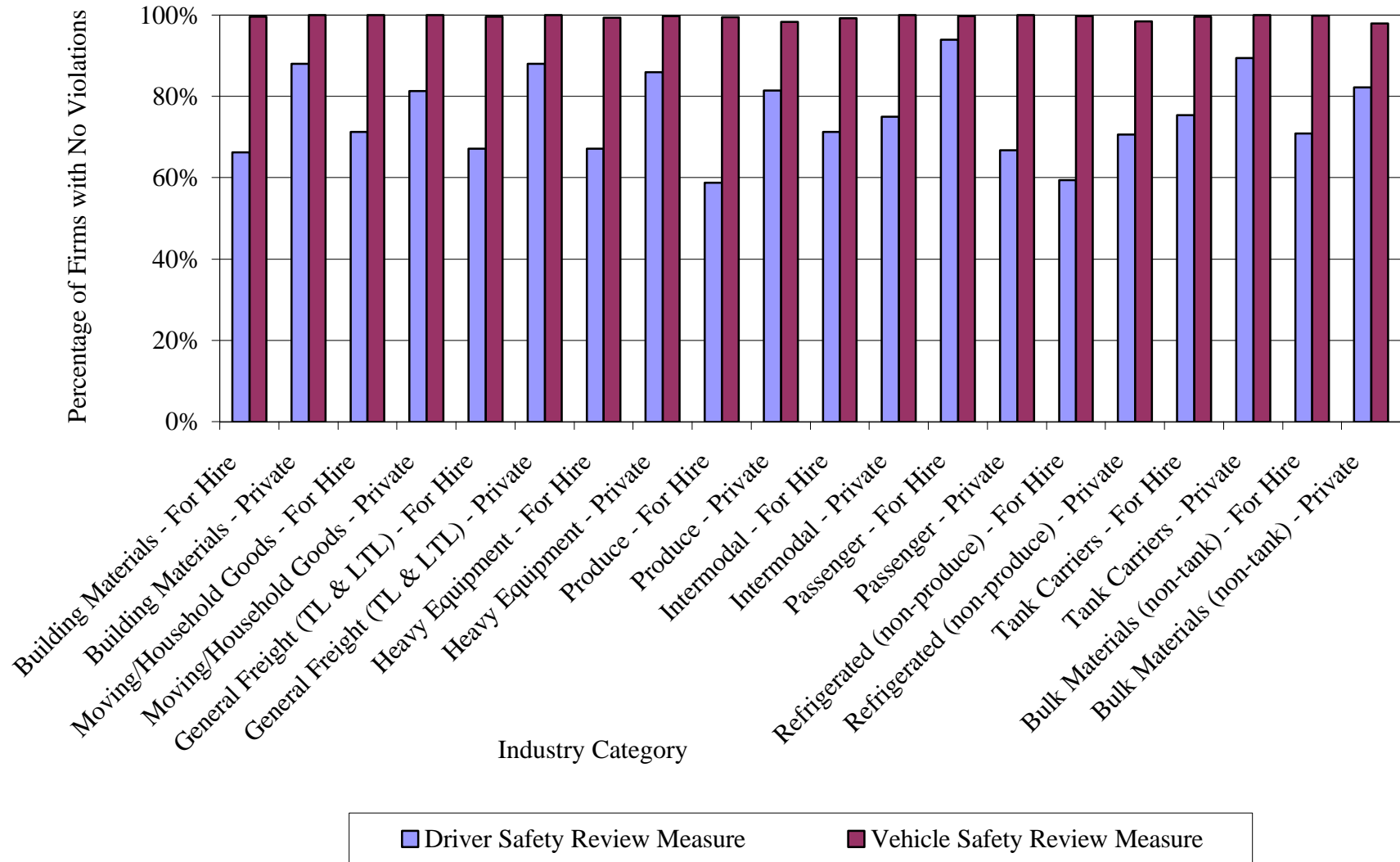


Figure 5
Safety Management Review Measure

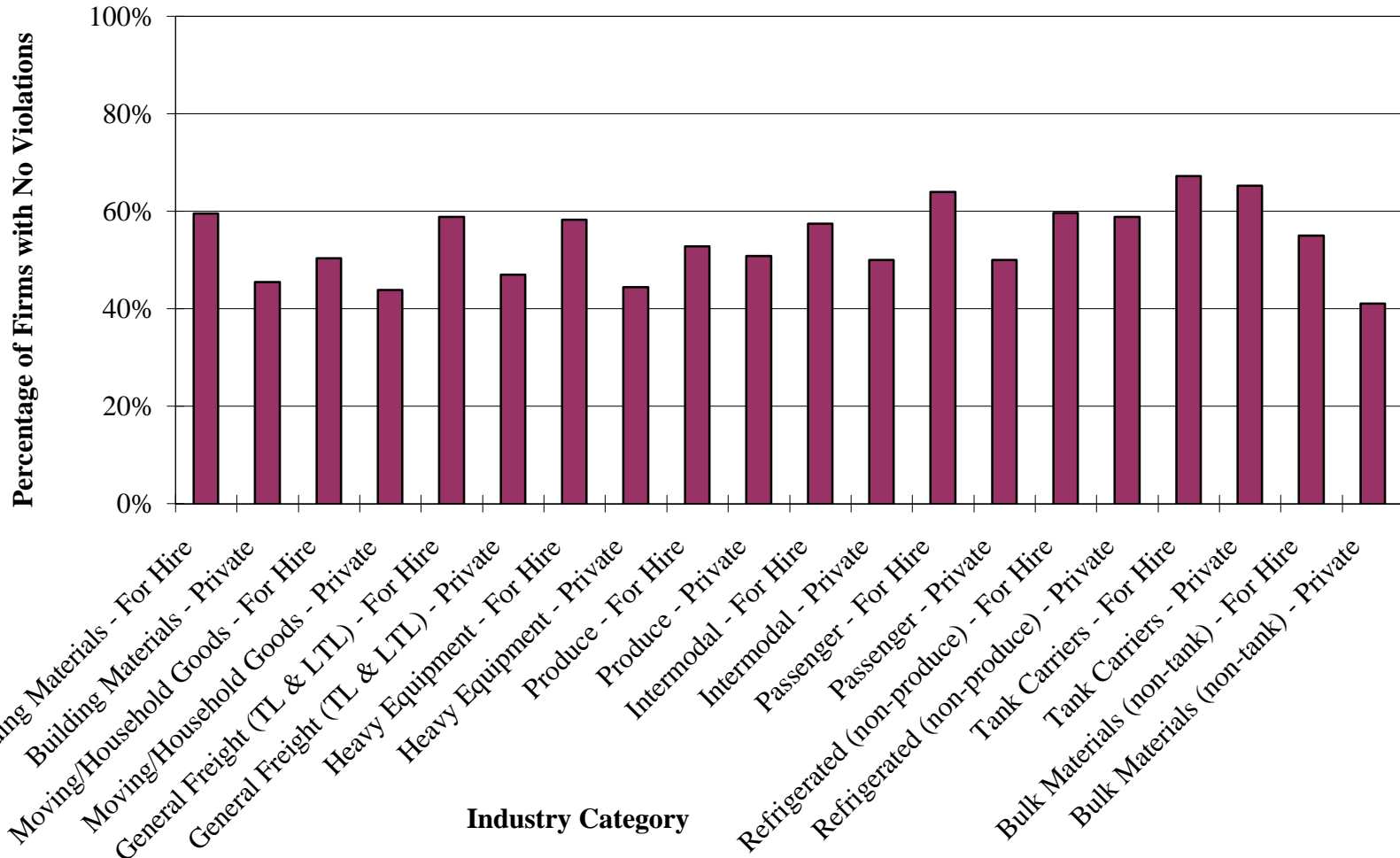


Figure 6
Enforcement Severity Measure

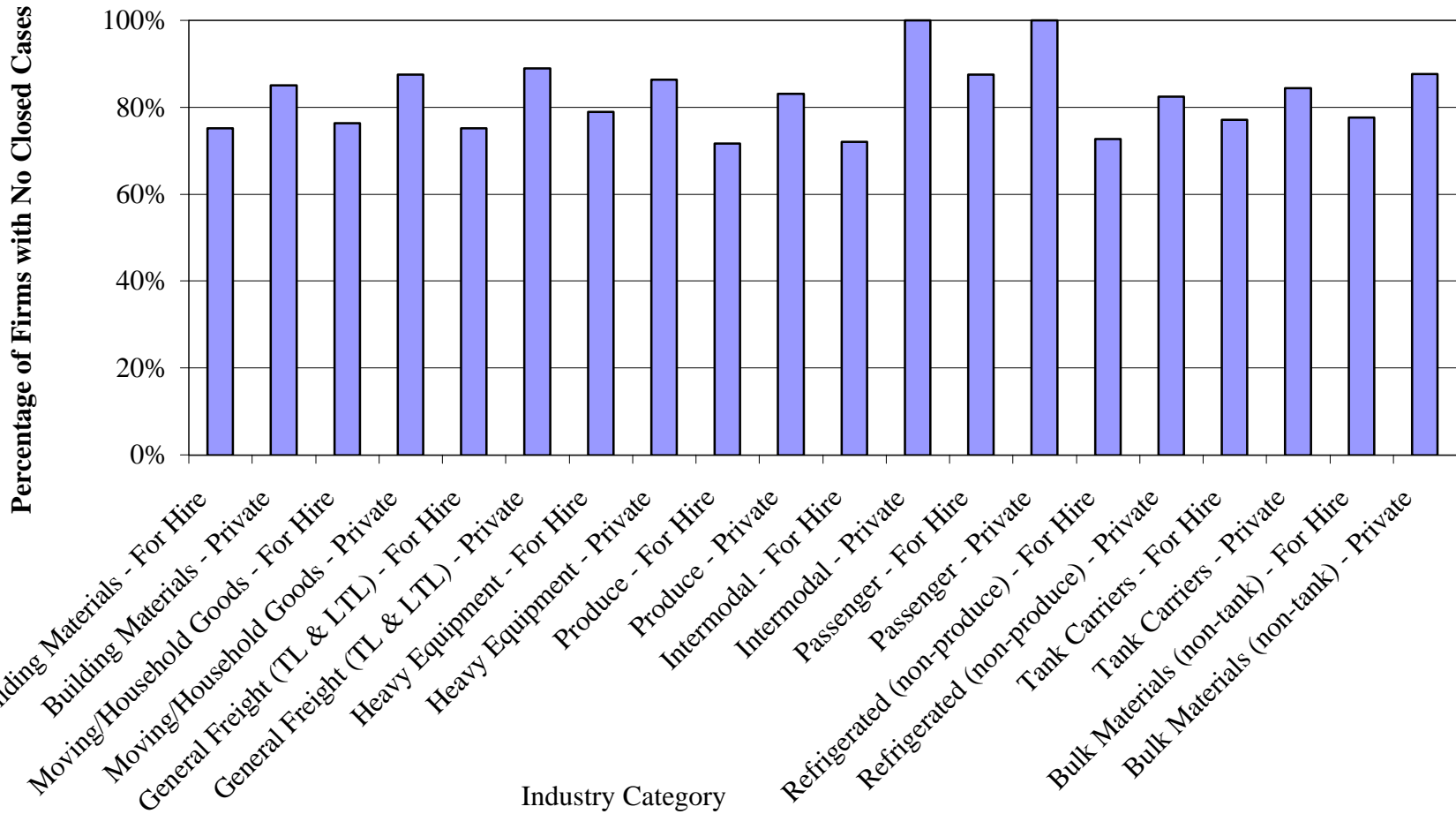


Figure 7
Driver Safety Evaluation Score

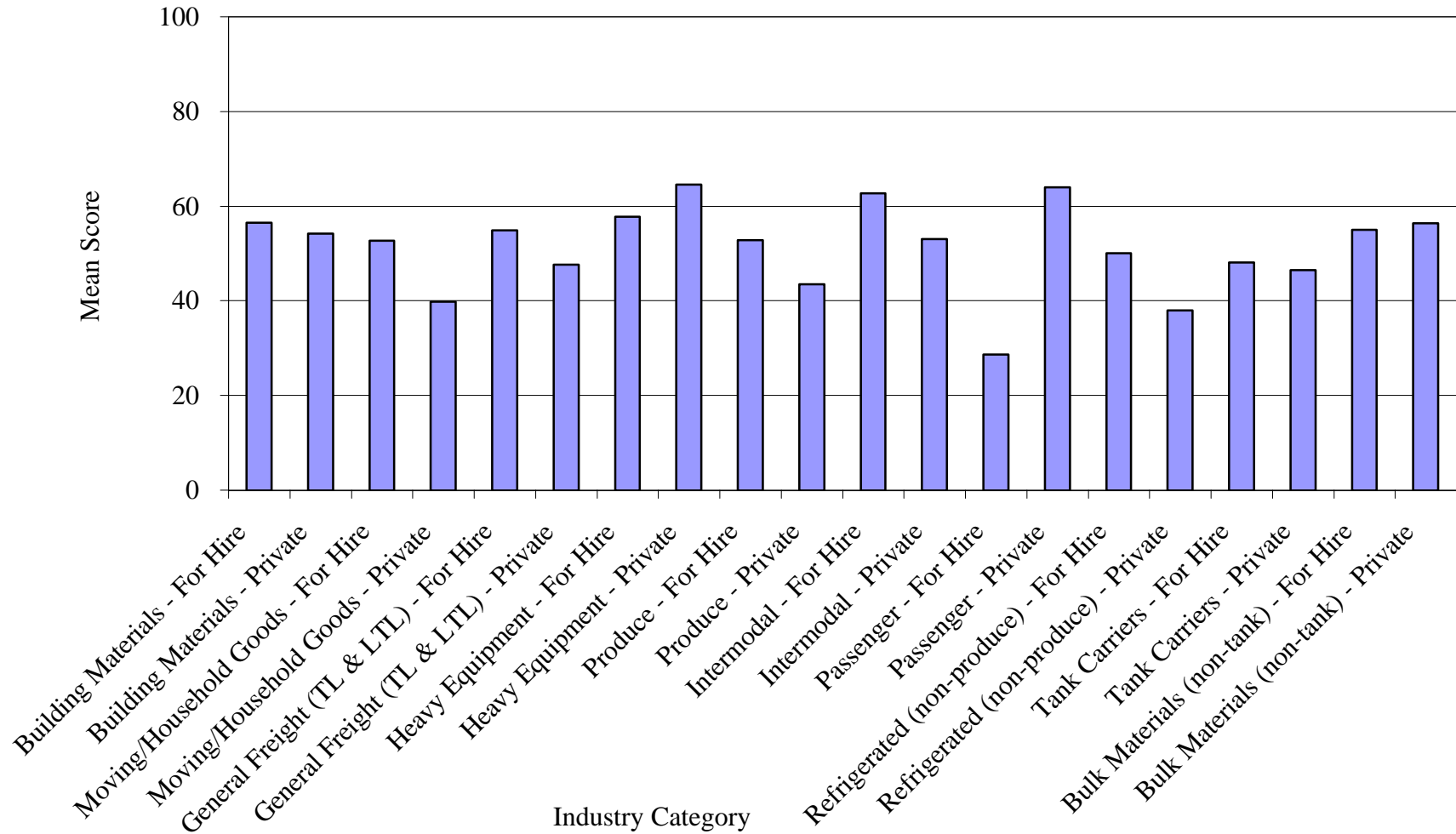


Figure 8
Vehicle Safety Evaluation Score

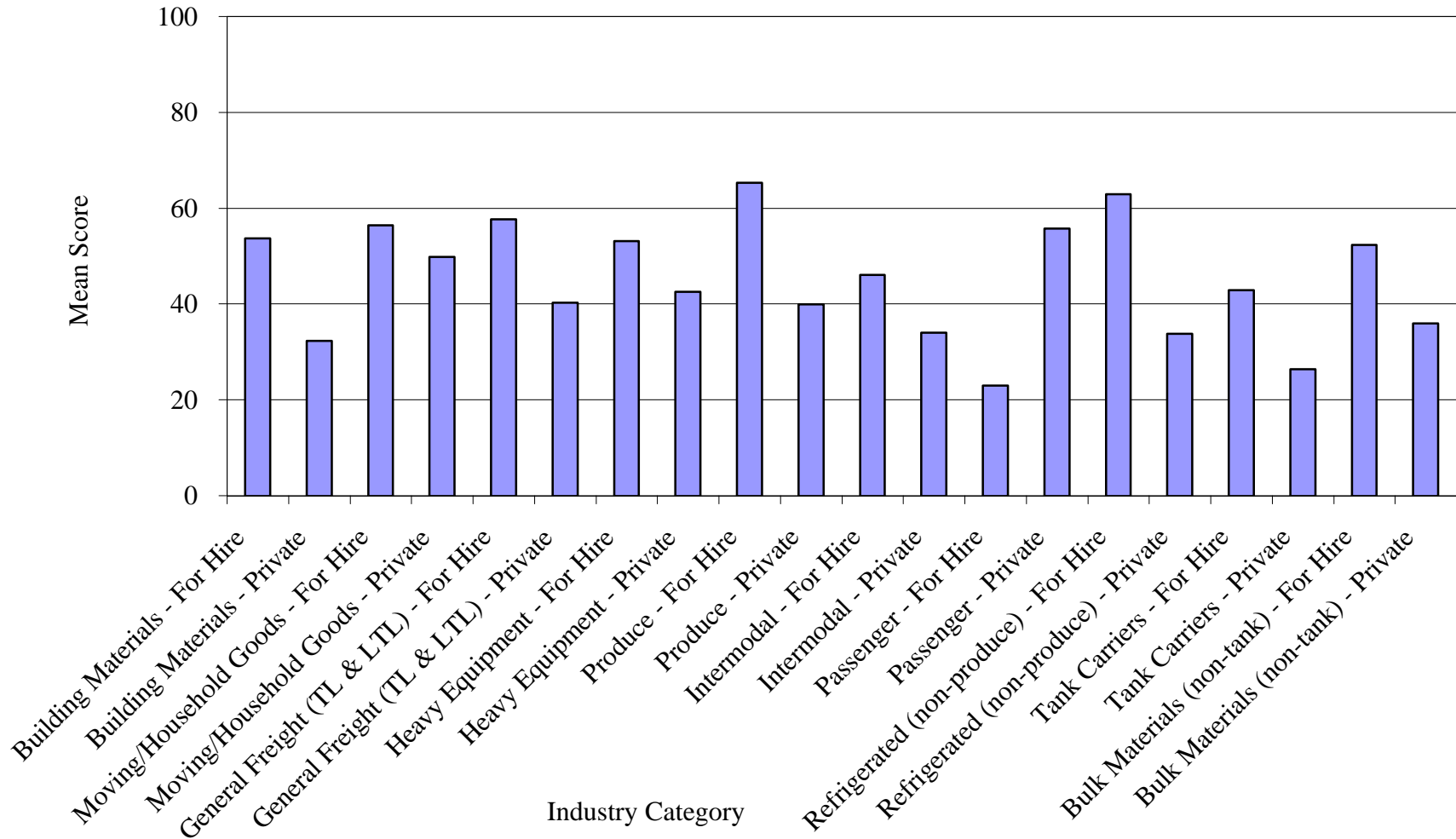


Figure 9
Building Materials
Overall Safety Review Rating: Most Recent CR

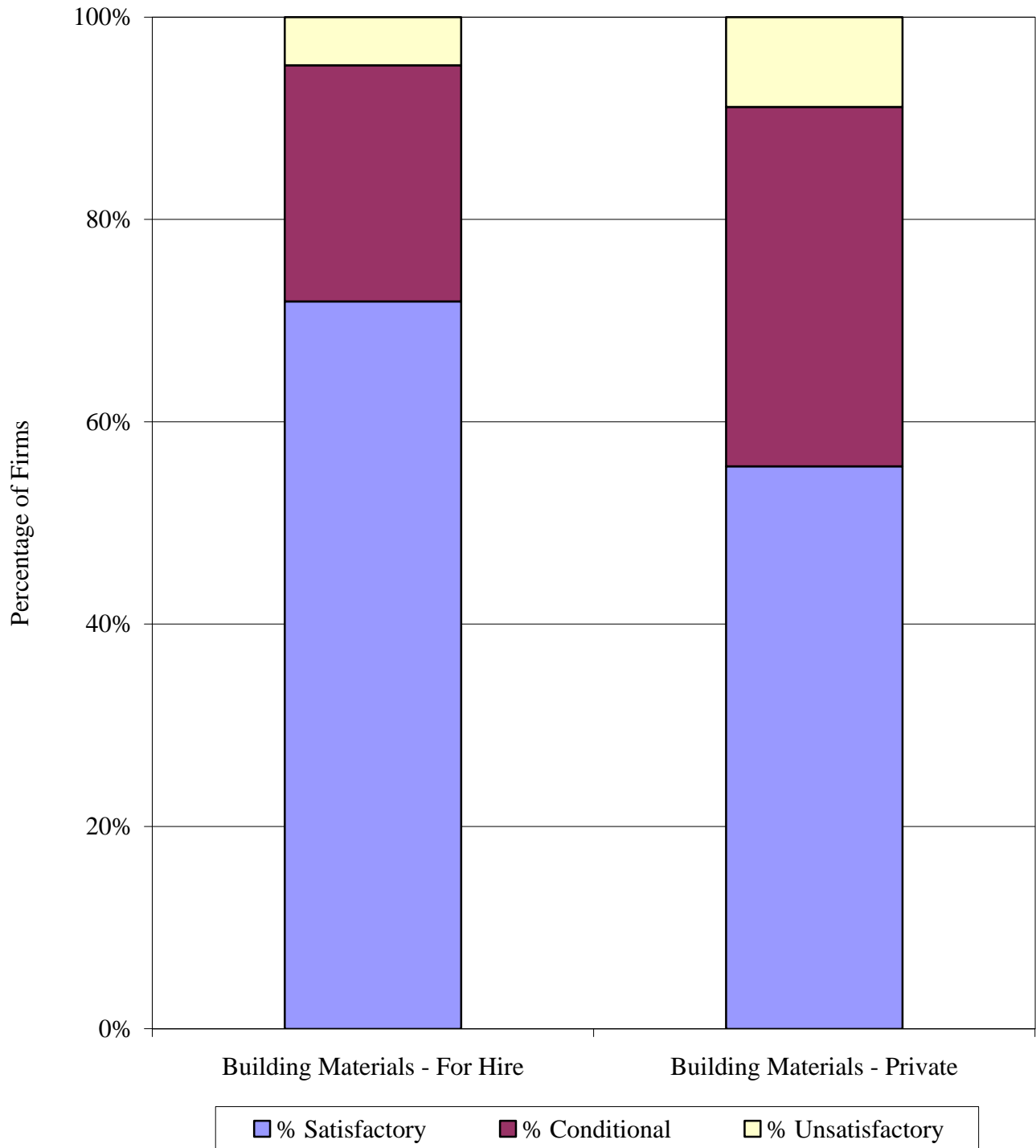


Figure 10
Building Materials
CR Results: 18 Months Prior to Database Development

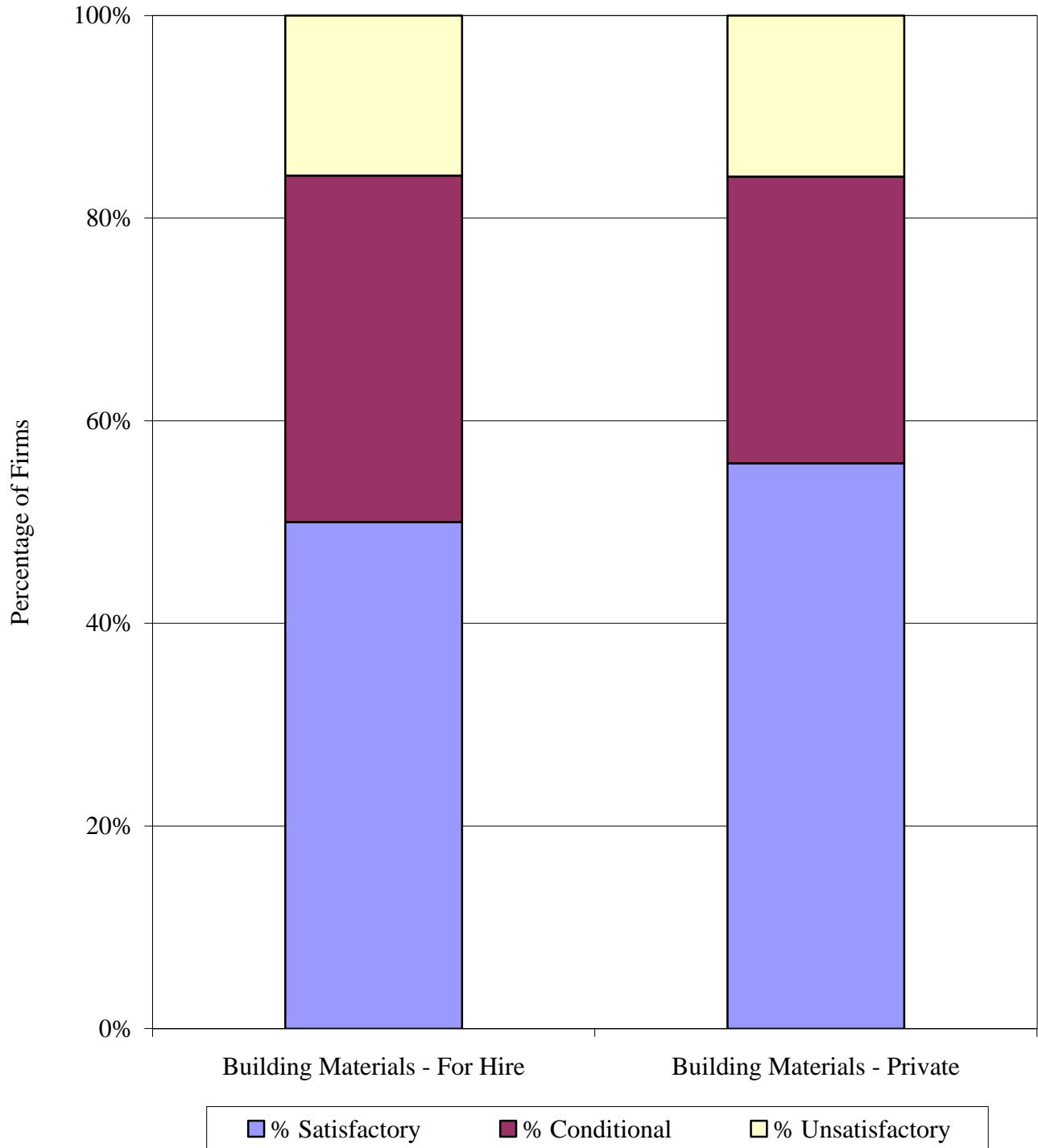


Figure 11
Building Materials
Recordable Crash Rate Comparison

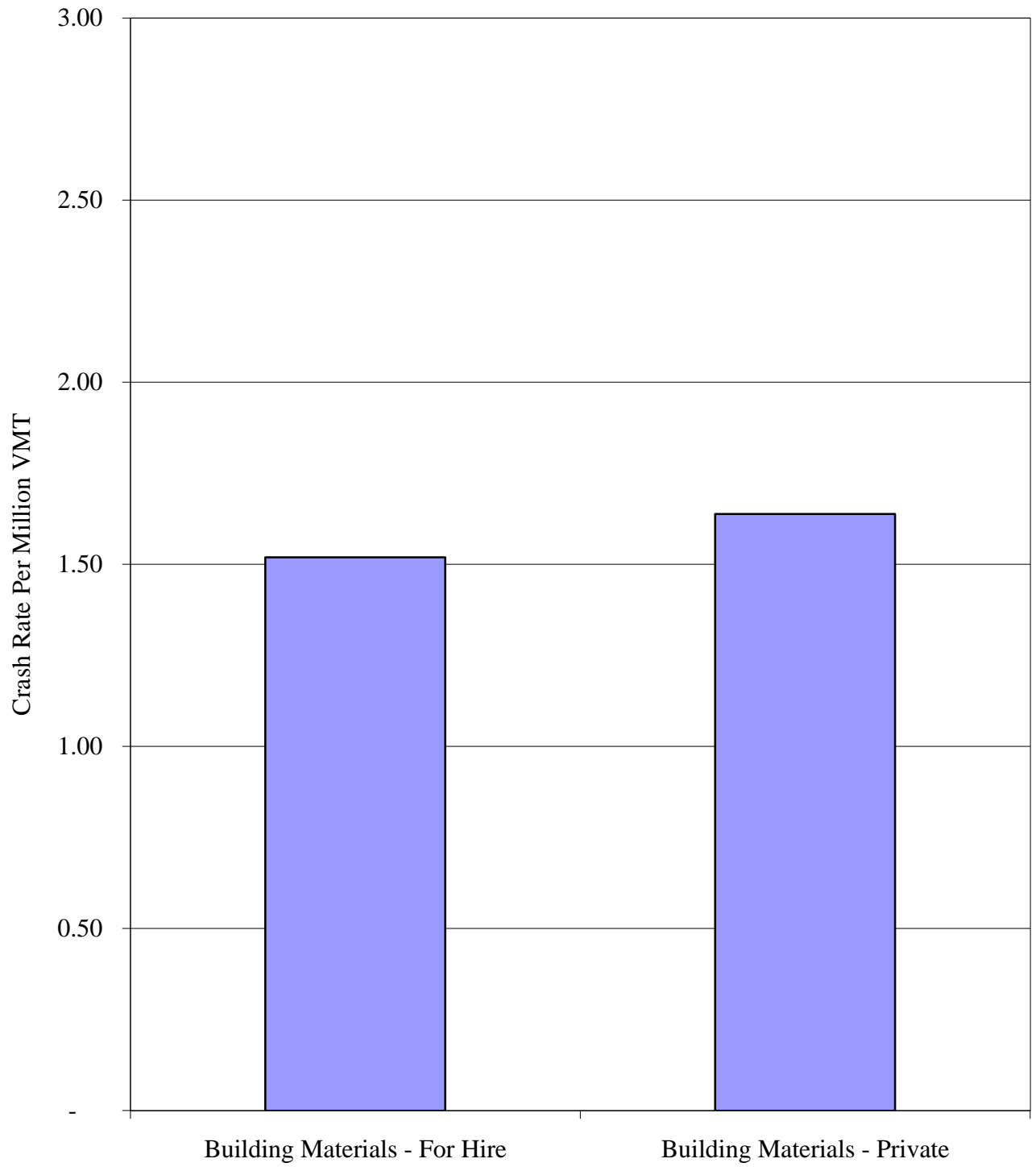


Figure 12
Building Materials
Driver and Vehicle Safety Review Measure

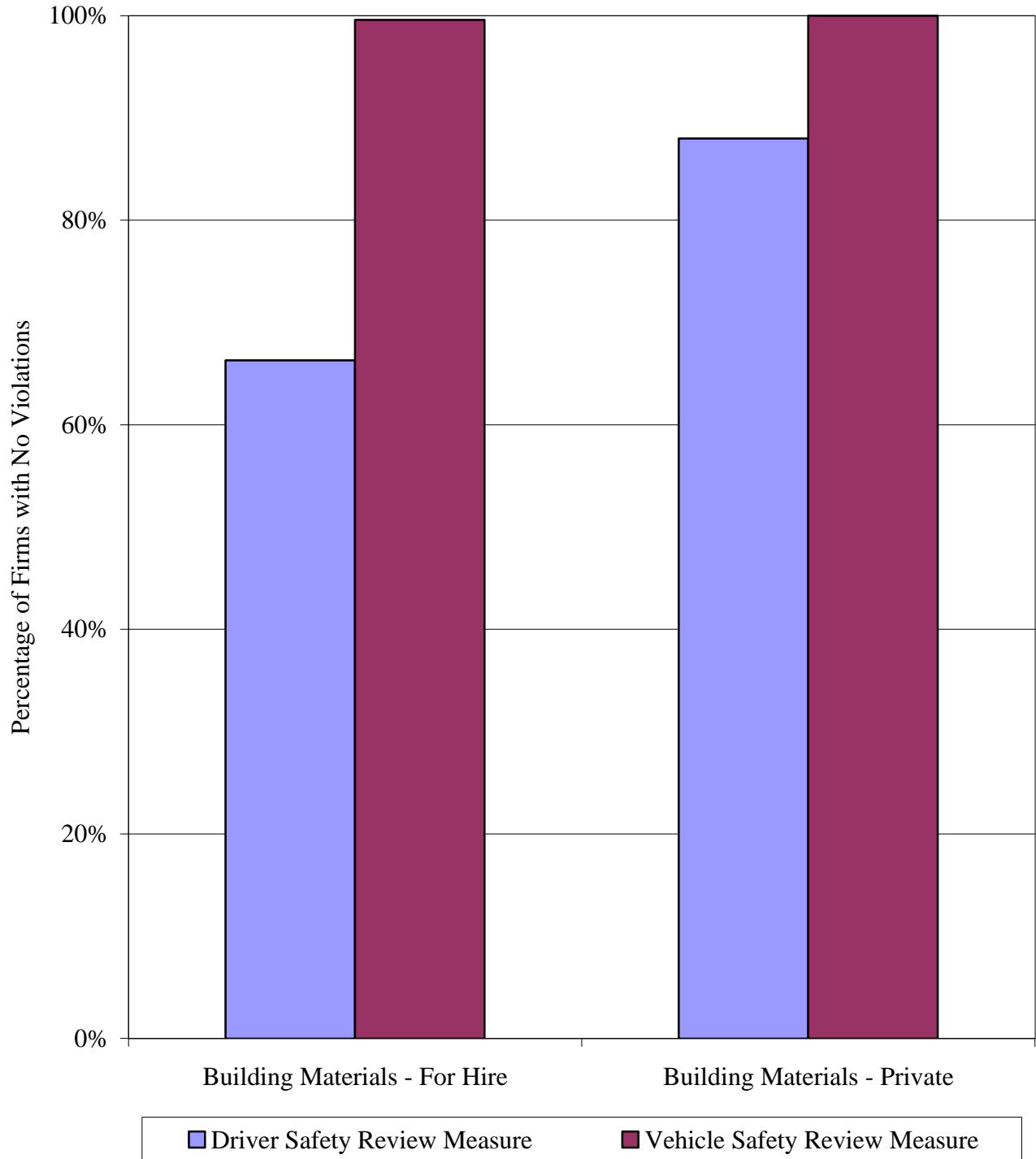


Figure 13
Building Materials
Safety Management Review Measure

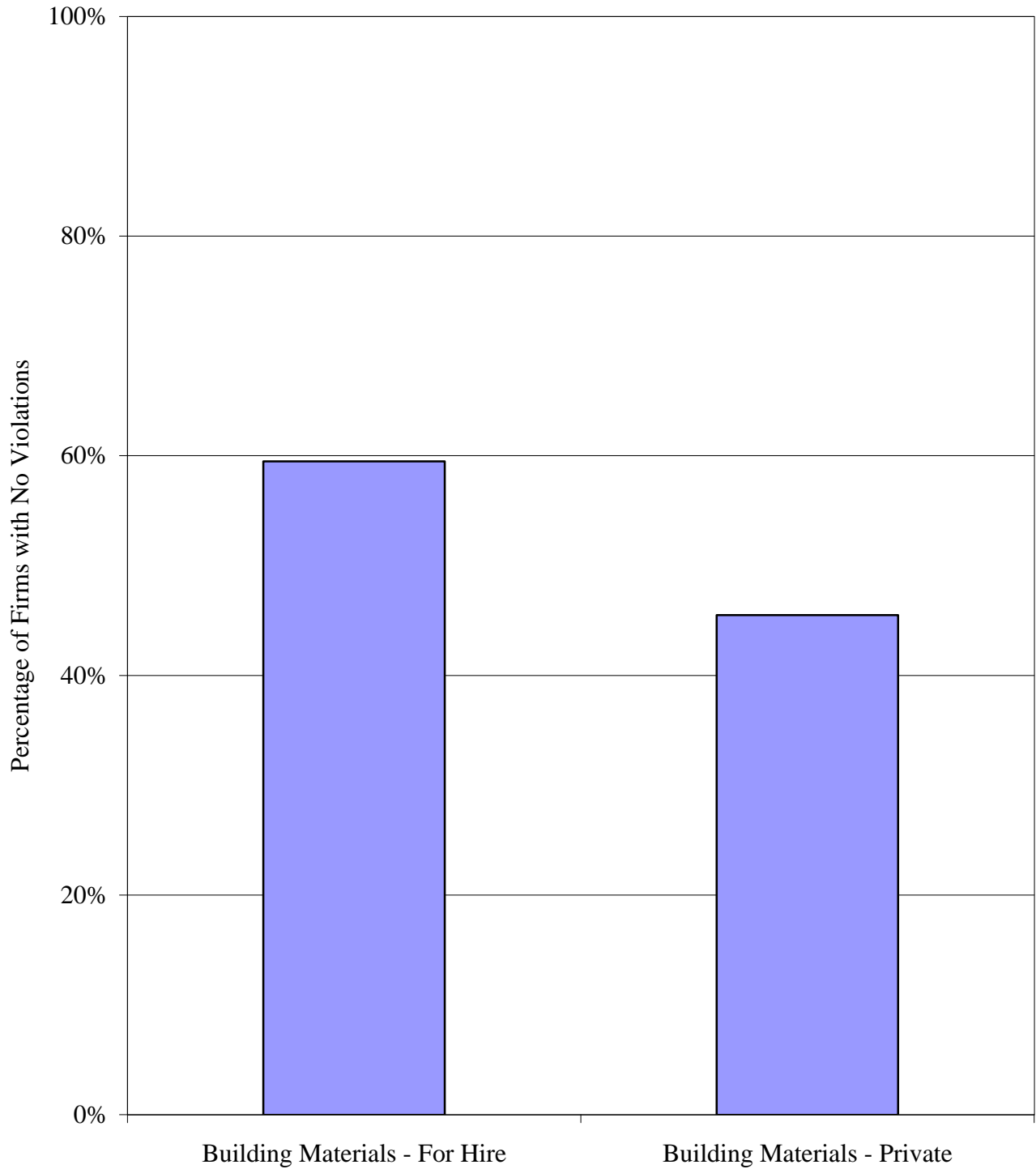


Figure 14
Building Materials
Enforcement Severity Measure

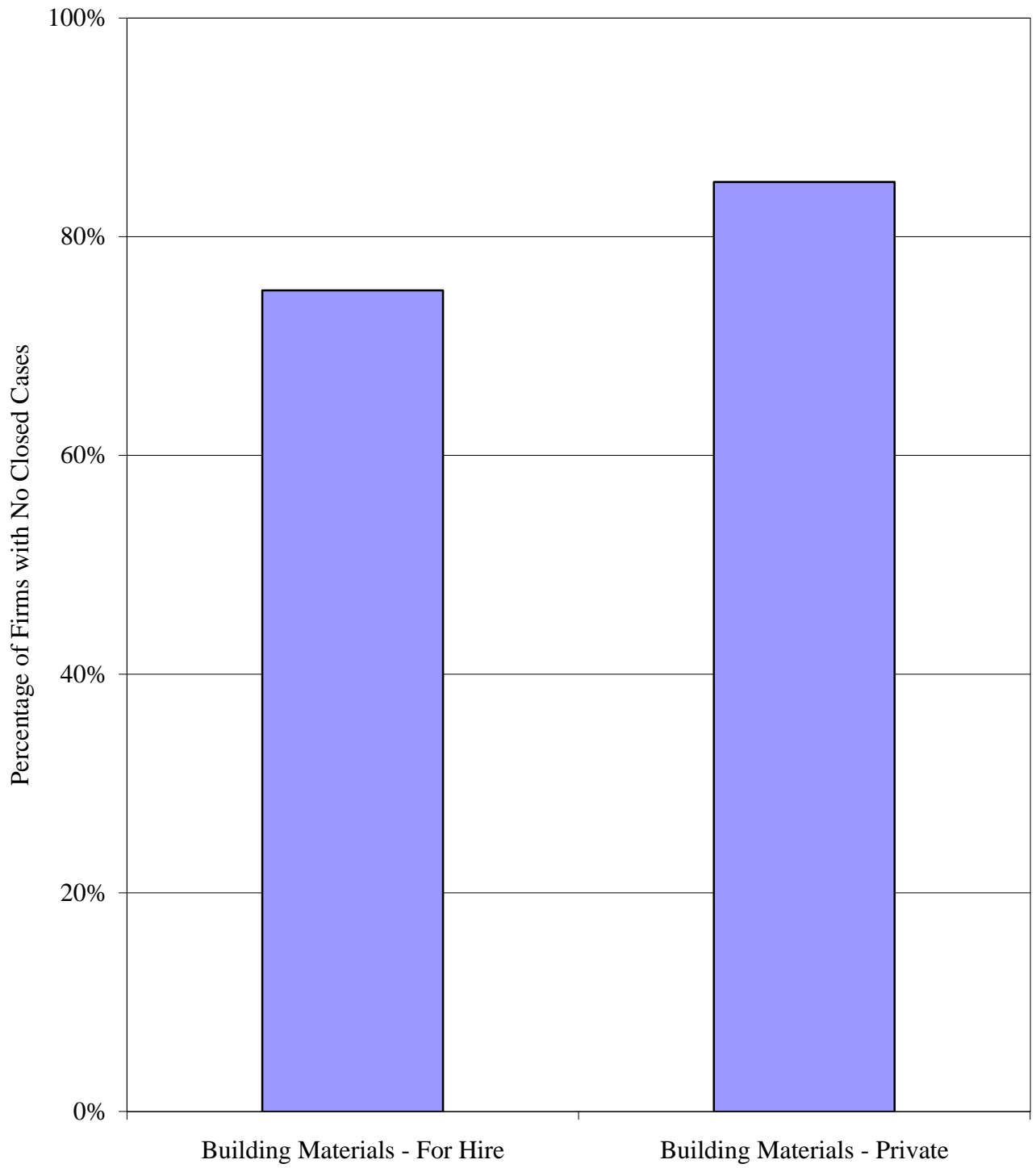


Figure 15
Moving/Household Goods
Overall Safety Review Rating: Most Recent CR

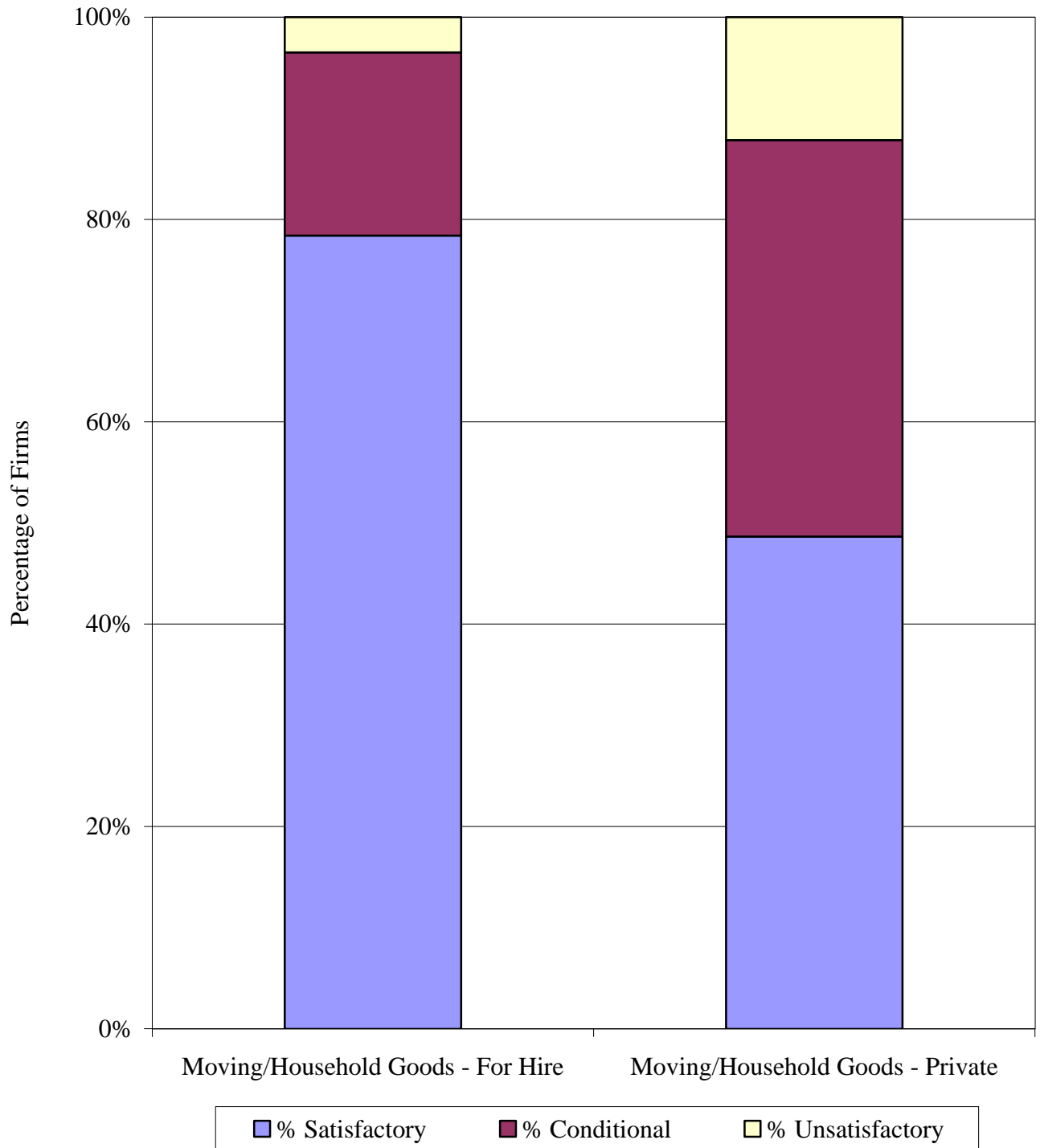


Figure 16
Moving/Household Goods
CR Results: 18 Months Prior to Database Development

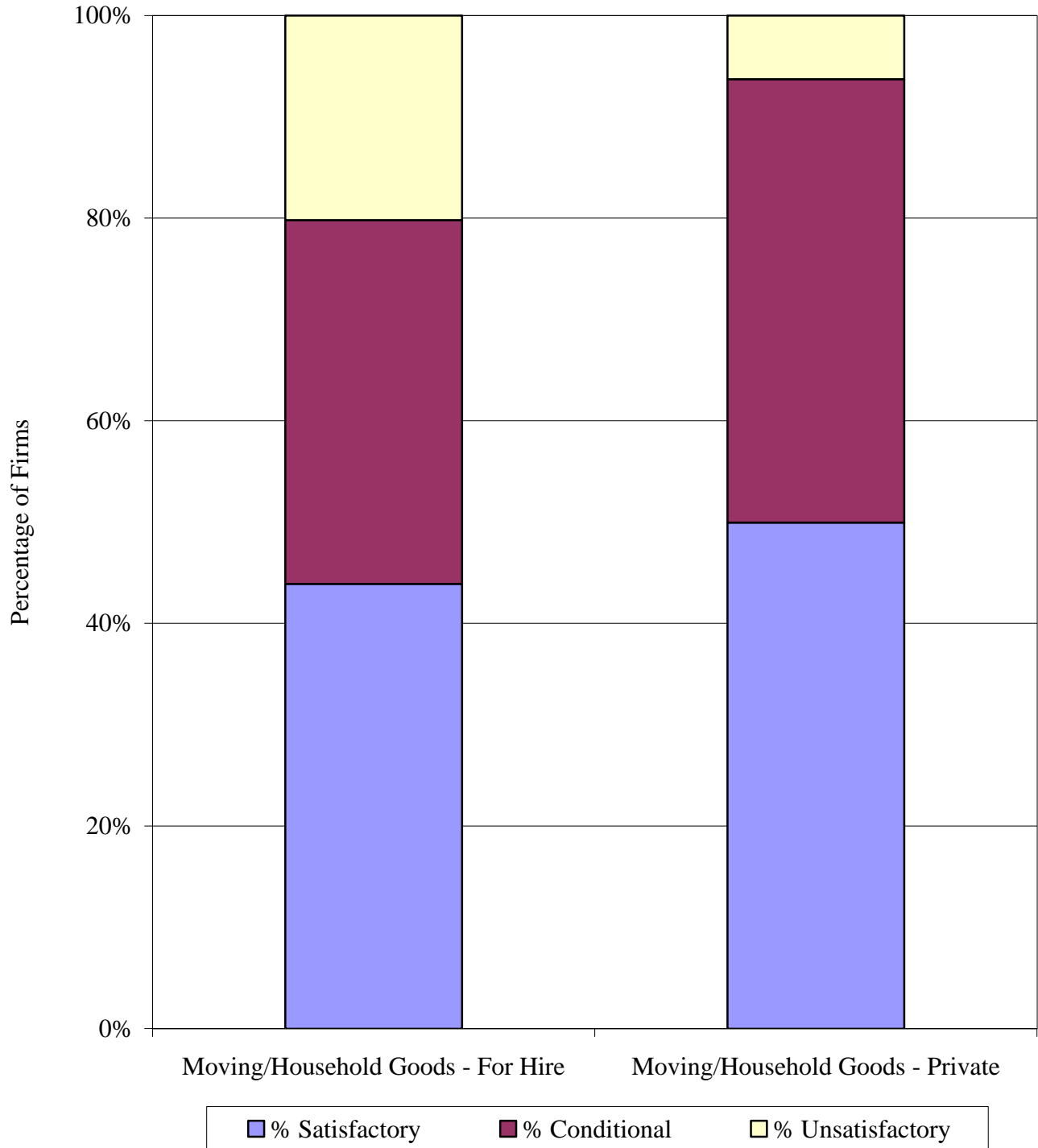


Figure 17
Moving/Household Goods
Recordable Crash Rate Comparison

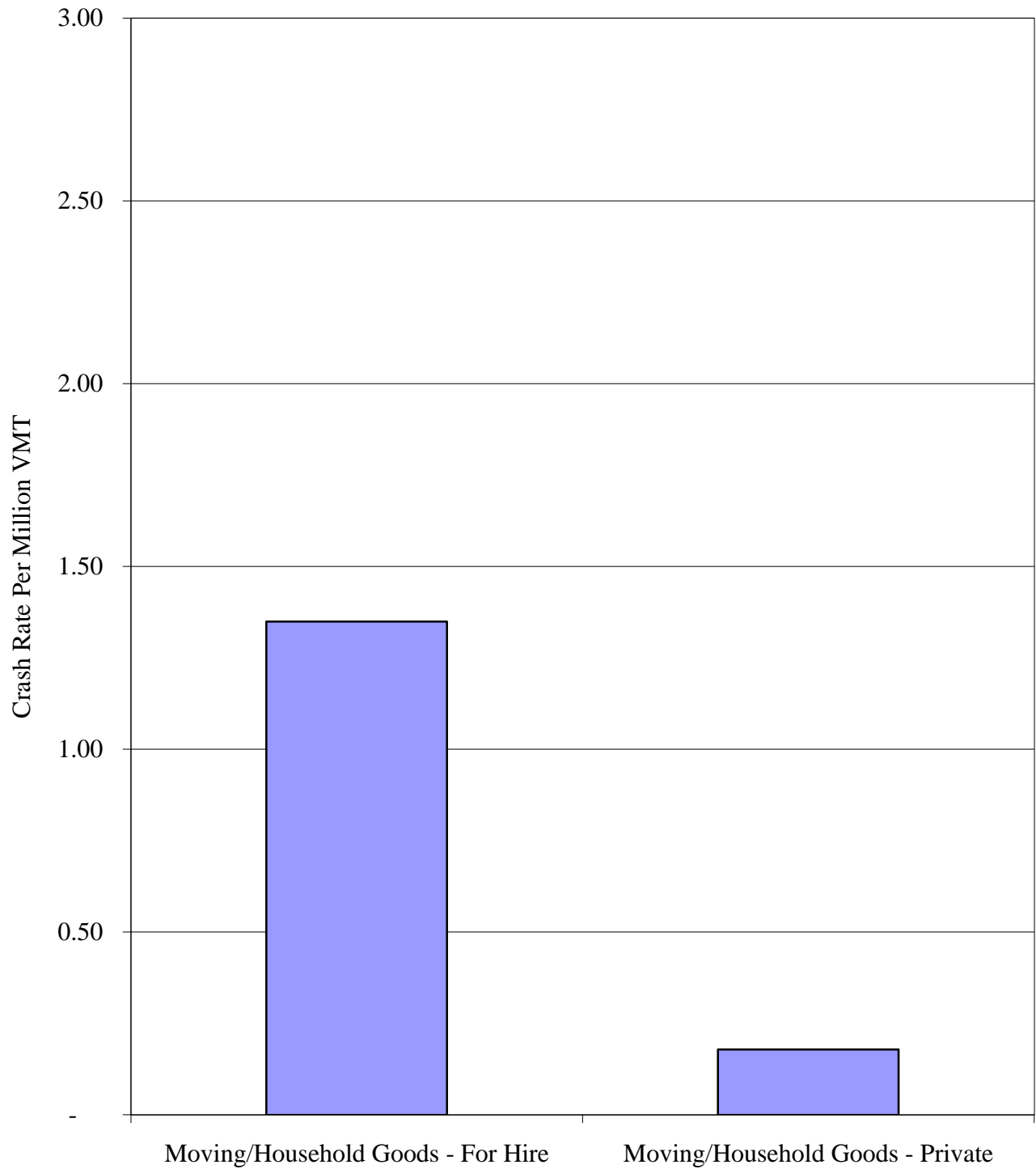


Figure 18
Moving/Household Goods
Driver and Vehicle Safety Review Measure

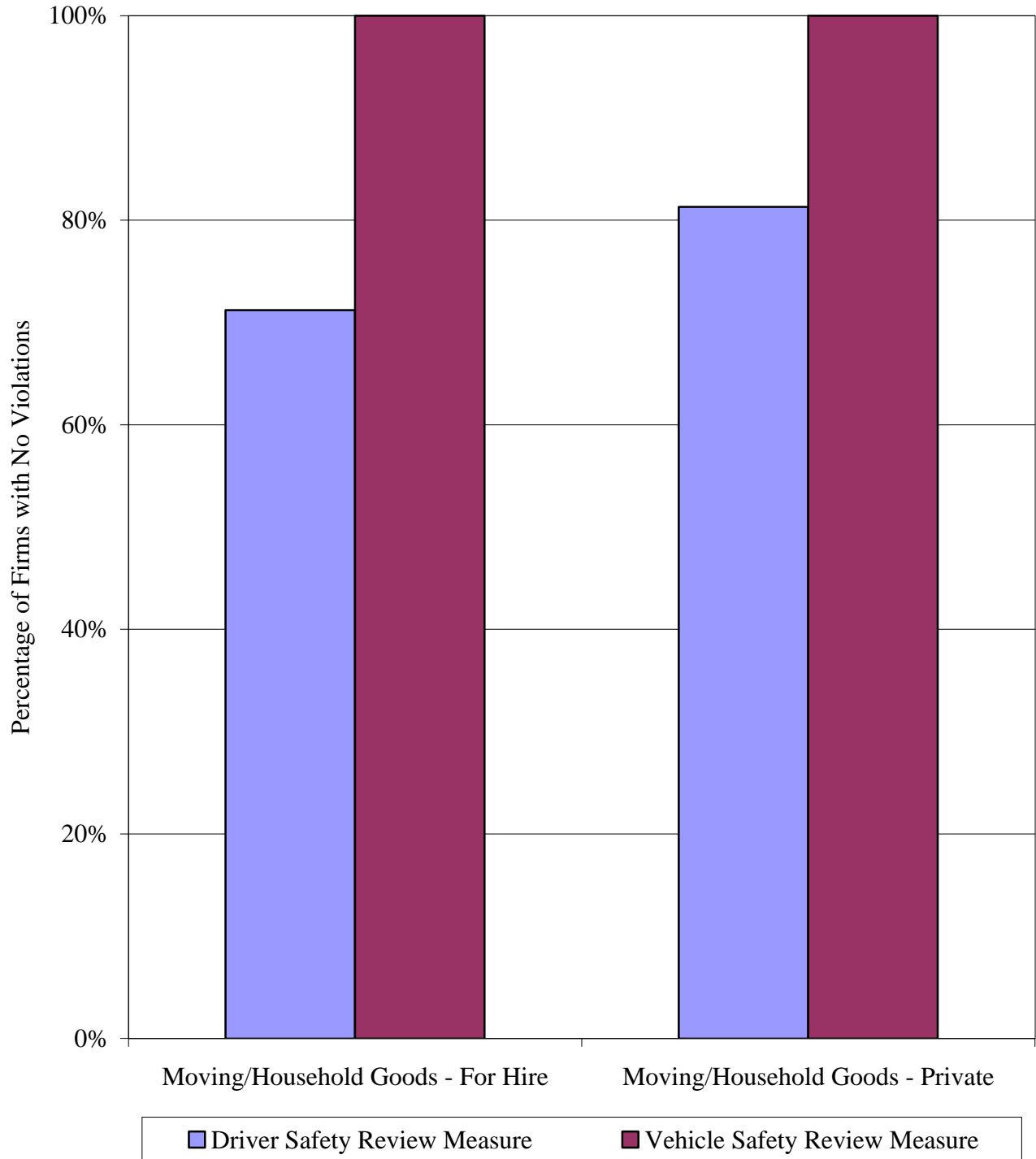


Figure 19
Moving/Household Goods
Safety Management Review Measure

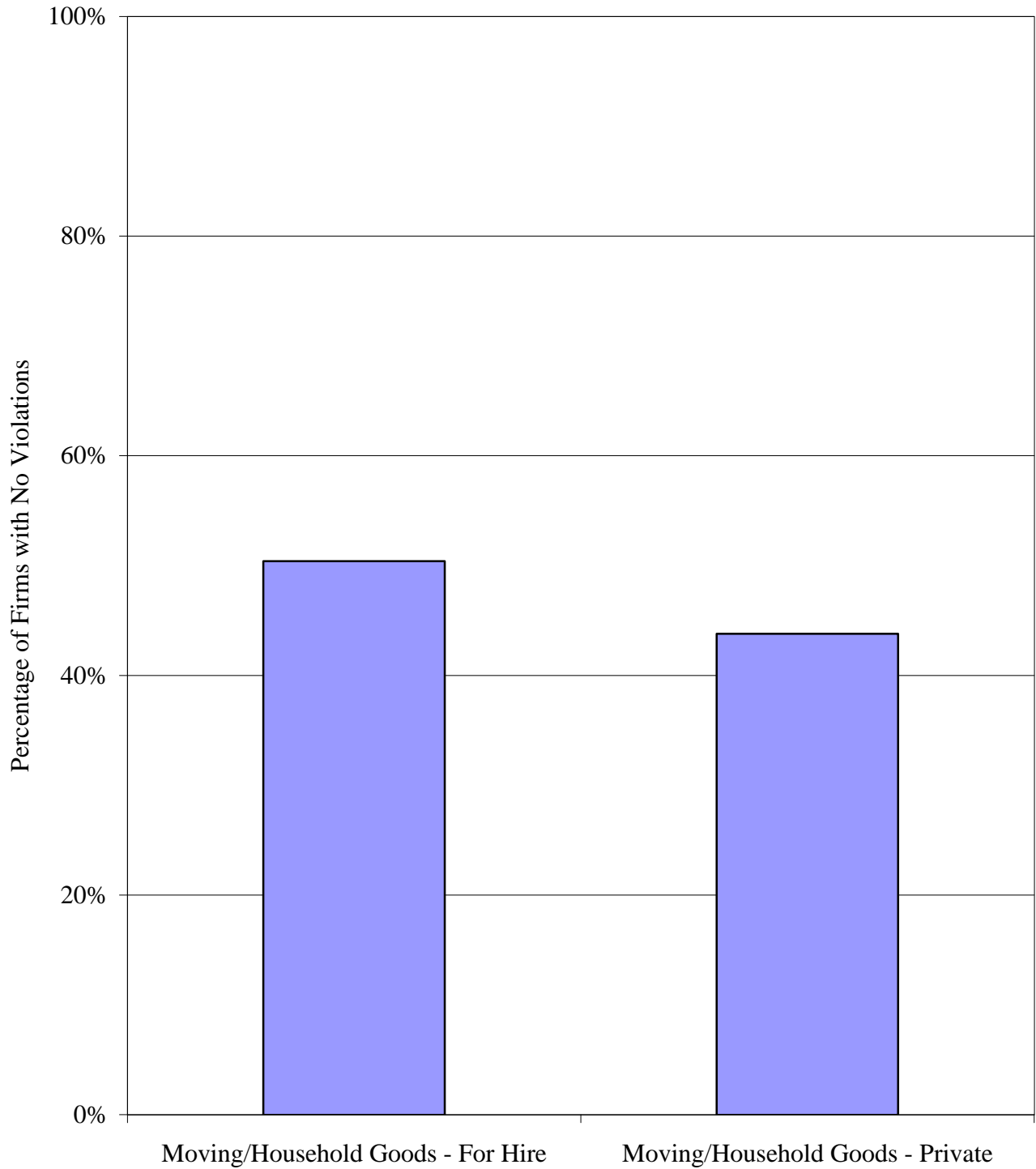


Figure 20
Moving/Household Goods
Enforcement Severity Measure

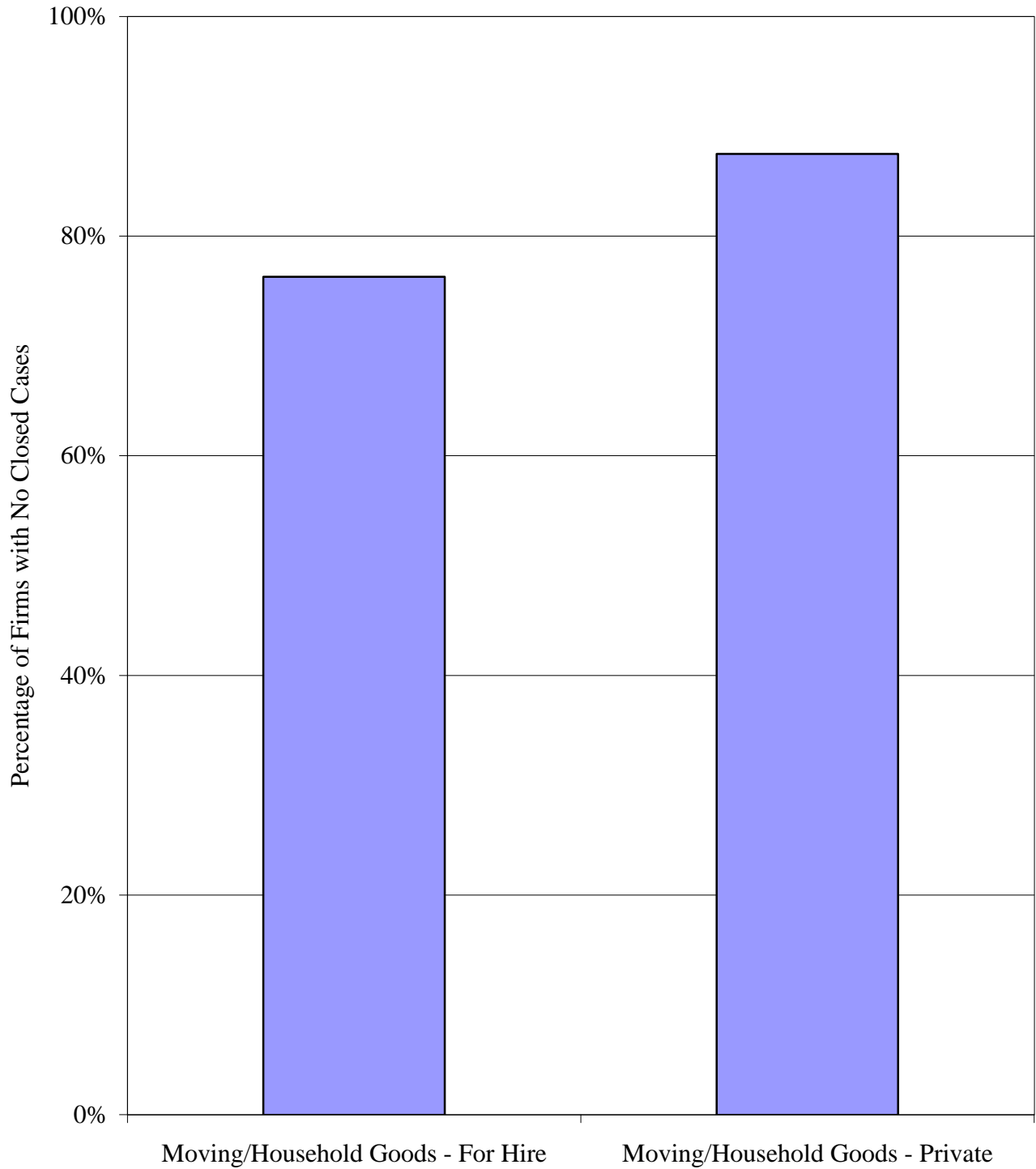


Figure 21
General Freight (TL & LTL)
Overall Safety Review Rating: Most Recent CR

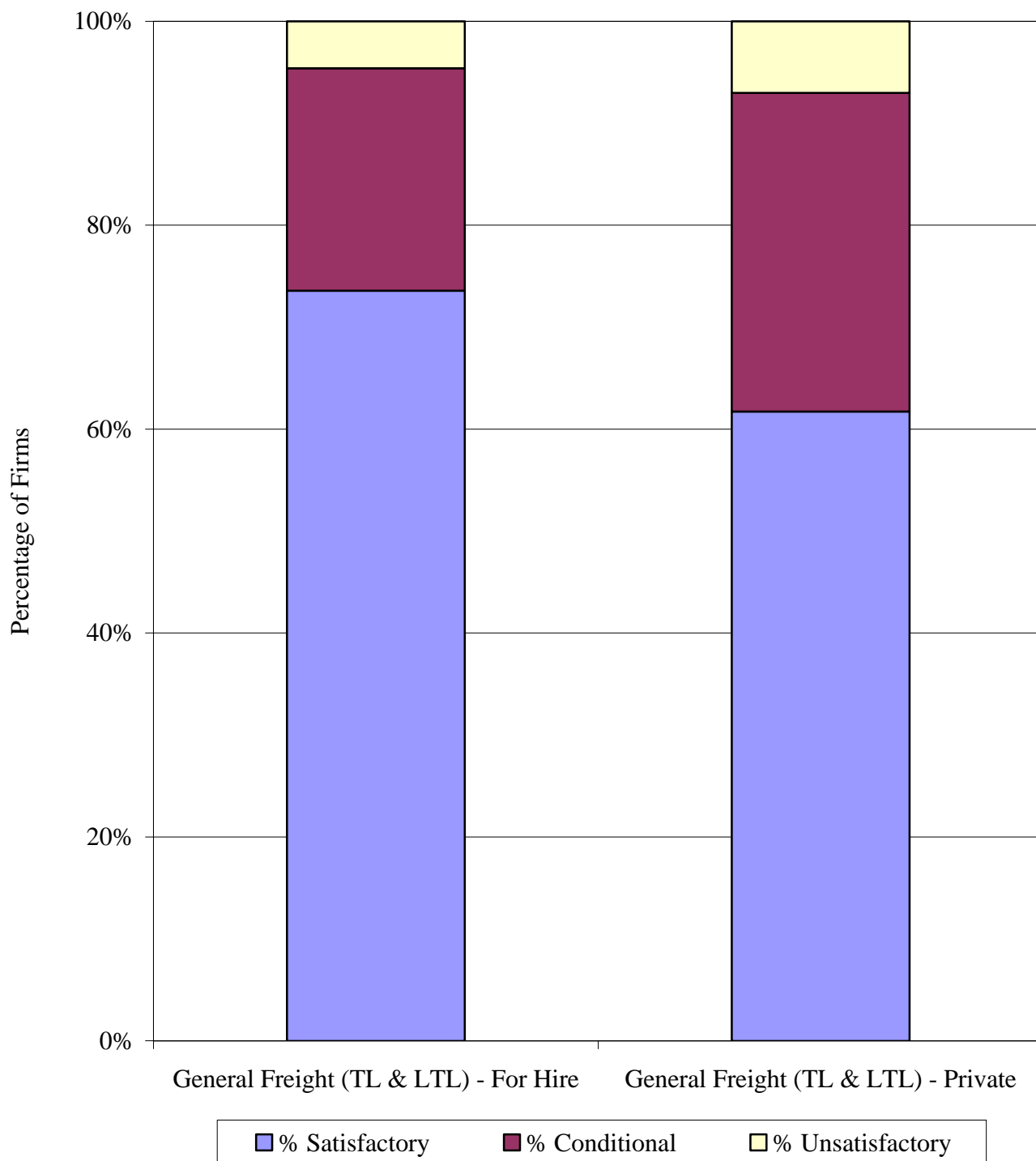


Figure 22
General Freight (TL & LTL)
CR Results: 18 Months Prior to Database Development

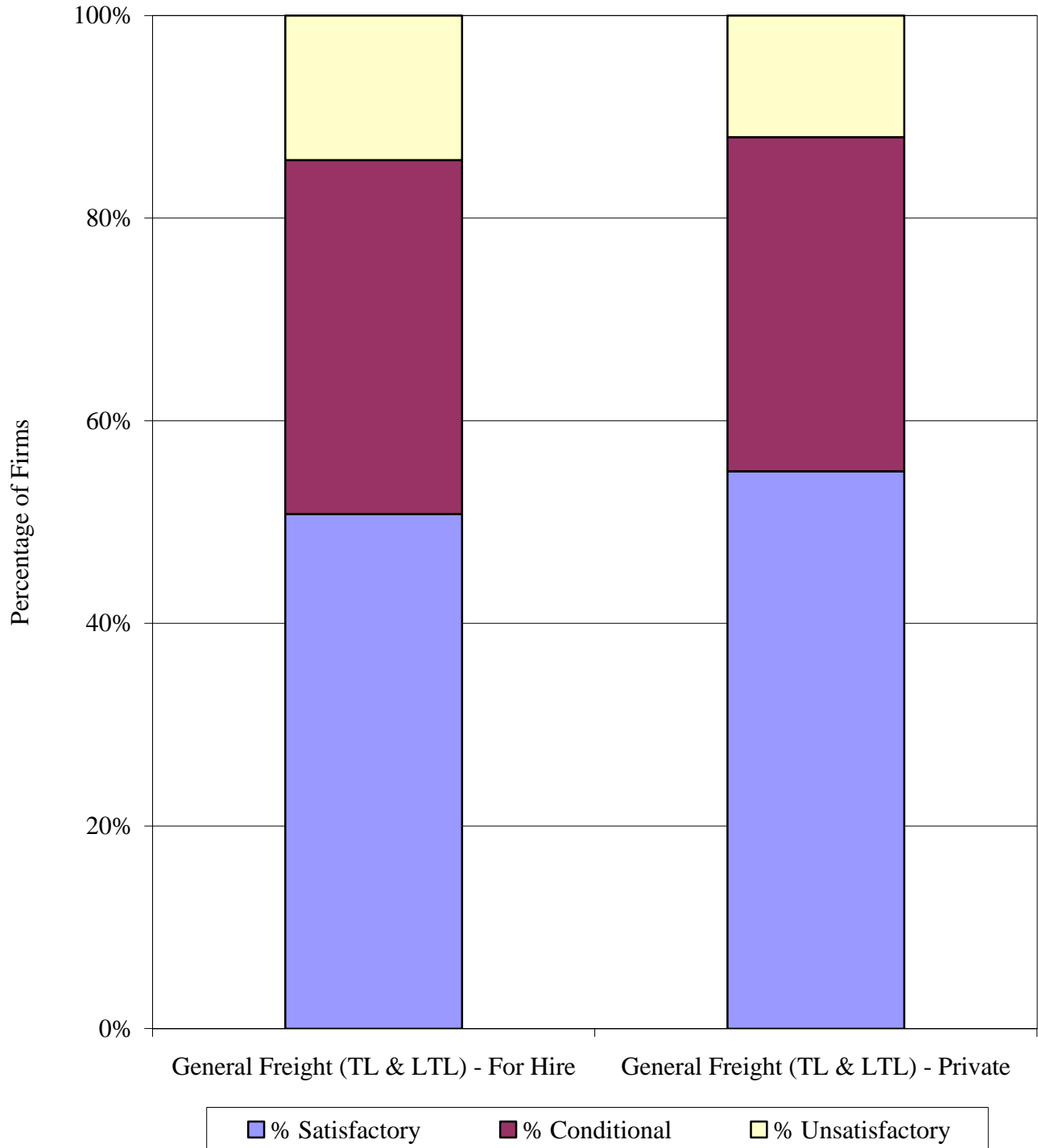


Figure 23
General Freight (TL & LTL)
Recordable Crash Rate Comparison

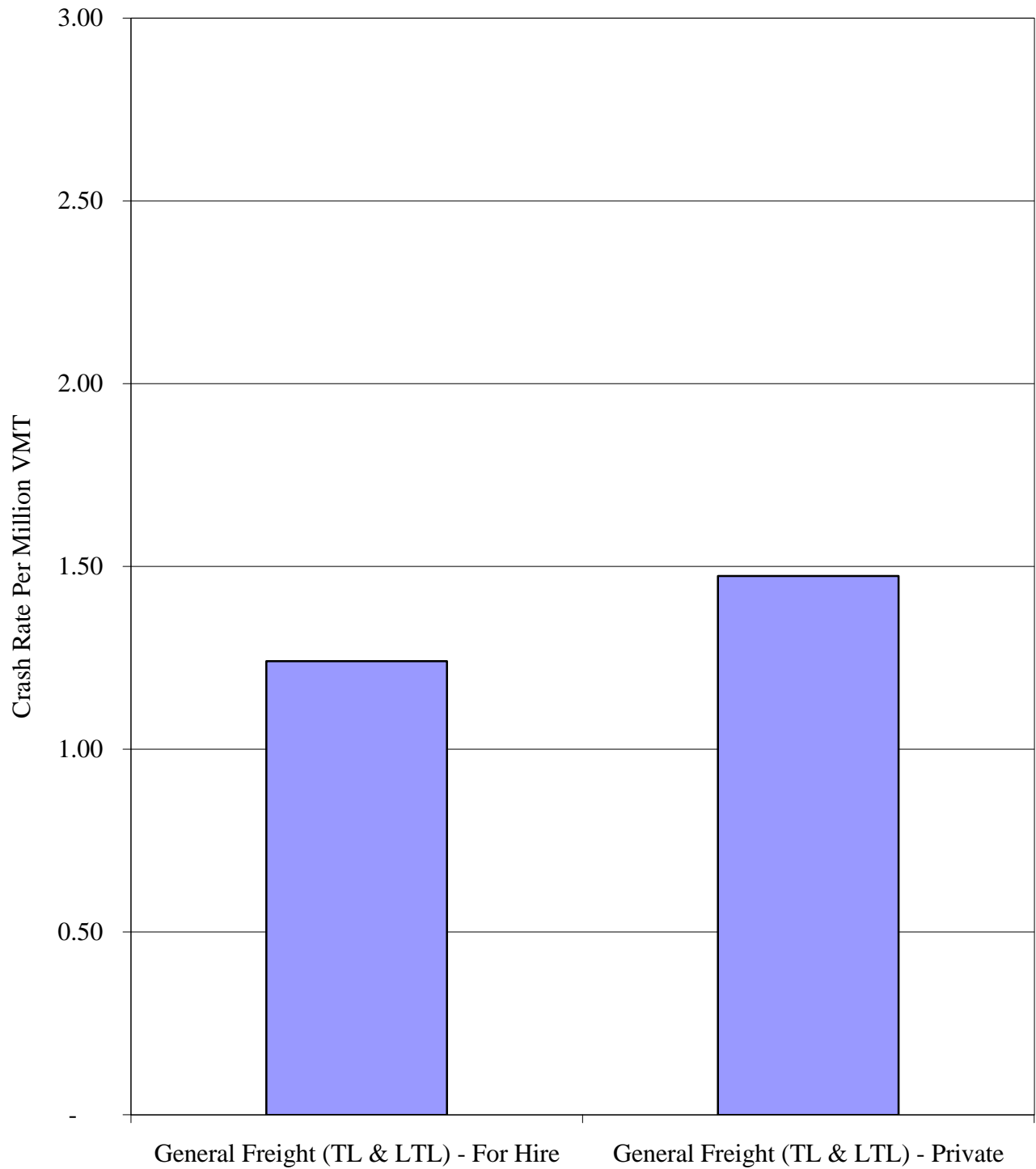


Figure 24
General Freight (TL & LTL)
Driver and Vehicle Safety Review Measure

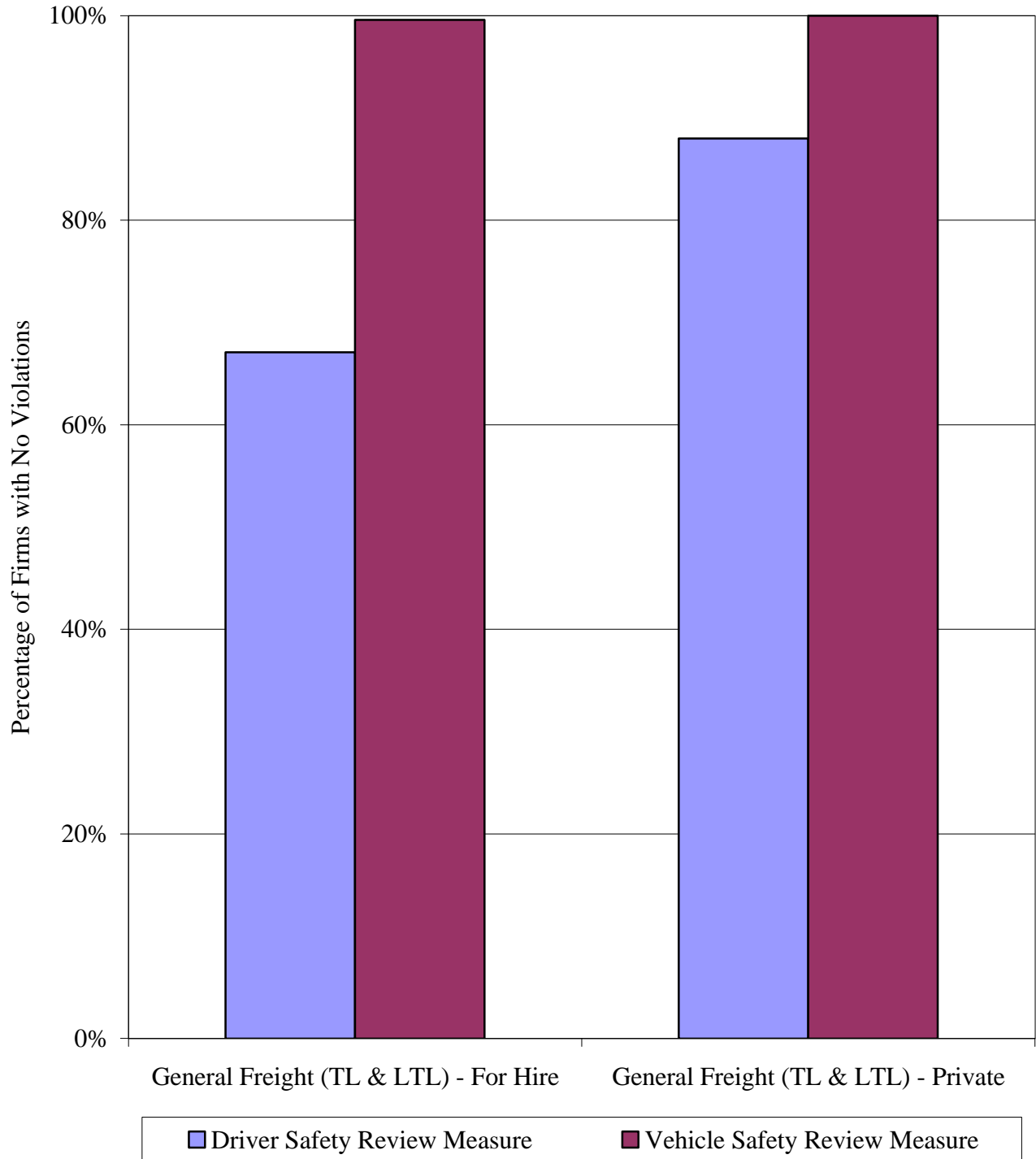


Figure 25
General Freight (TL & LTL)
Safety Management Review Measure

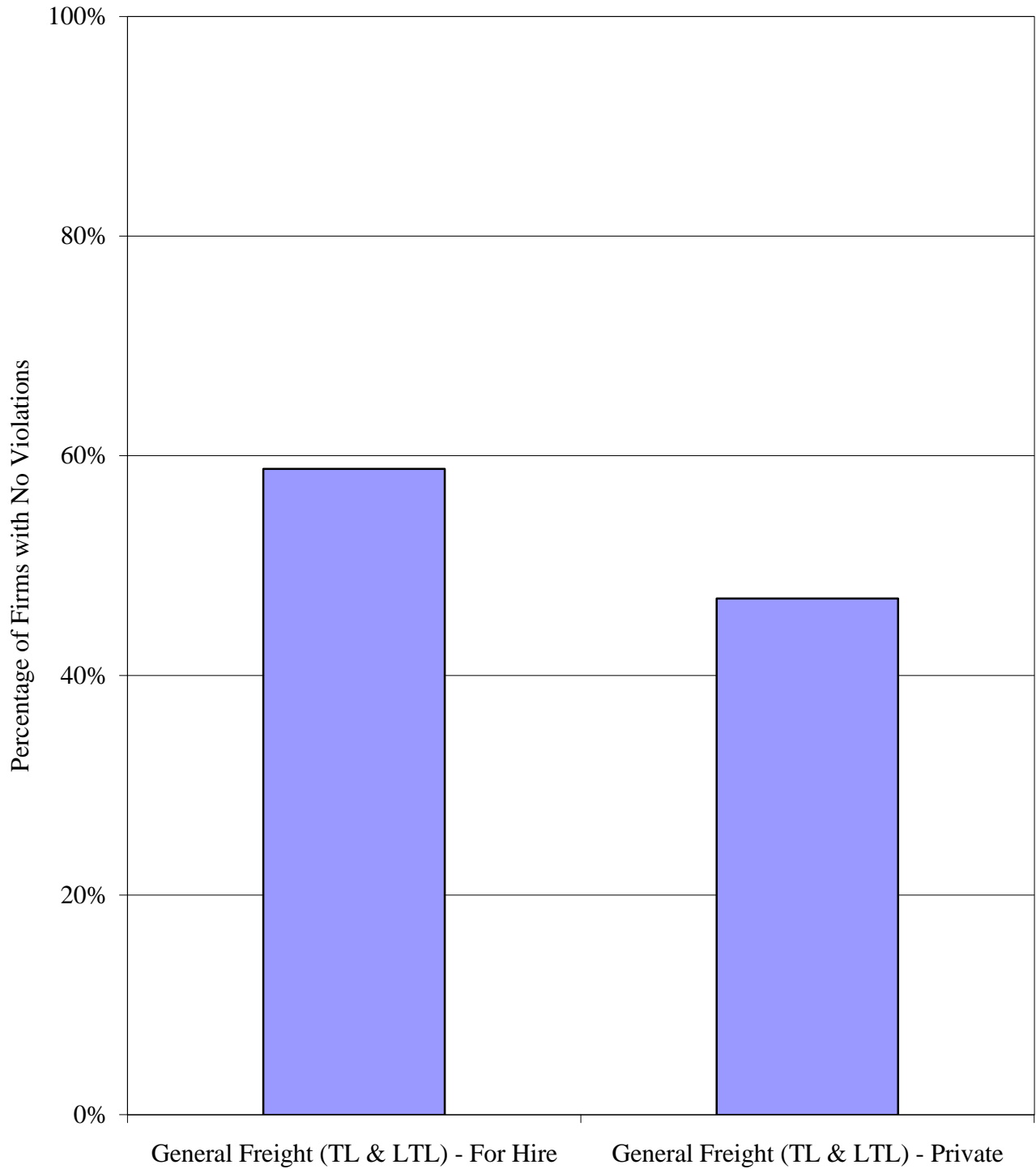


Figure 26
General Freight (TL & LTL)
Enforcement Severity Measure

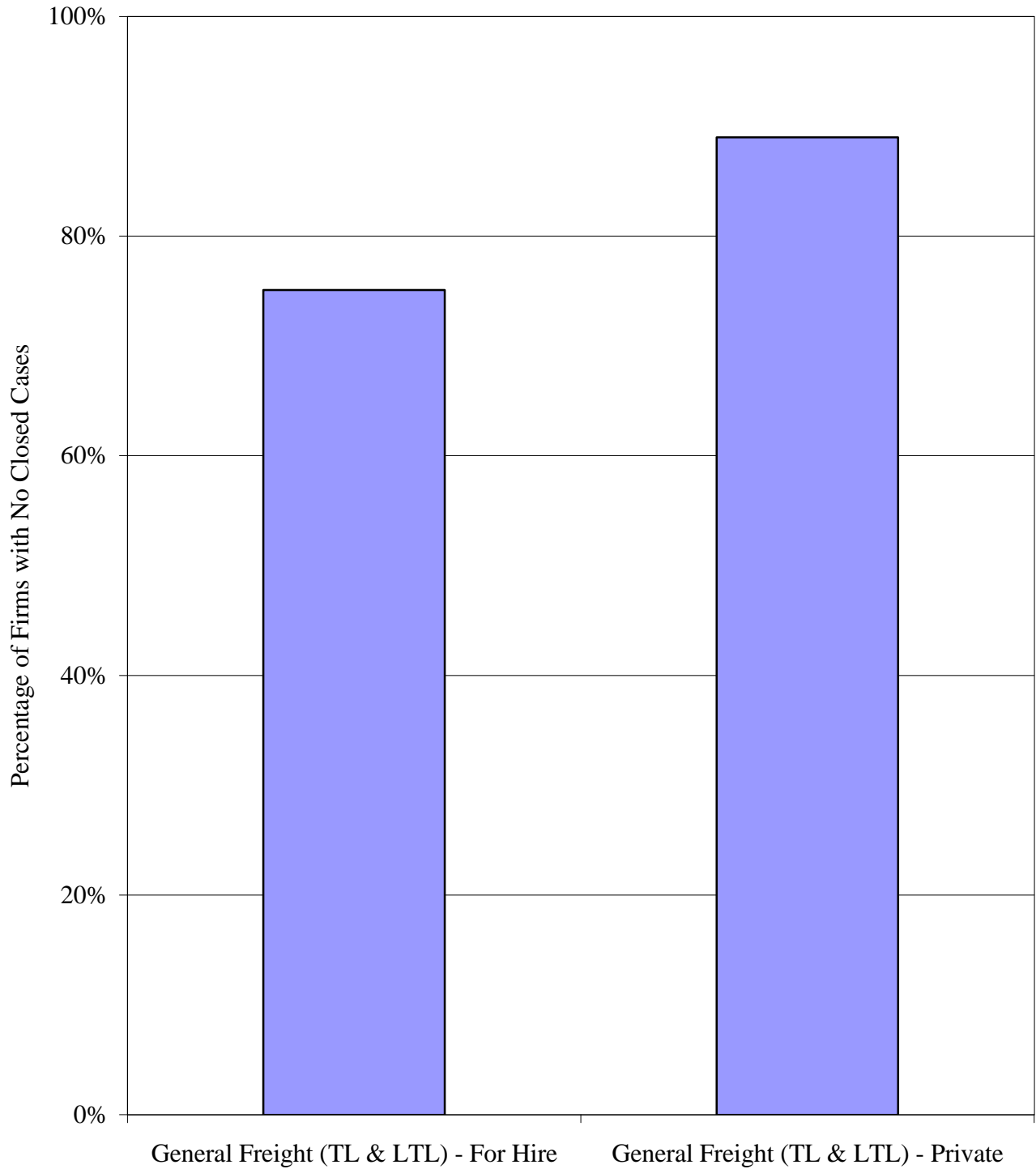


Figure 27
Heavy Equipment
Overall Safety Review Rating: Most Recent CR

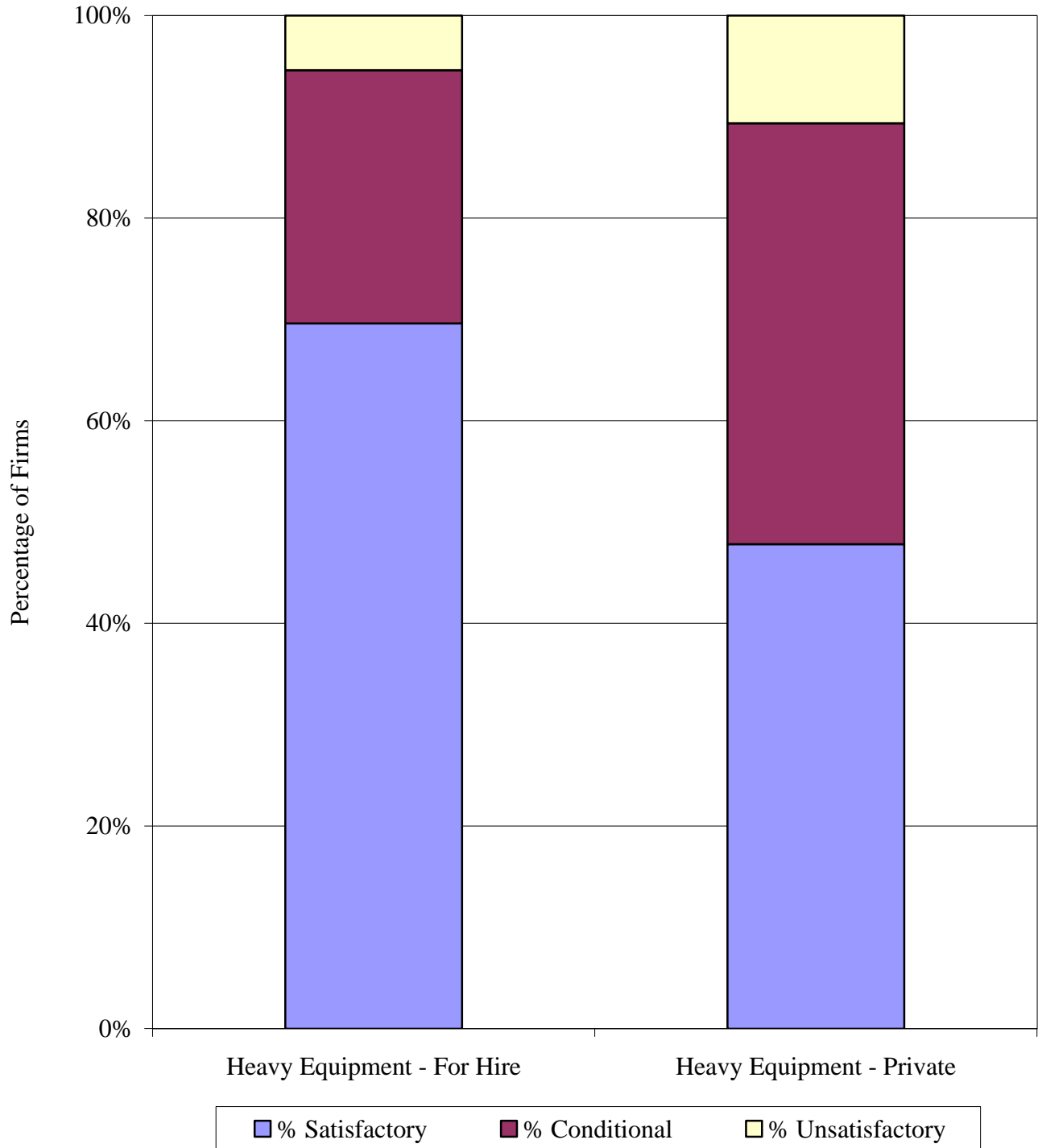


Figure 28
Heavy Equipment
CR Results: 18 Months Prior to Database Development

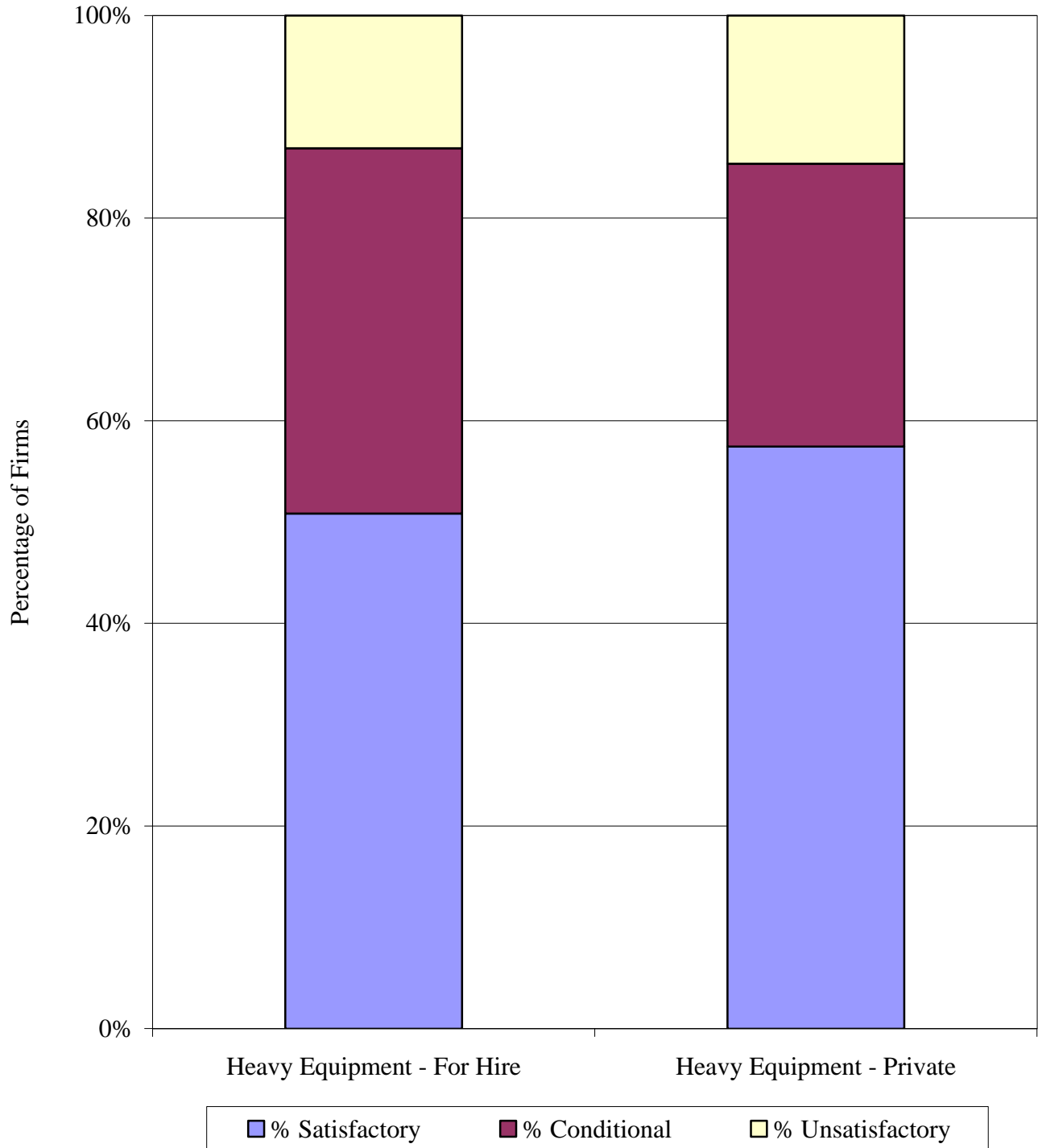


Figure 29
Heavy Equipment
Recordable Crash Rate Comparison

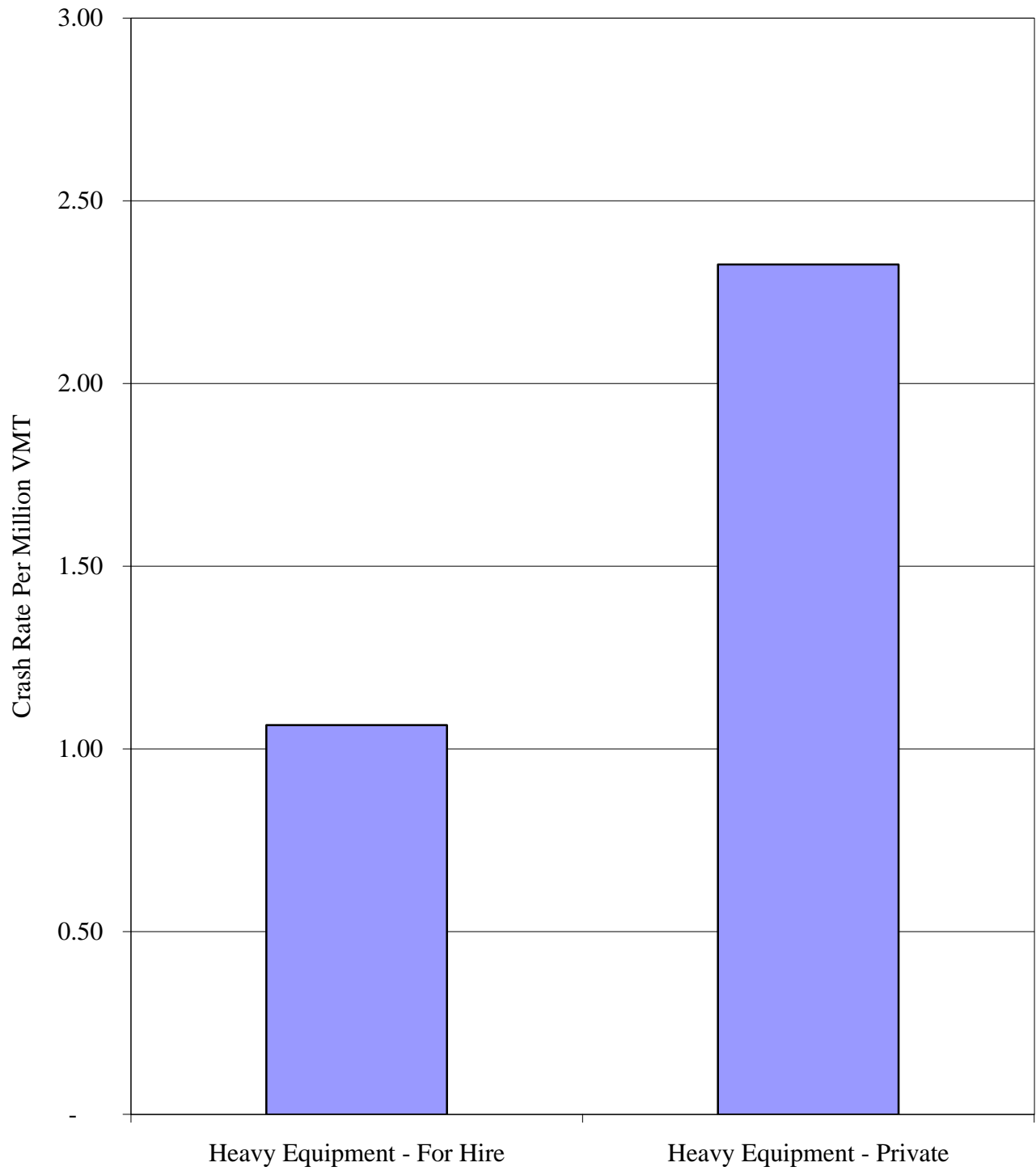


Figure 30
Heavy Equipment
Driver and Vehicle Safety Review Measure

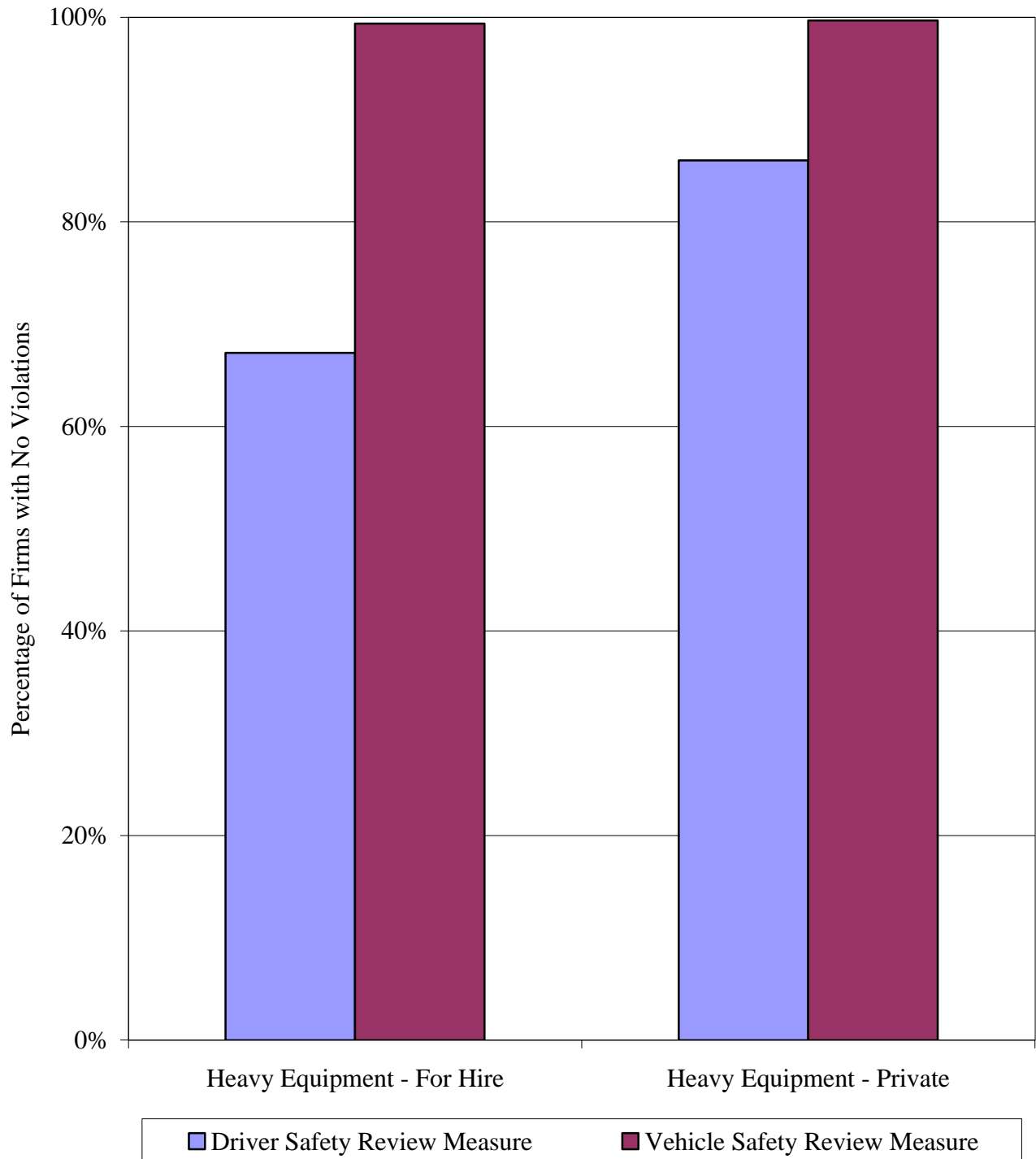


Figure 31
Heavy Equipment
Safety Management Review Measure

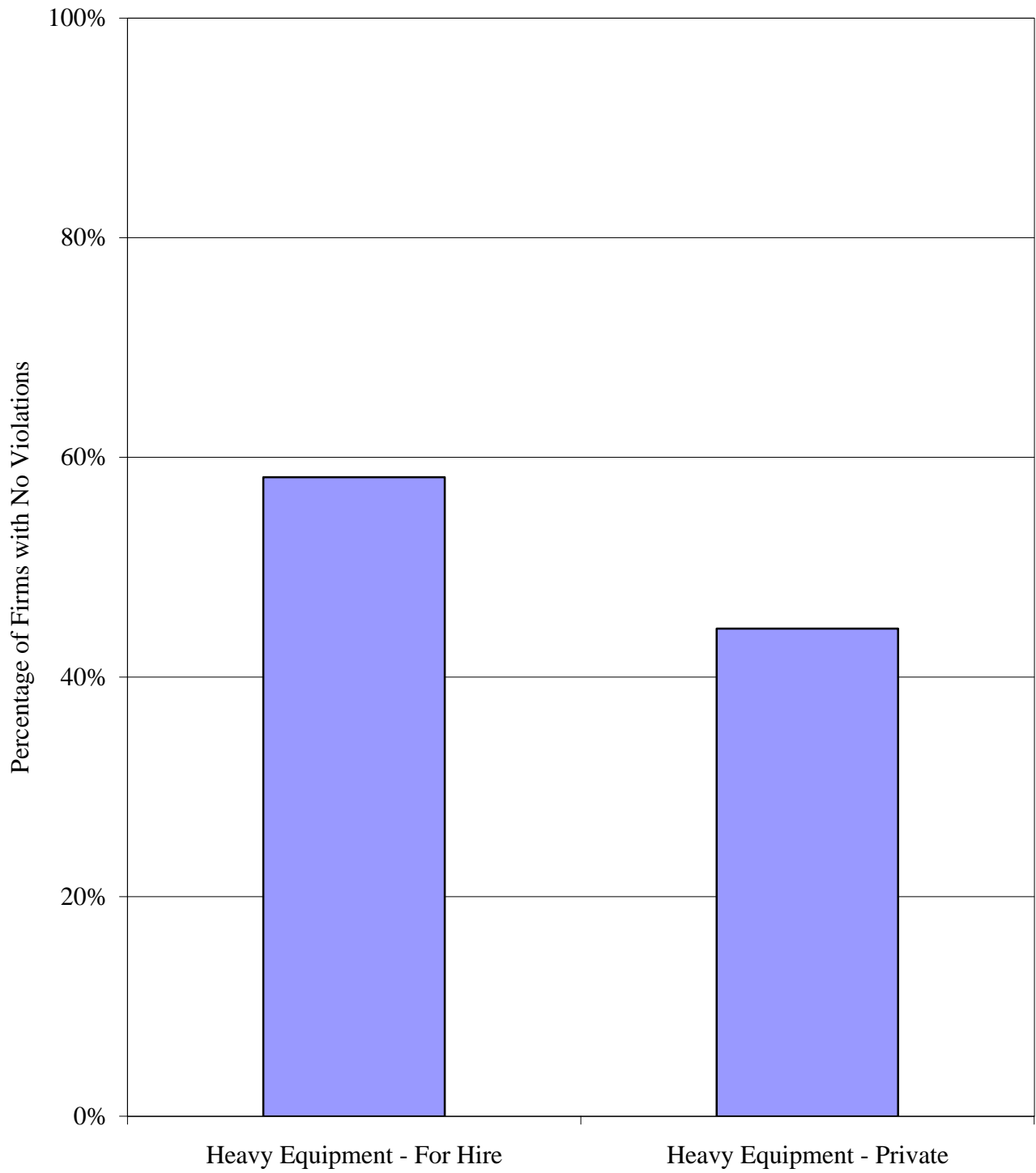


Figure 32
Heavy Equipment
Enforcement Severity Measure

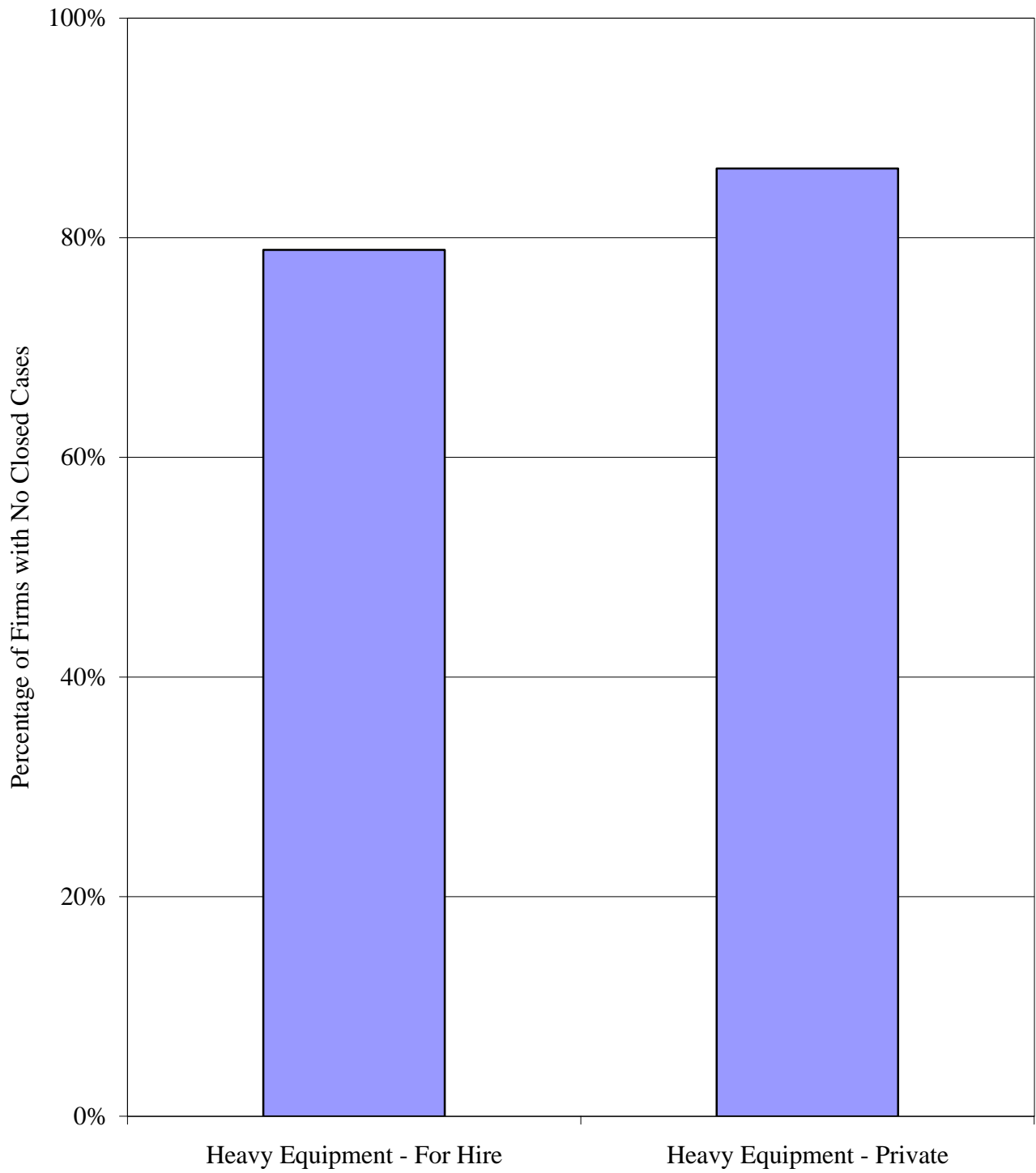


Figure 33
Produce
Overall Safety Review Rating: Most Recent CR

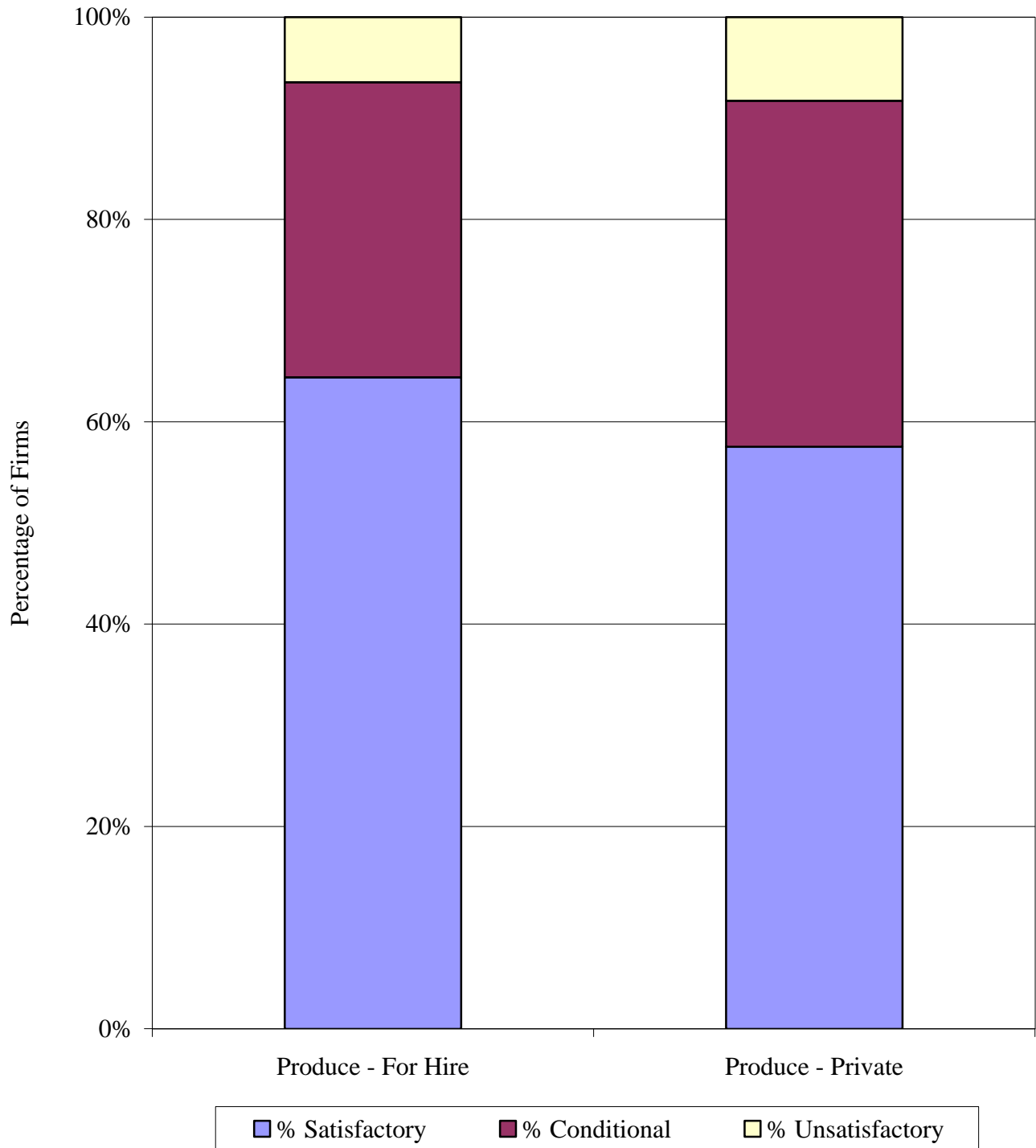


Figure 34
Produce
CR Results: 18 Months Prior to Database Development

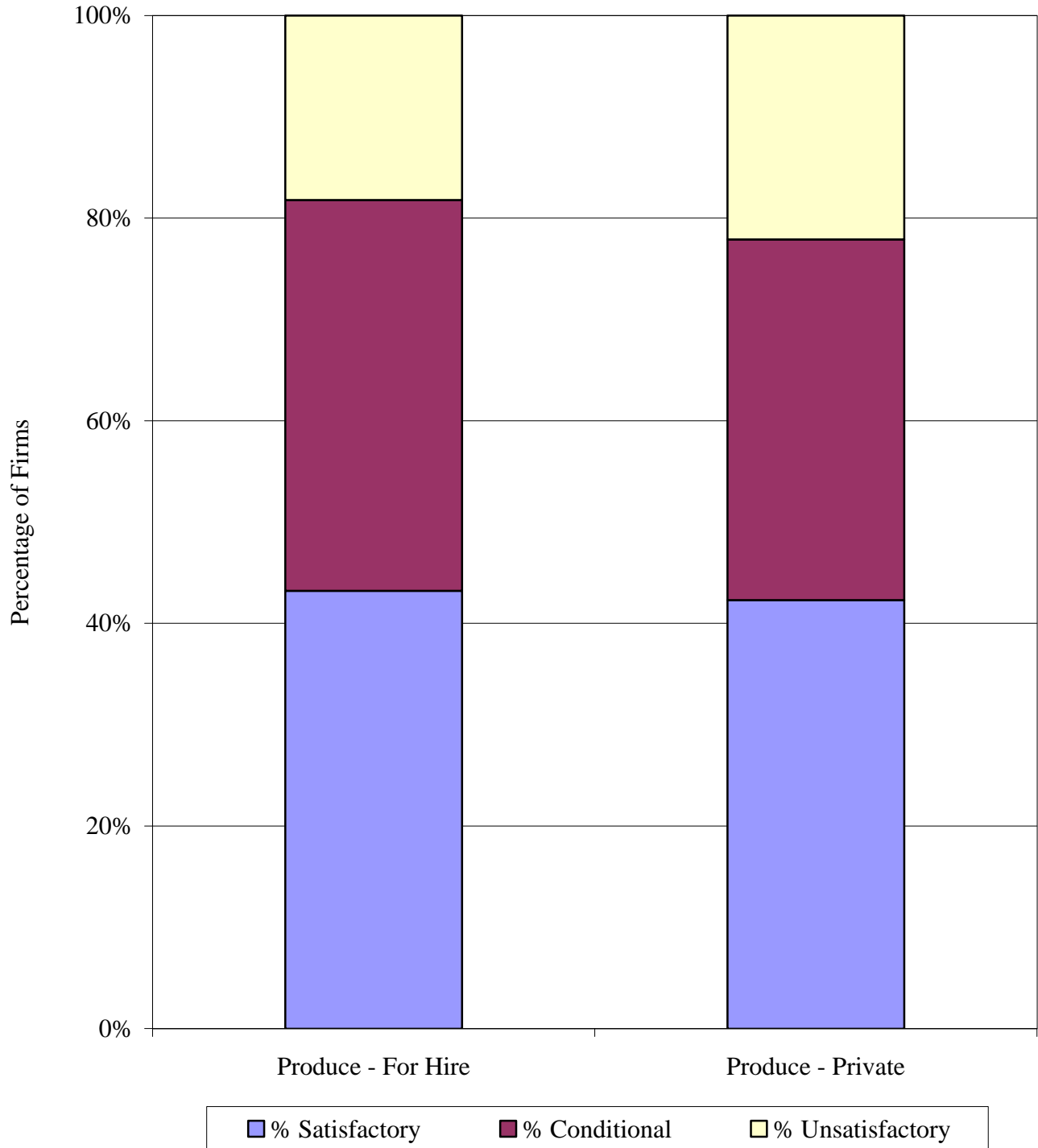


Figure 35
Produce
Recordable Crash Rate Comparison

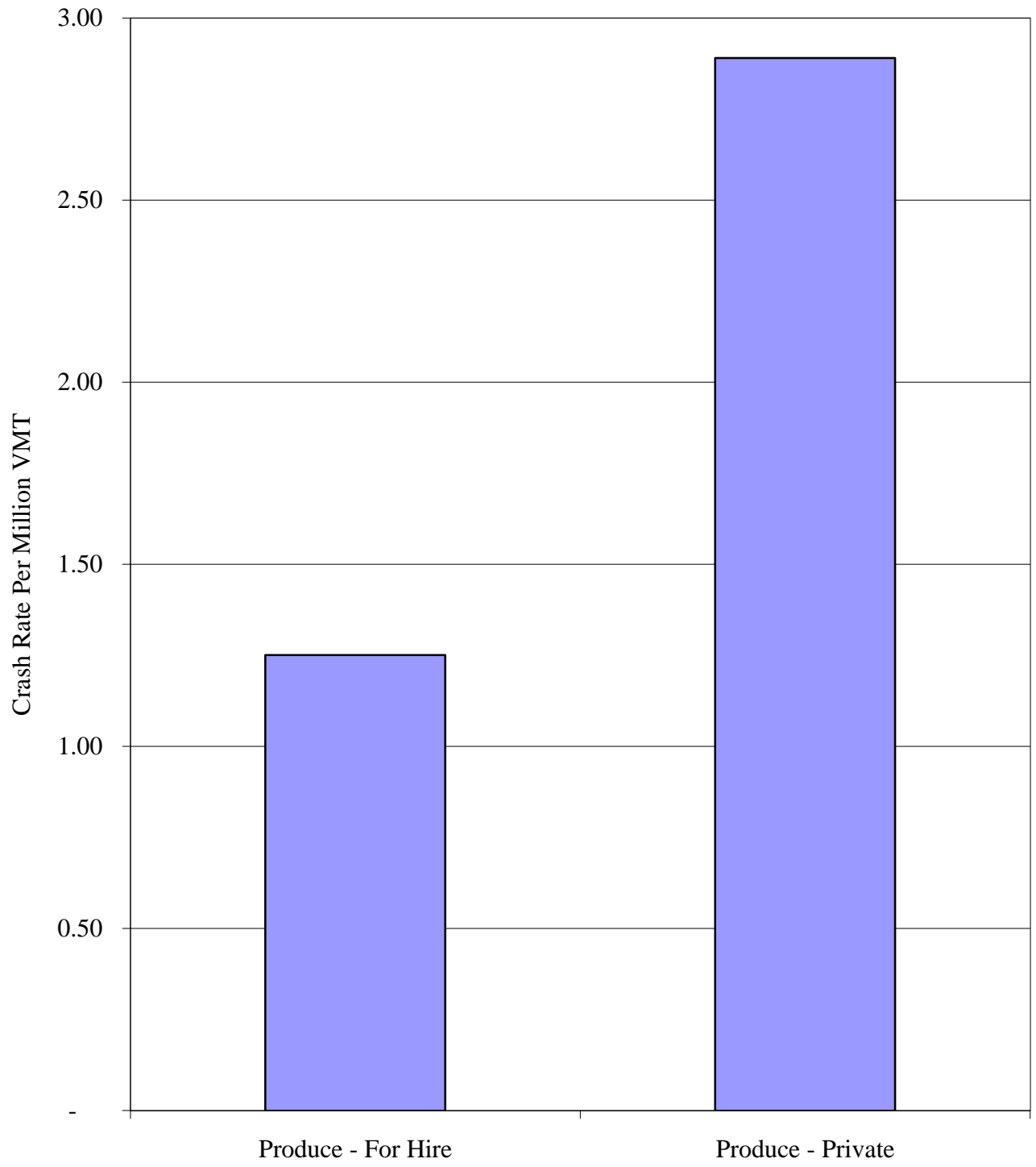


Figure 36
Produce
Driver and Vehicle Safety Review Measure

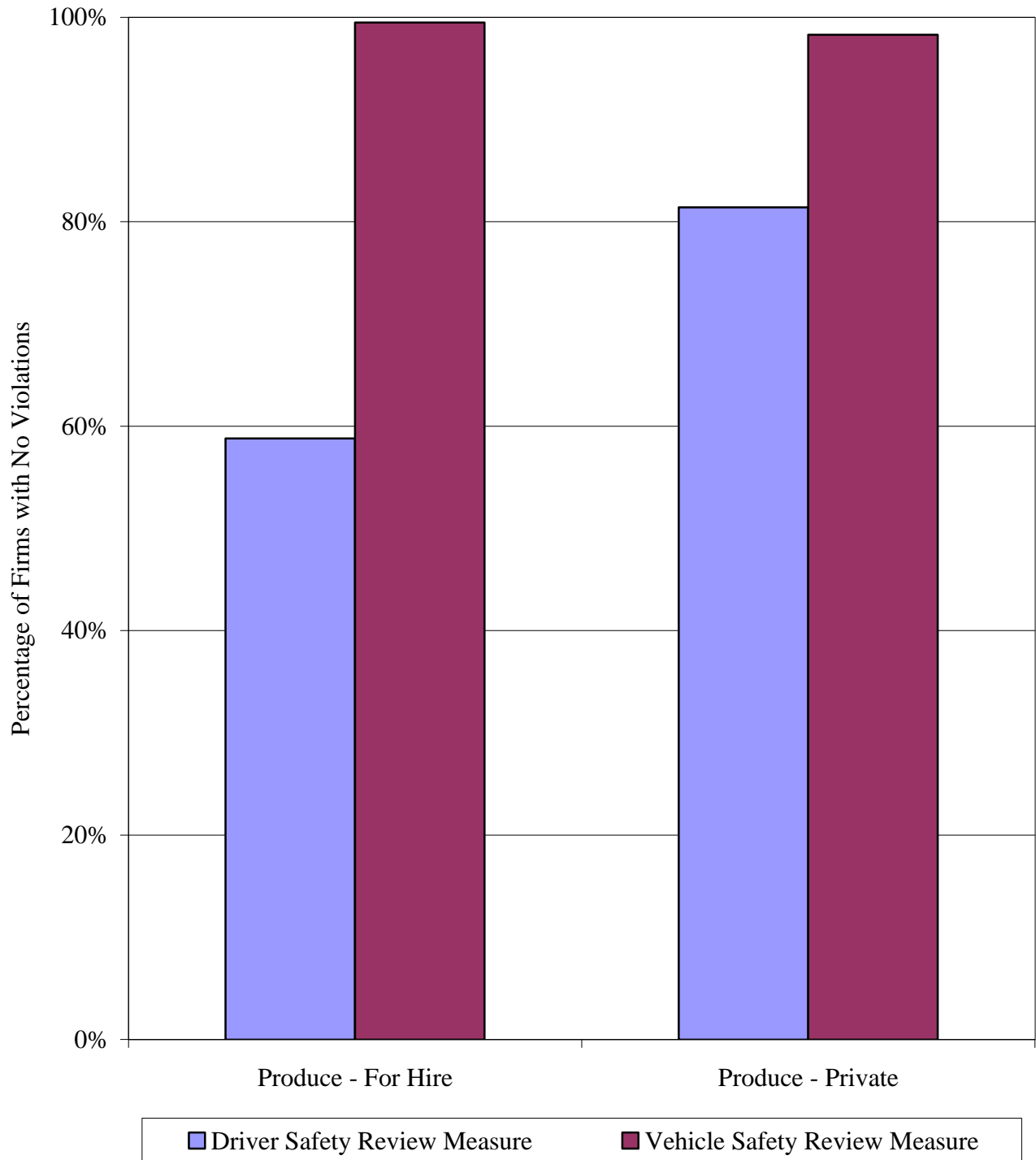


Figure 37
Produce
Safety Management Review Measure

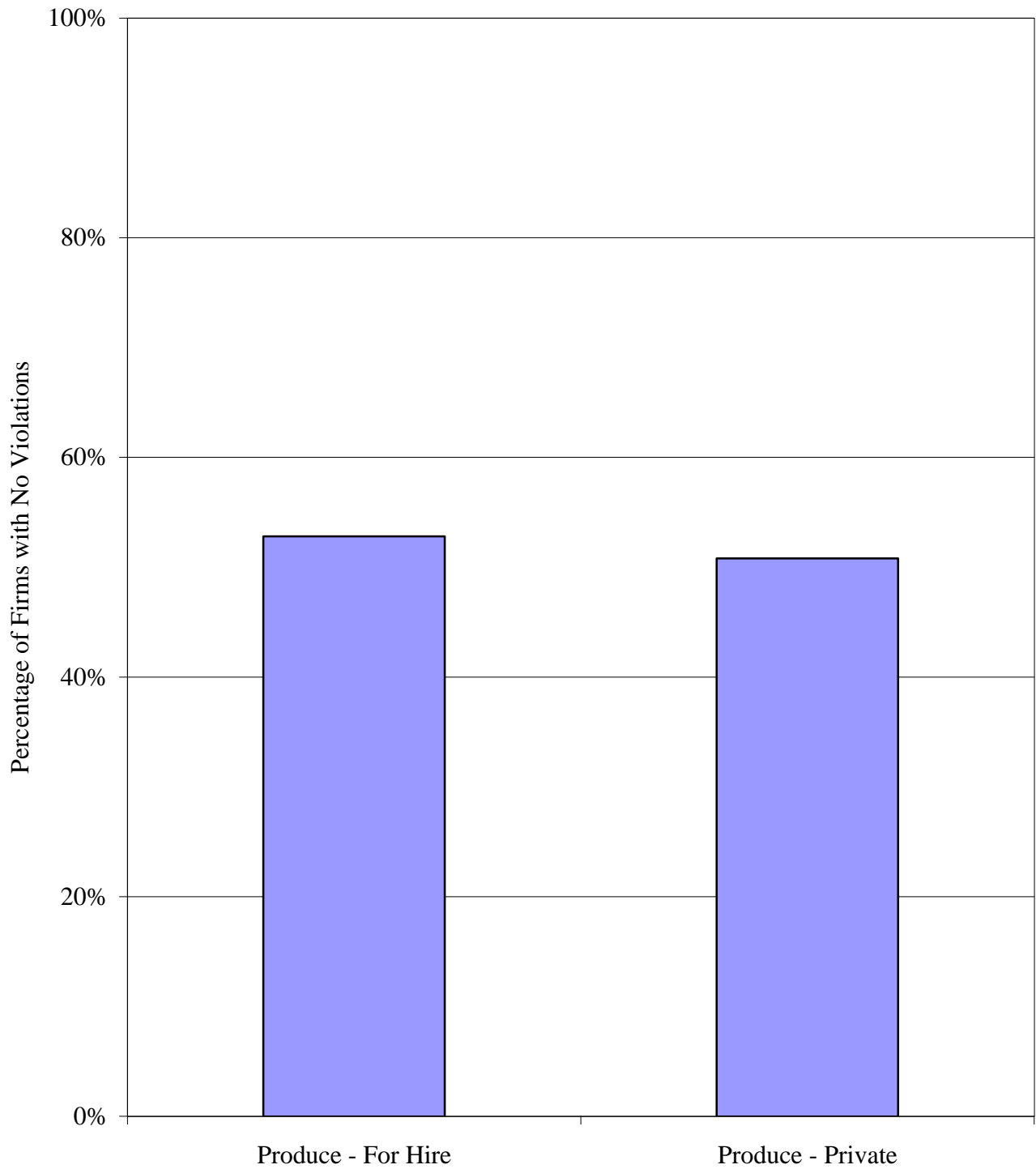


Figure 38
Produce
Enforcement Severity Measure

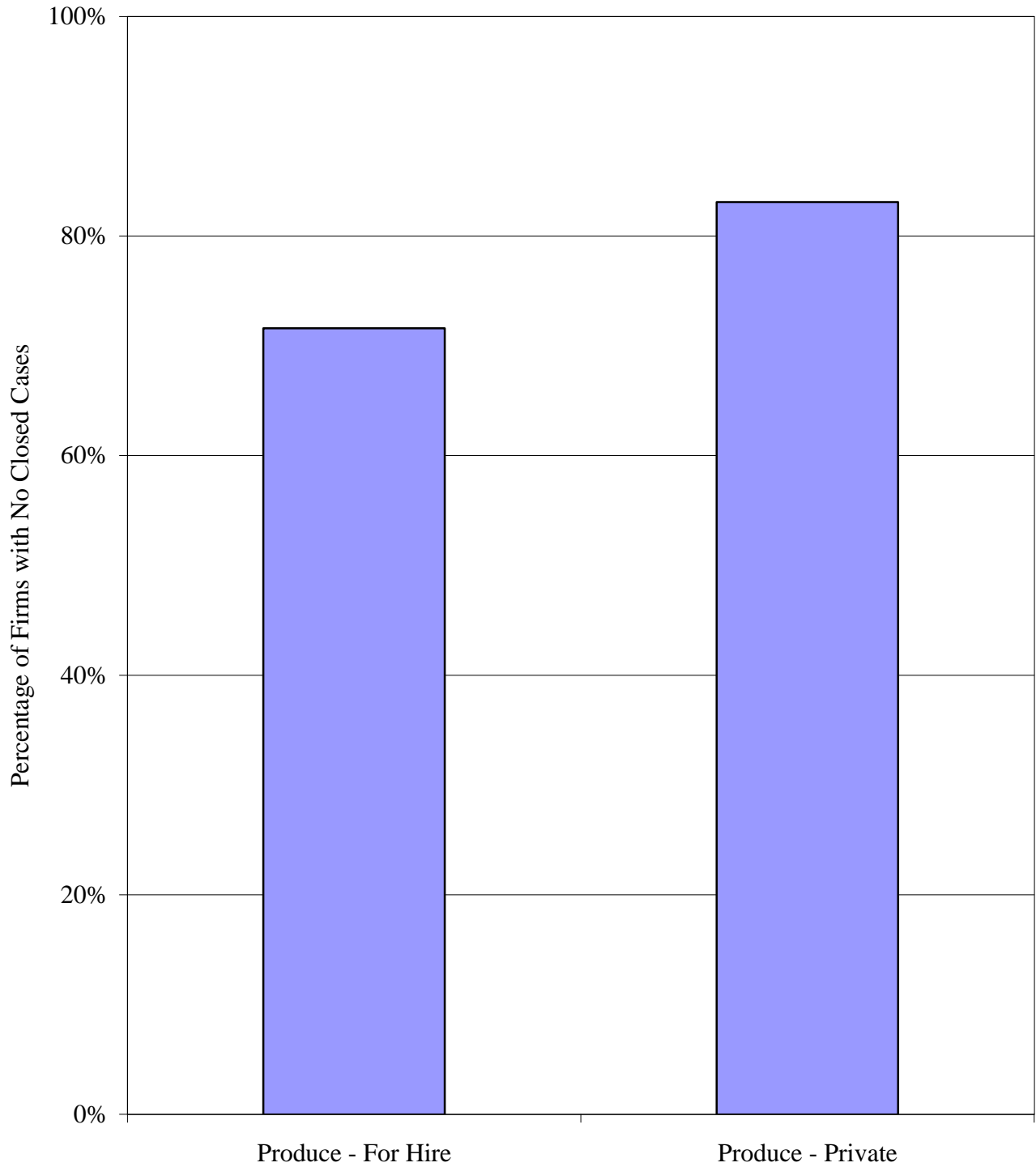


Figure 39
Intermodal
Overall Safety Review Rating: Most Recent CR

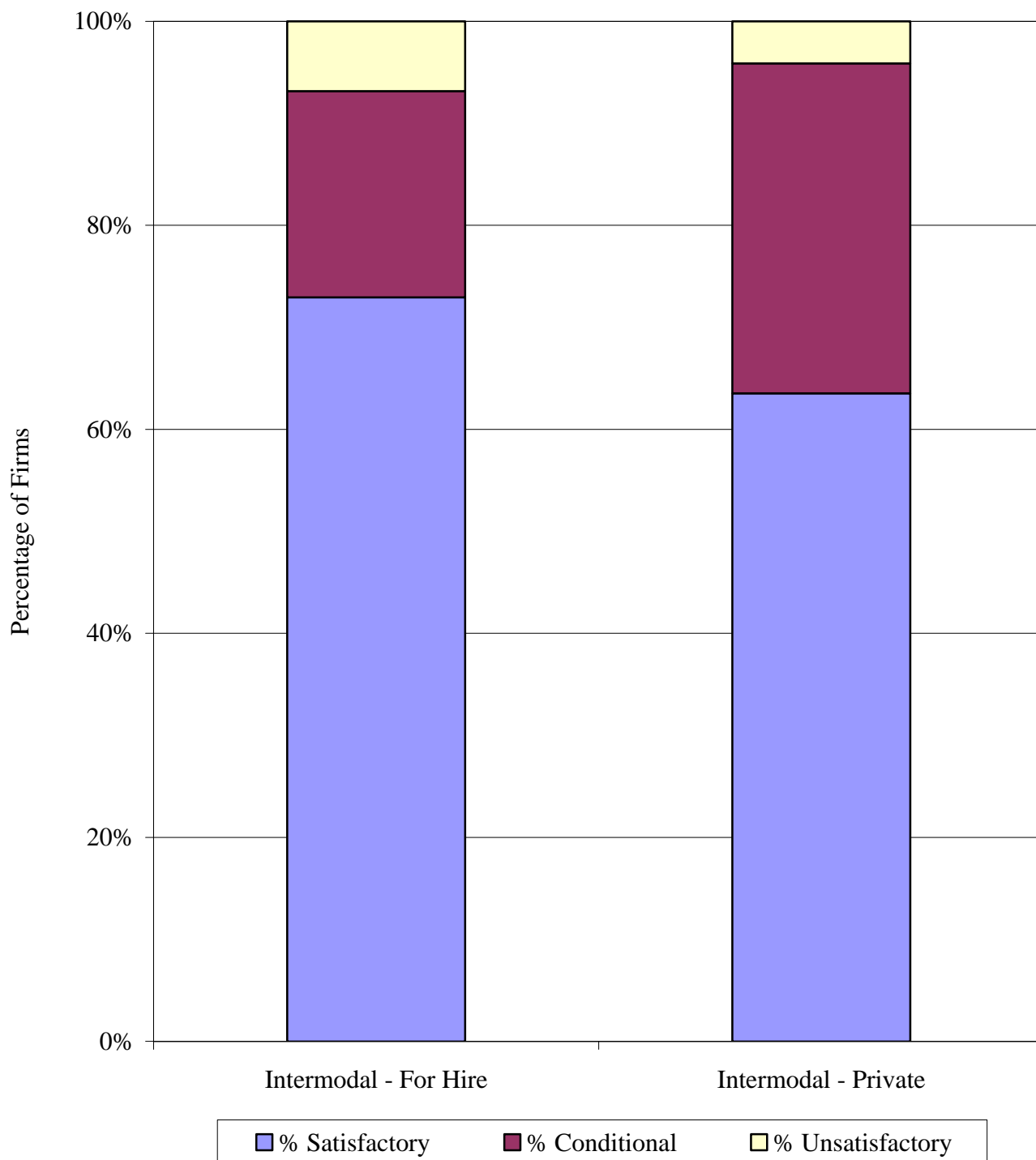


Figure 40
Intermodal
CR Results: 18 Months Prior to Database Development

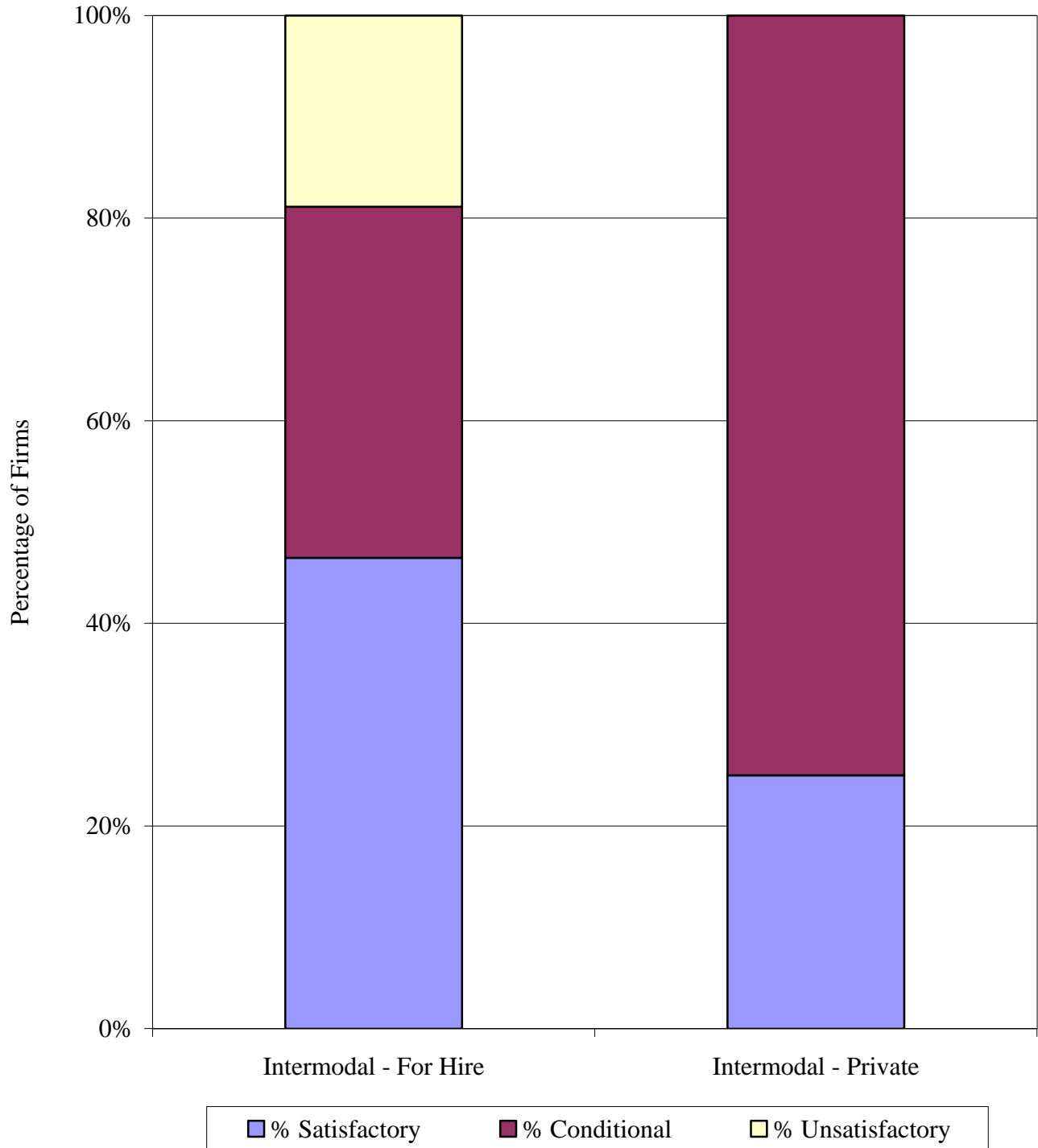


Figure 41
Intermodal
Recordable Crash Rate Comparison

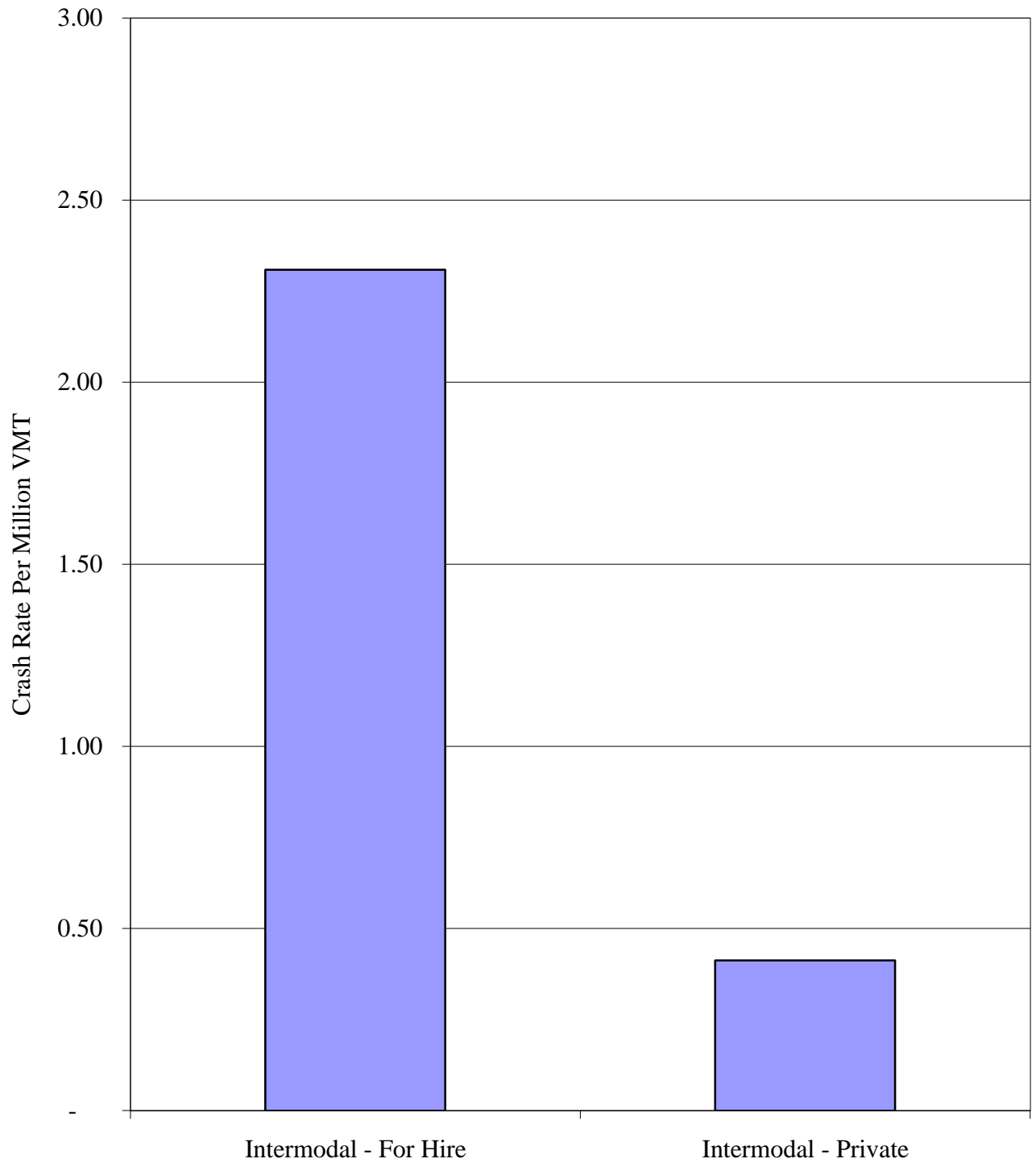


Figure 42
Intermodal
Driver and Vehicle Safety Review Measure

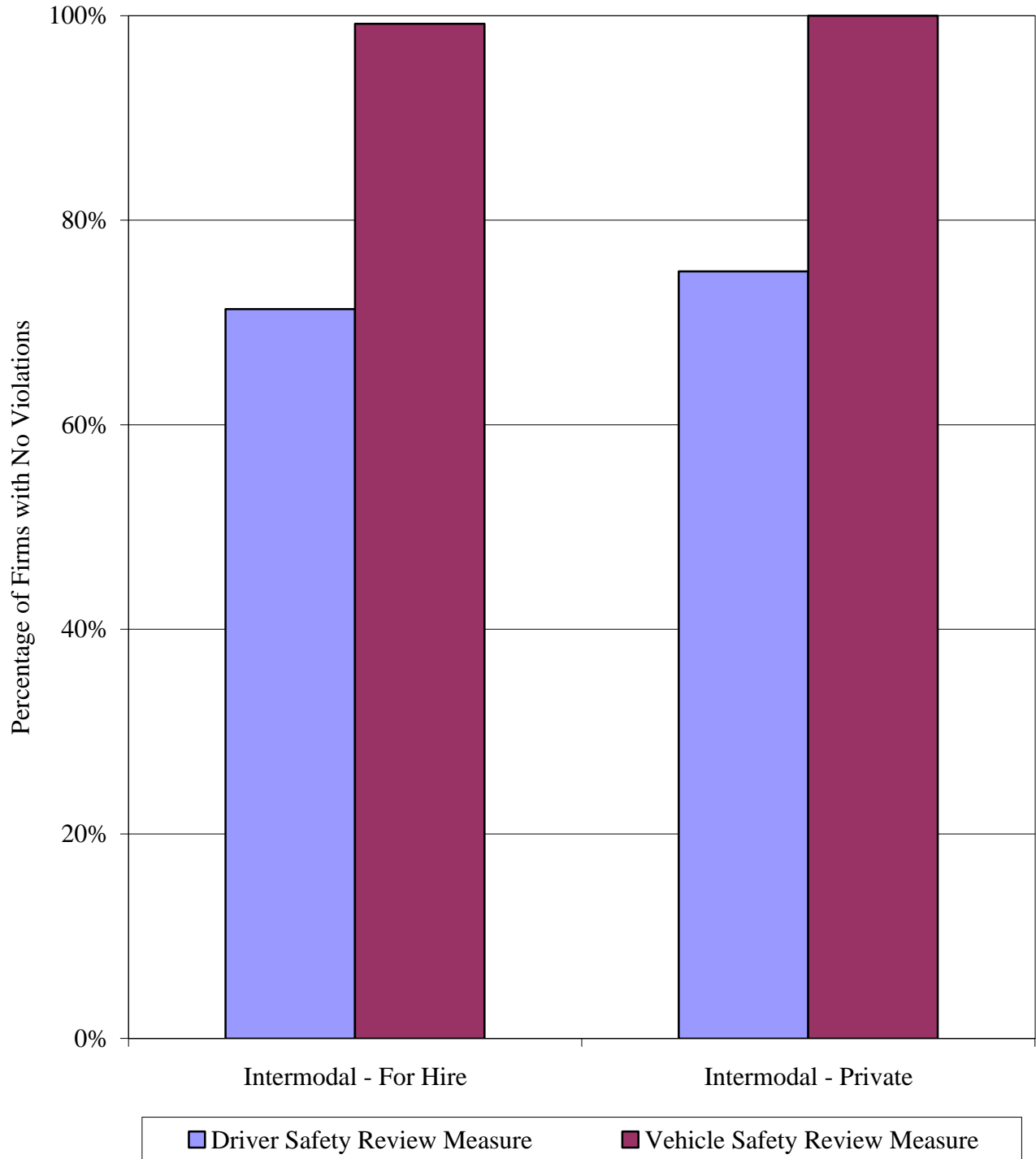


Figure 43
Intermodal
Safety Management Review Measure

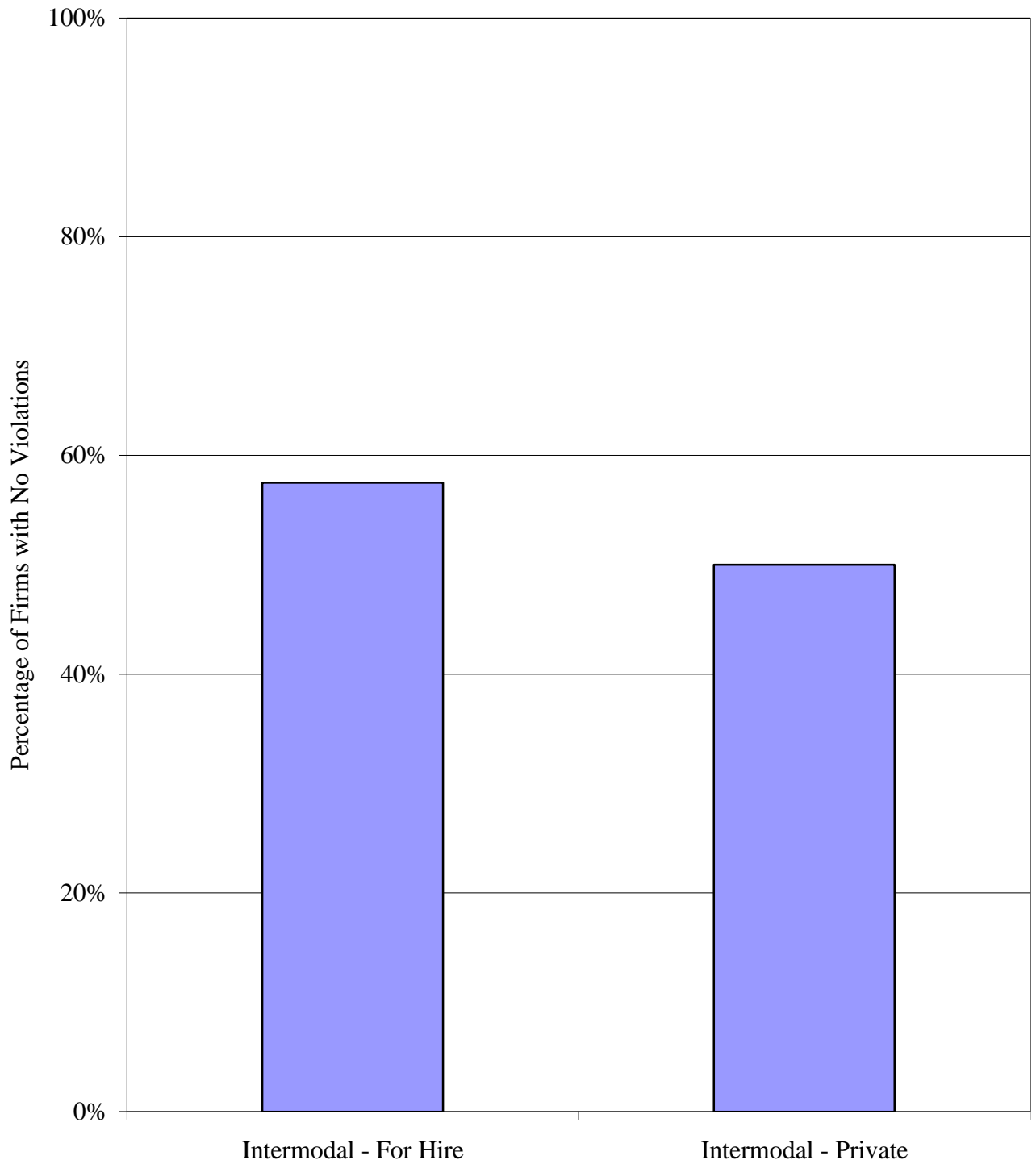


Figure 44
Intermodal
Enforcement Severity Measure

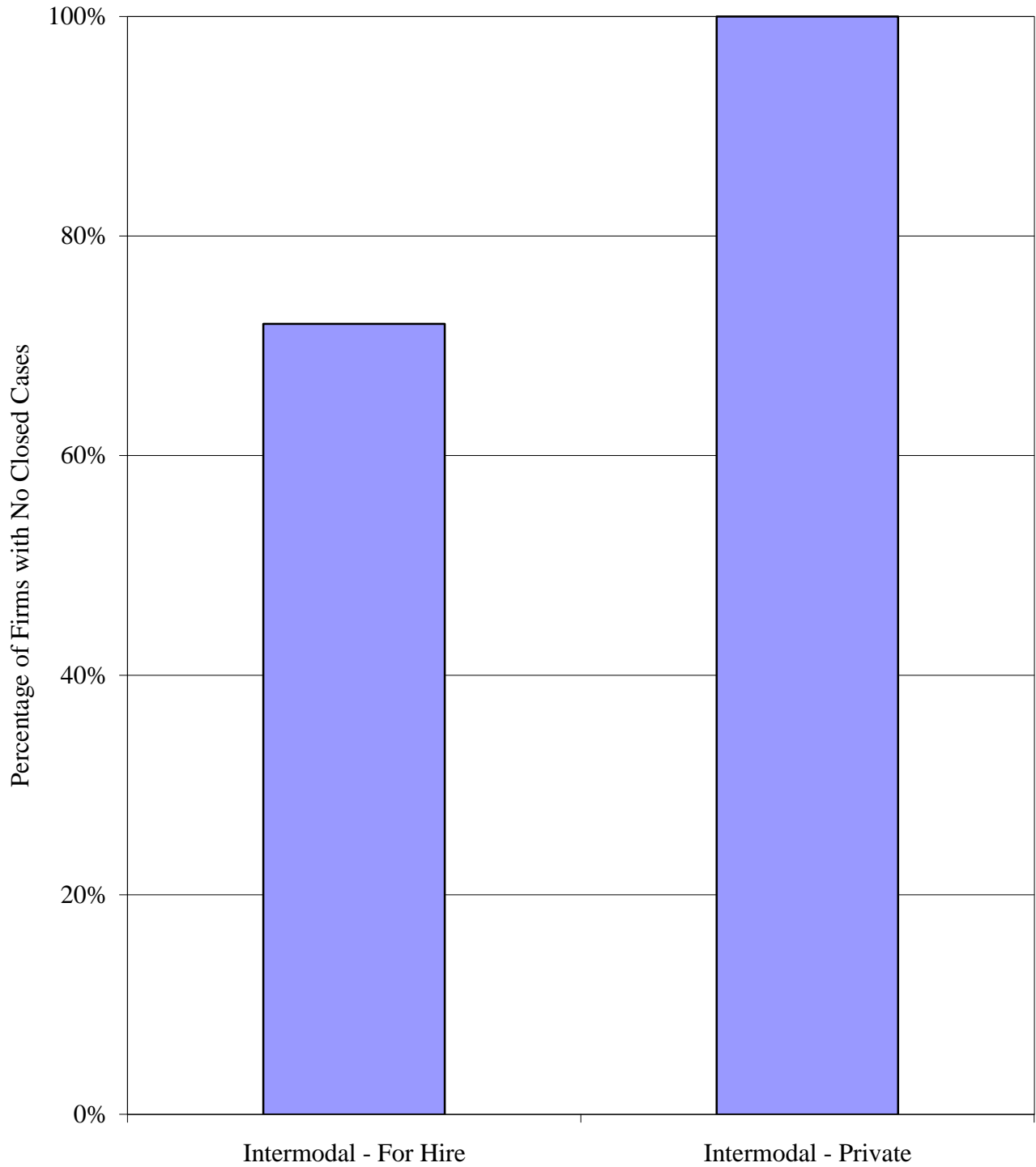


Figure 45
Passenger Transportation
Overall Safety Review Rating: Most Recent CR

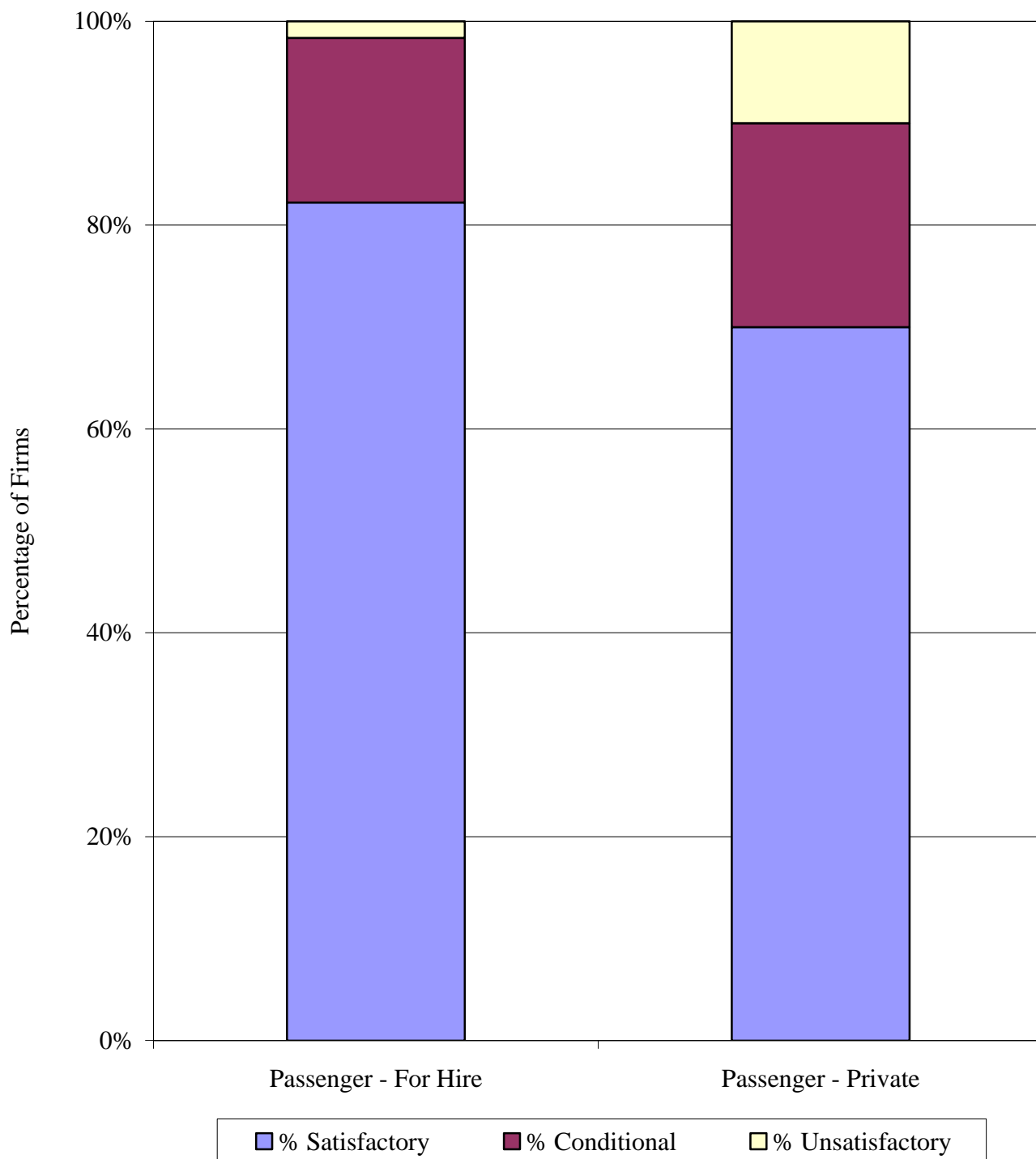


Figure 46
Passenger Transportation
CR Results: 18 Months Prior to Database Development

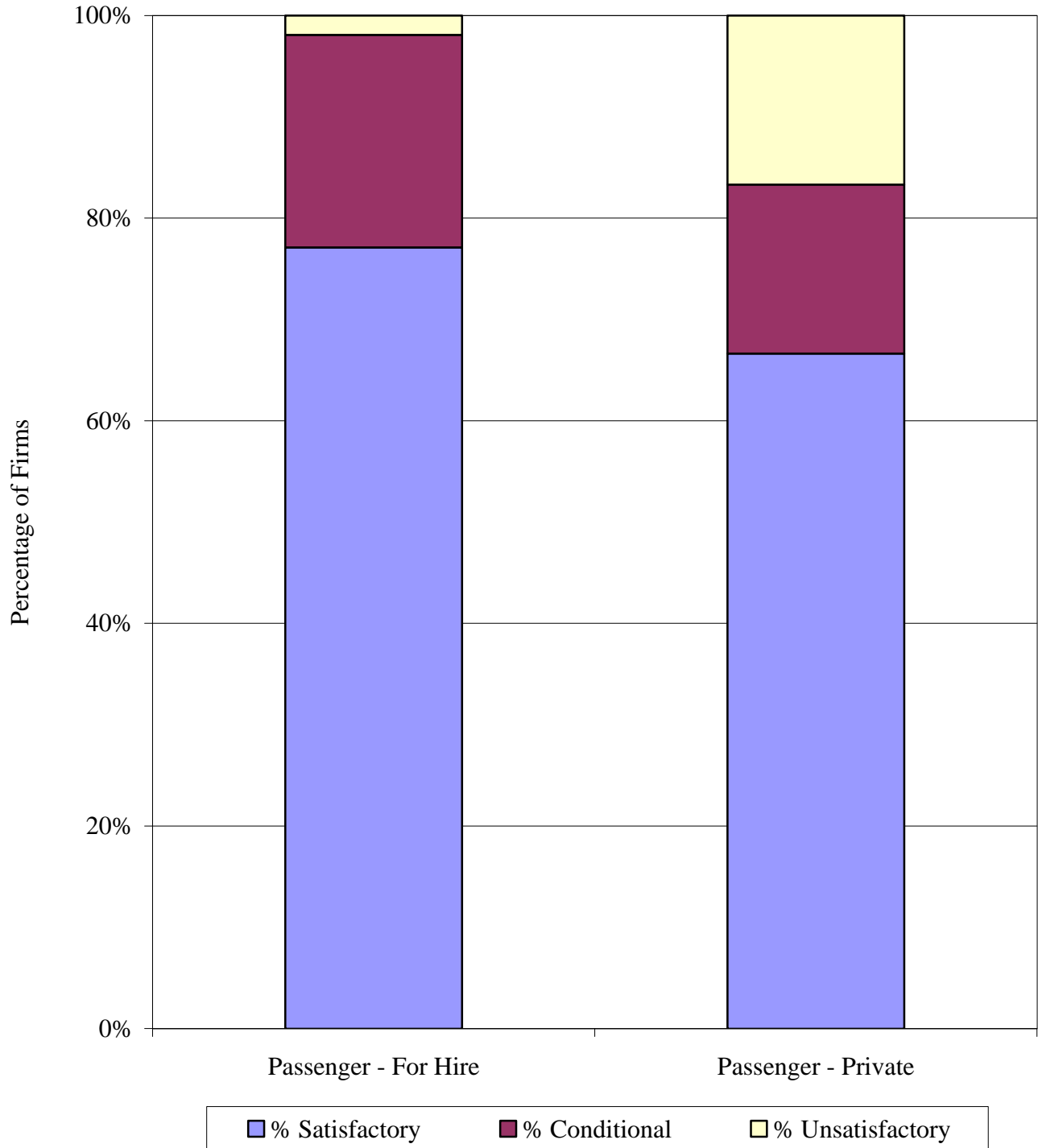


Figure 47
Passenger Transportation
Recordable Crash Rate Comparison

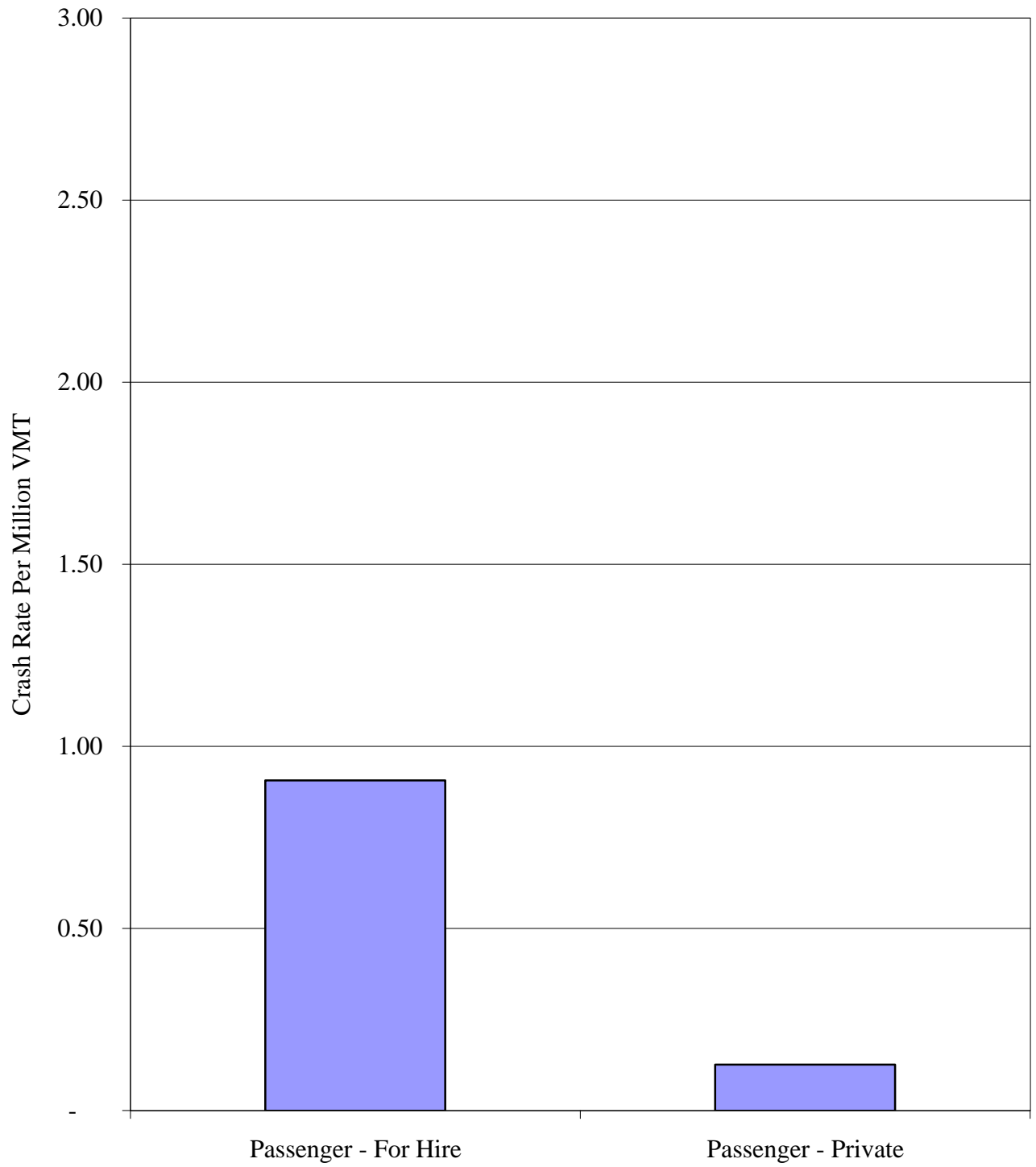


Figure 48
Passenger Transportation
Driver and Vehicle Safety Review Measure

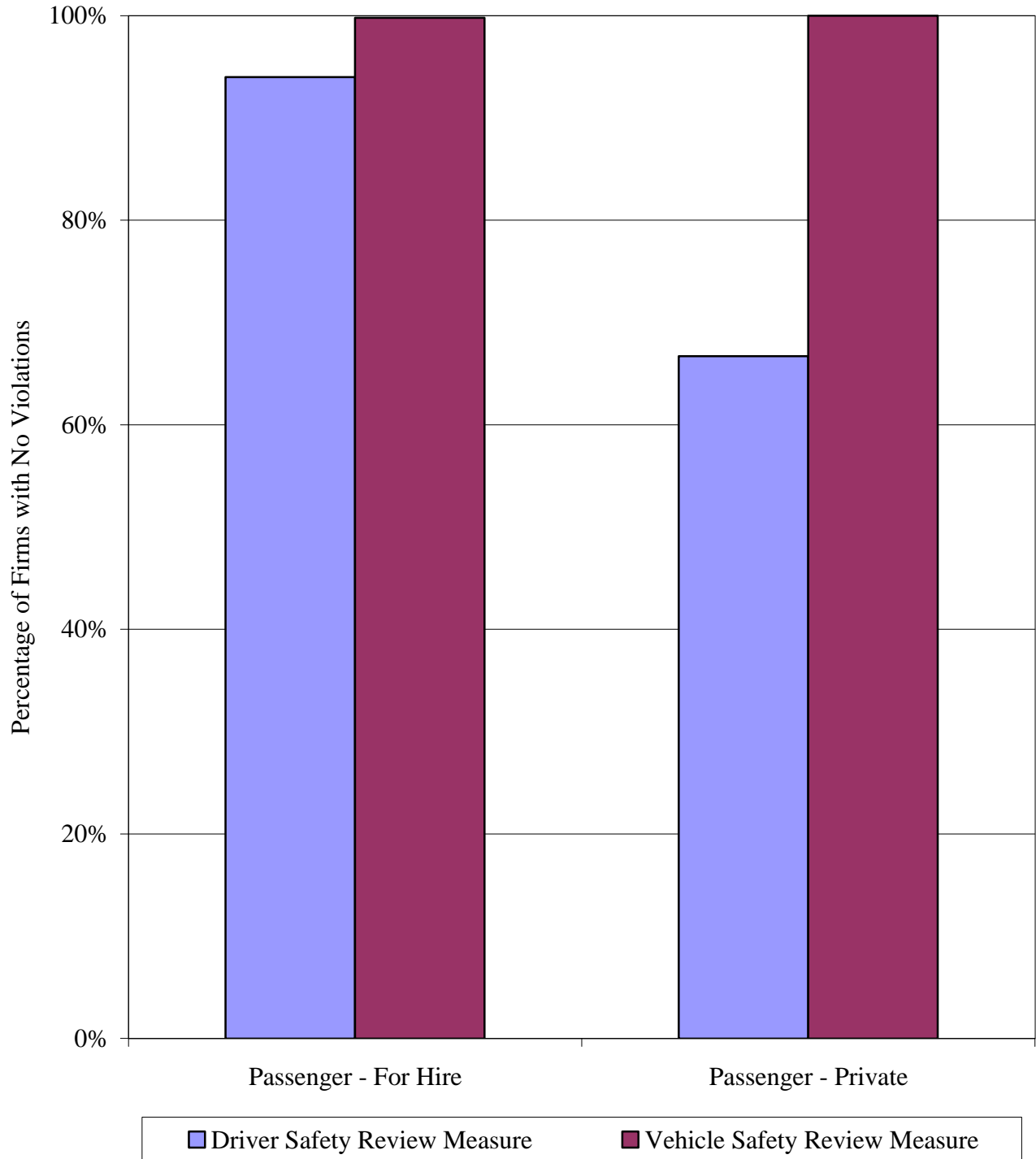


Figure 49
Passenger Transportation
Safety Management Review Measure

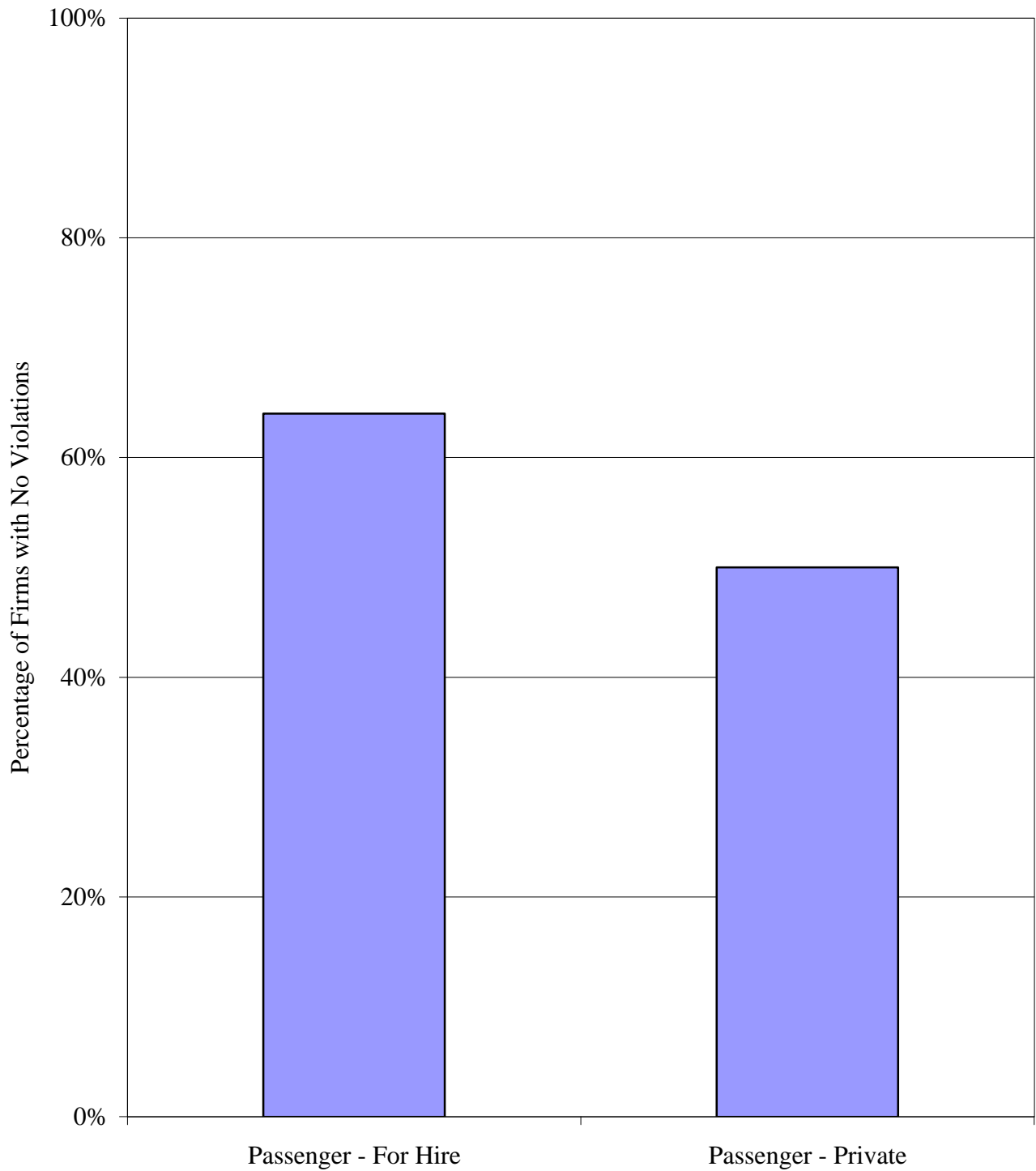


Figure 50
Passenger Transportation
Enforcement Severity Measure

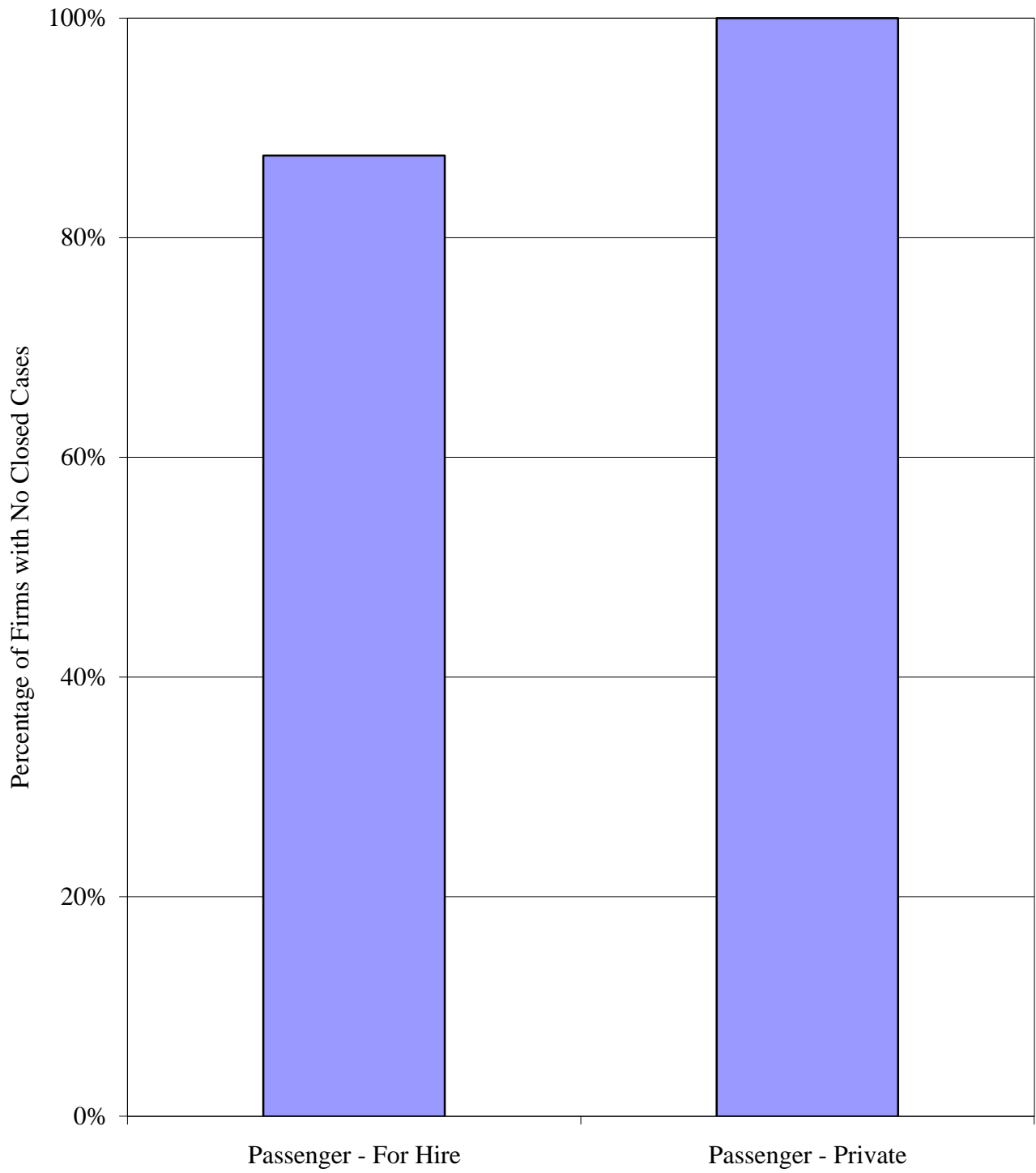


Figure 51
Refrigerated (non-produce)
Overall Safety Review Rating: Most Recent CR

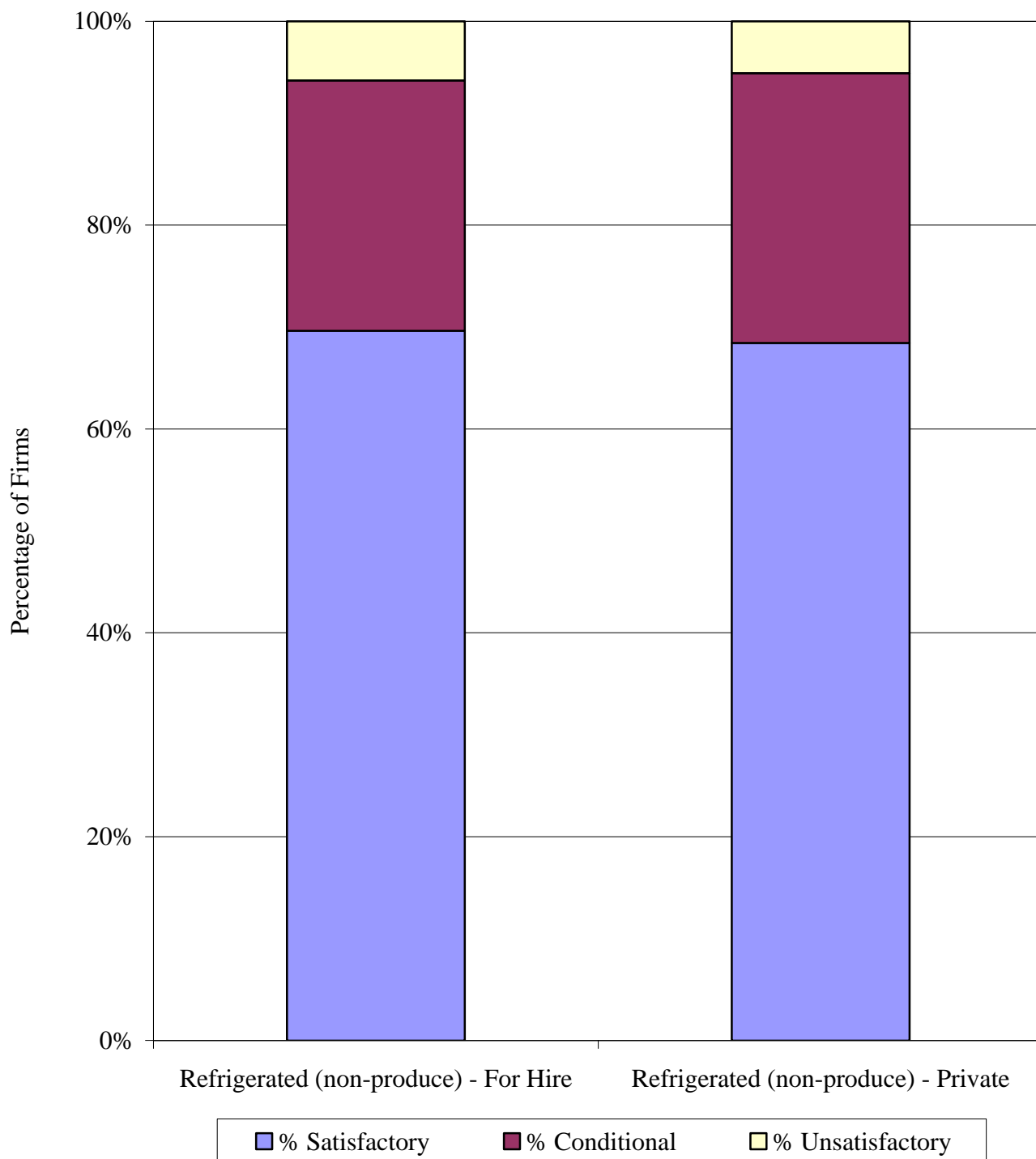


Figure 52
Refrigerated (non-produce)
CR Results: 18 Months Prior to Database Development

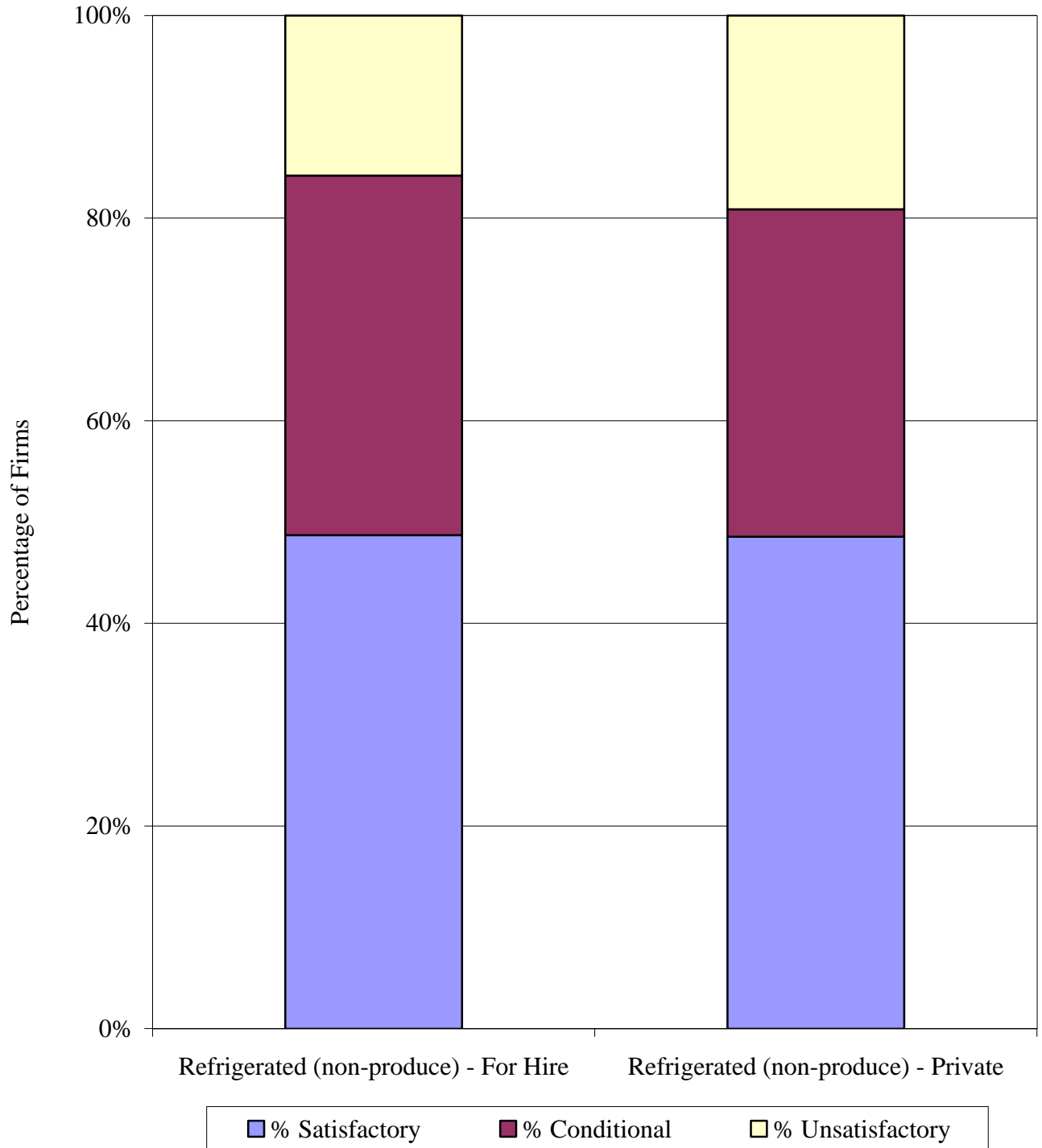


Figure 53
Refrigerated (non-produce)
Recordable Crash Rate Comparison

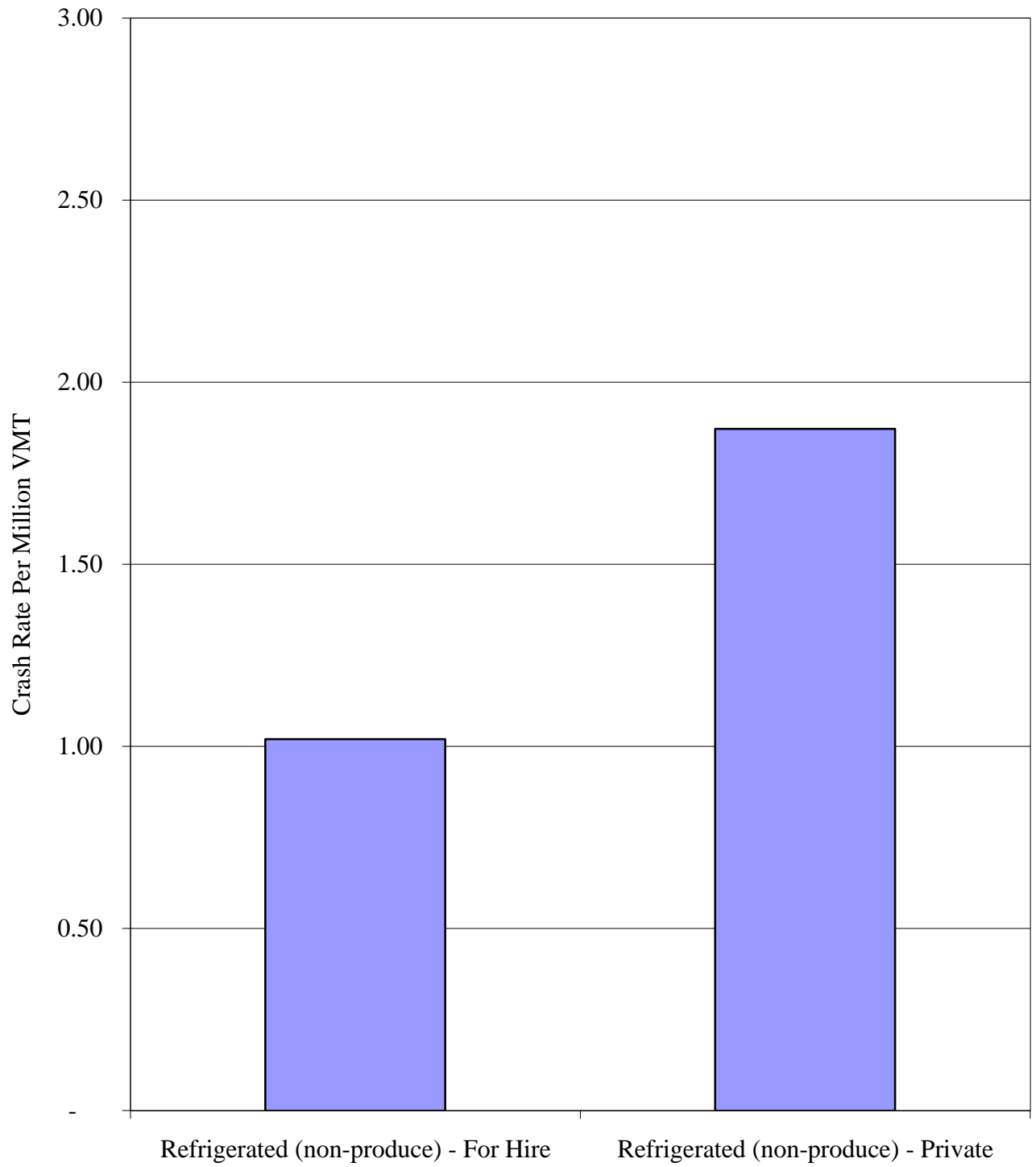


Figure 54
Refrigerated (non-produce)
Driver and Vehicle Safety Review Measure

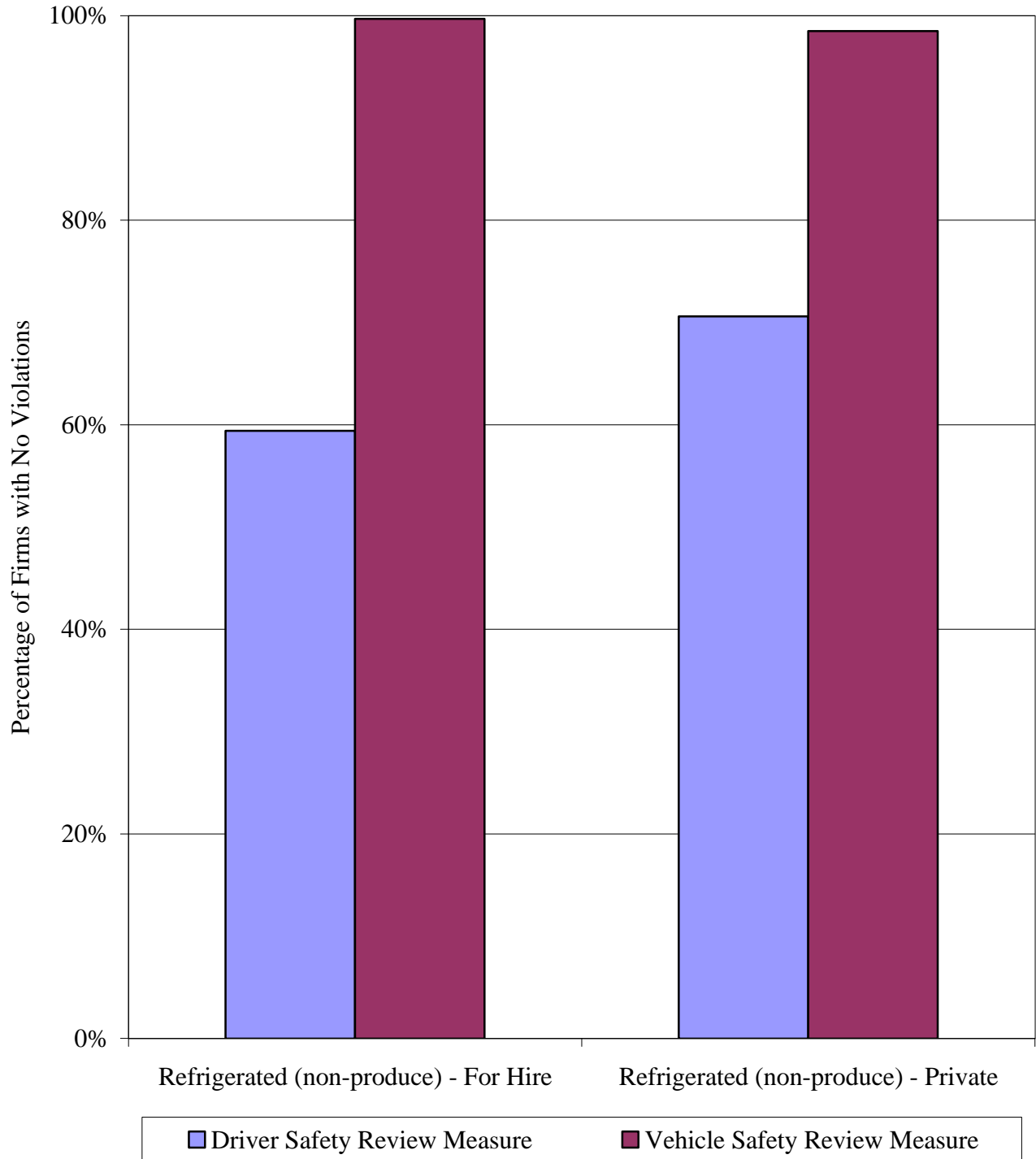


Figure 55
Refrigerated (non-produce)
Safety Management Review Measure

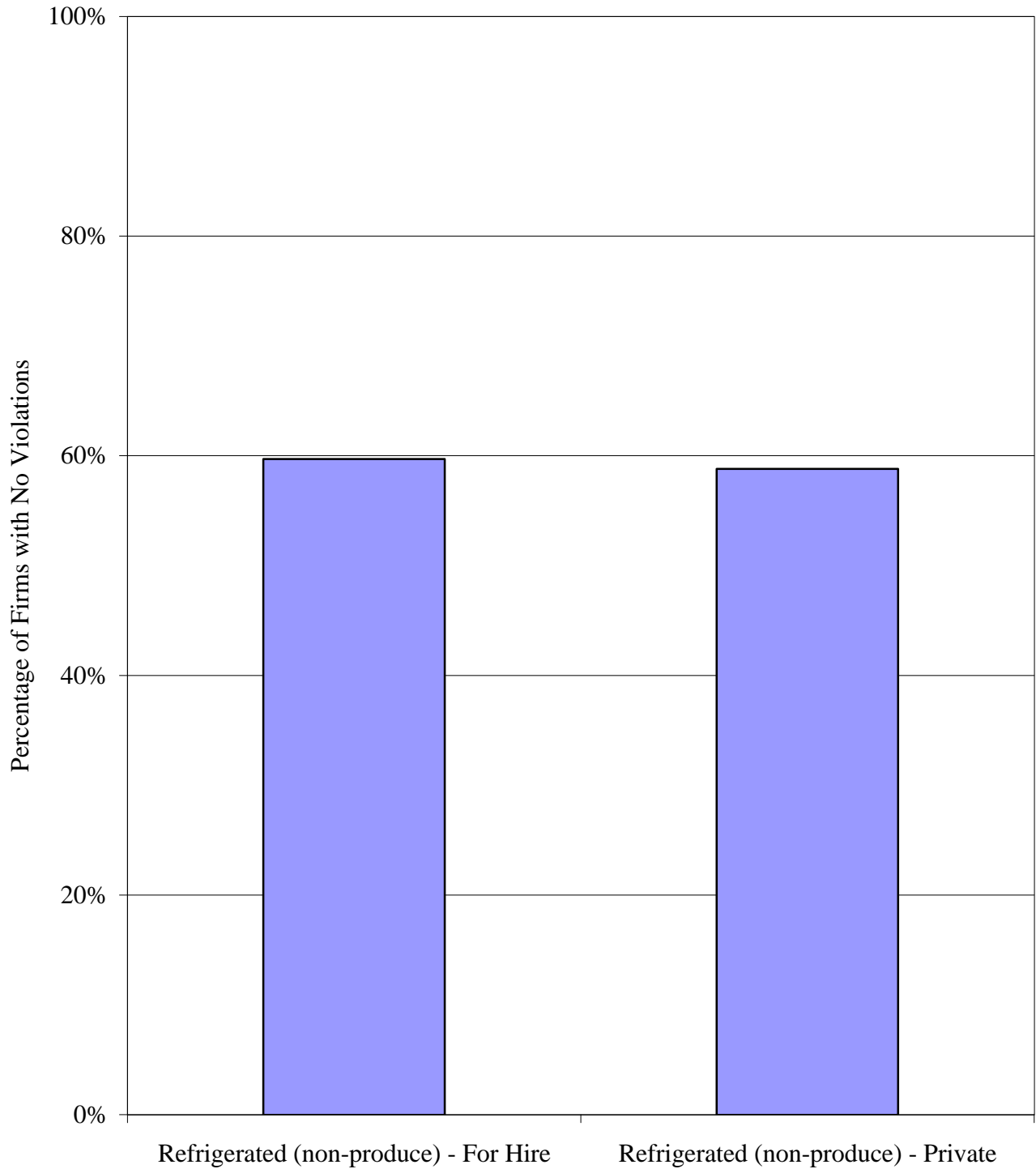


Figure 56
Refrigerated (non-produce)
Enforcement Severity Measure

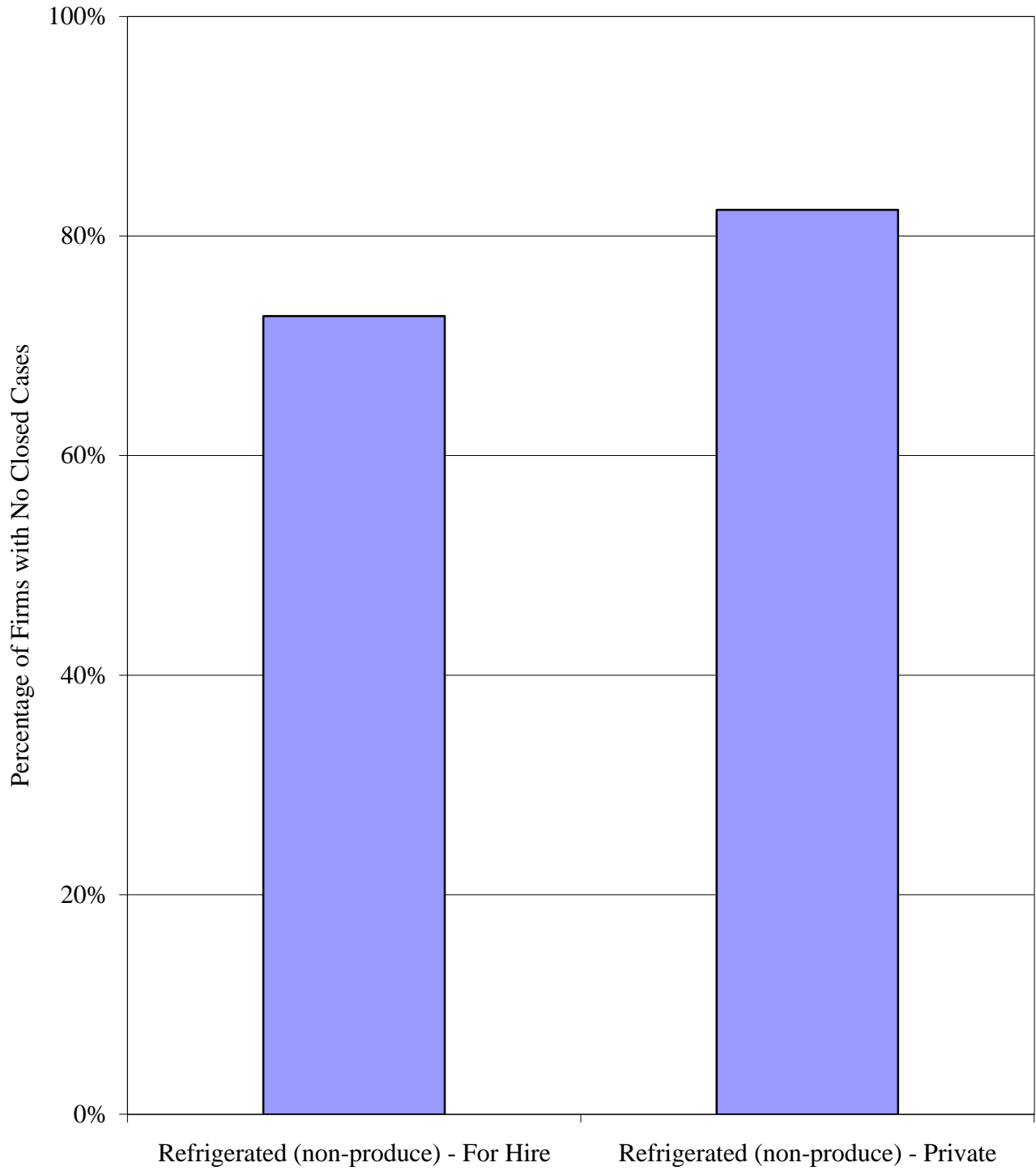


Figure 57
Tank
Overall Safety Review Rating: Most Recent CR

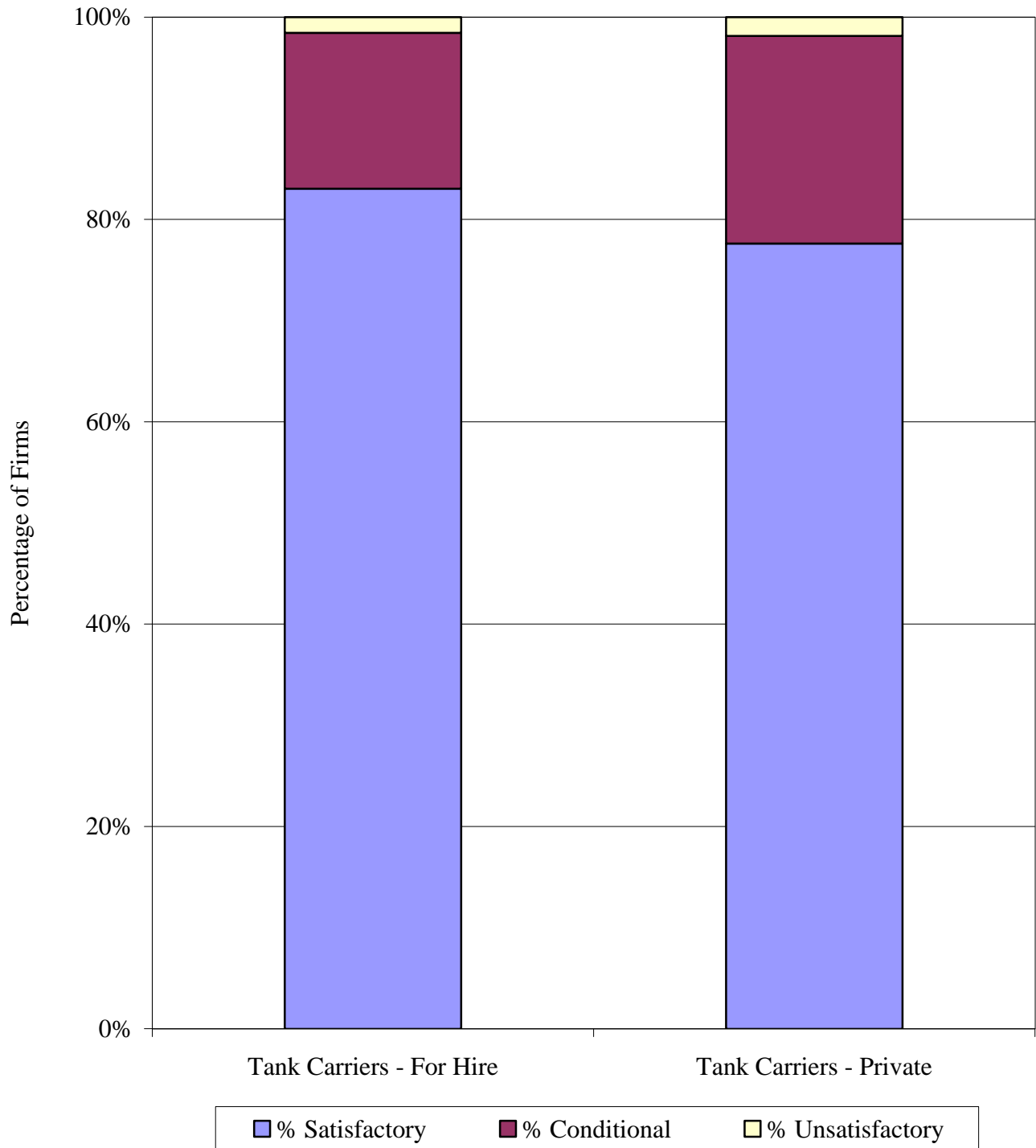


Figure 58
Tank
CR Results: 18 Months Prior to Database Development

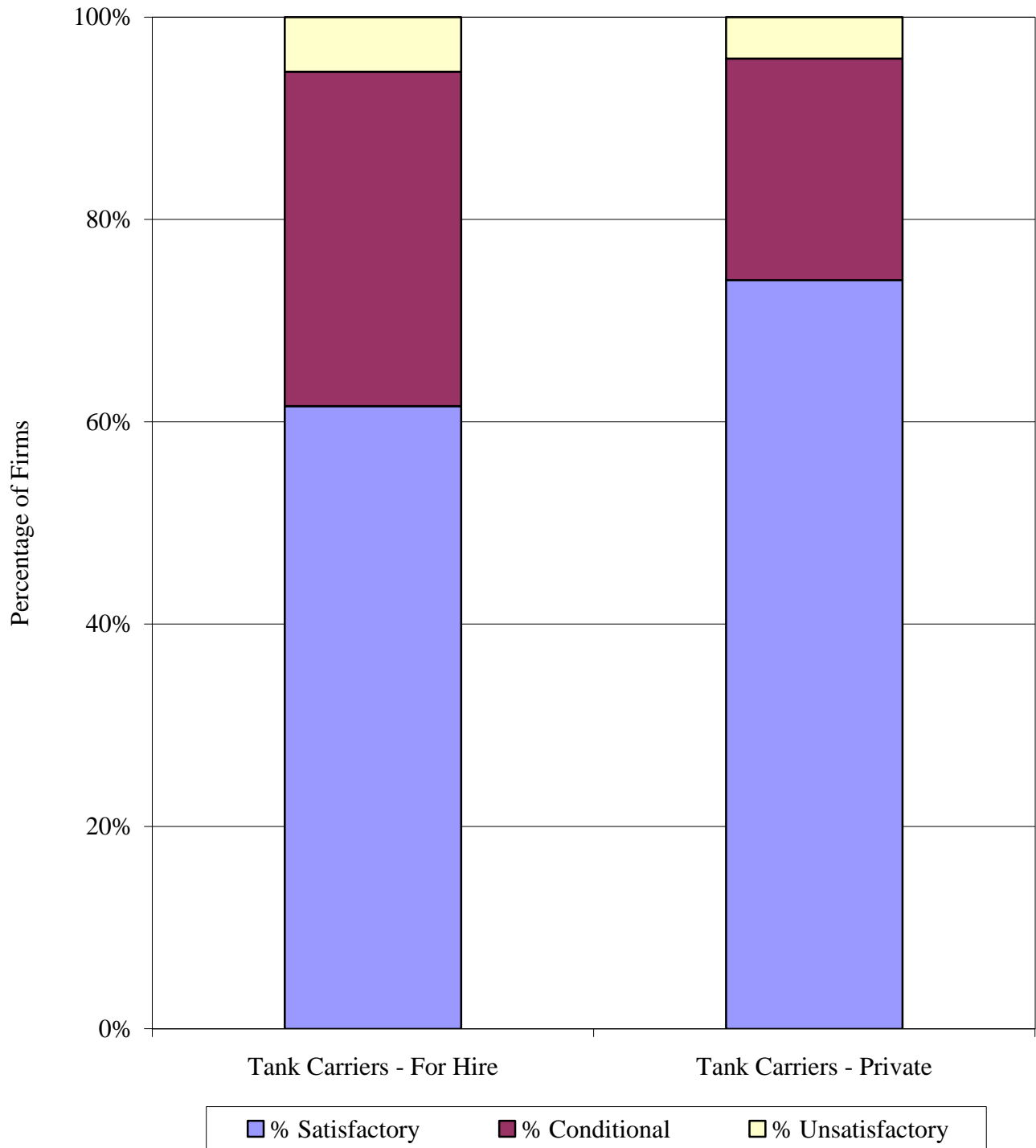


Figure 59
Tank
Recordable Crash Rate Comparison

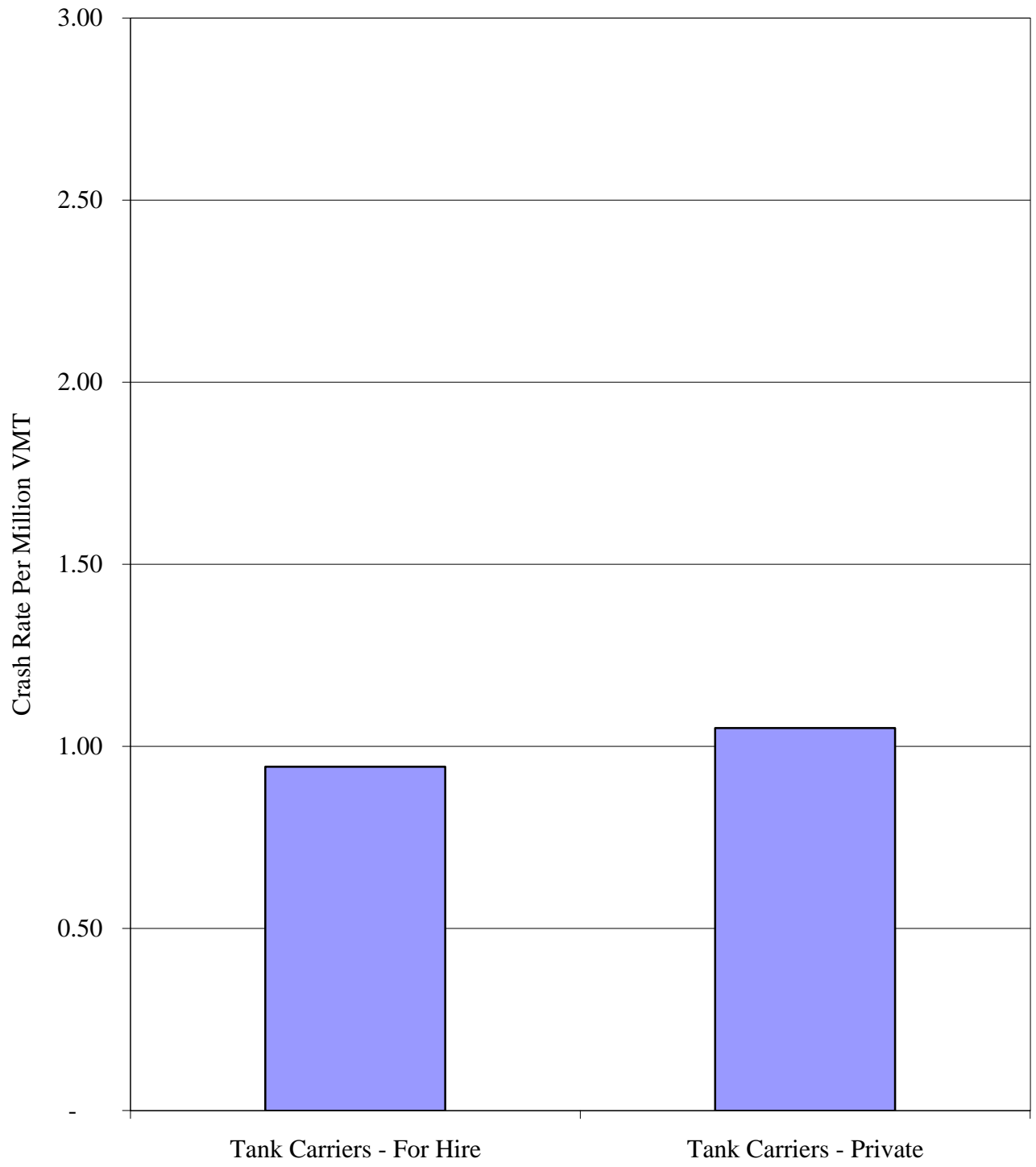


Figure 60
Tank
Driver and Vehicle Safety Review Measure

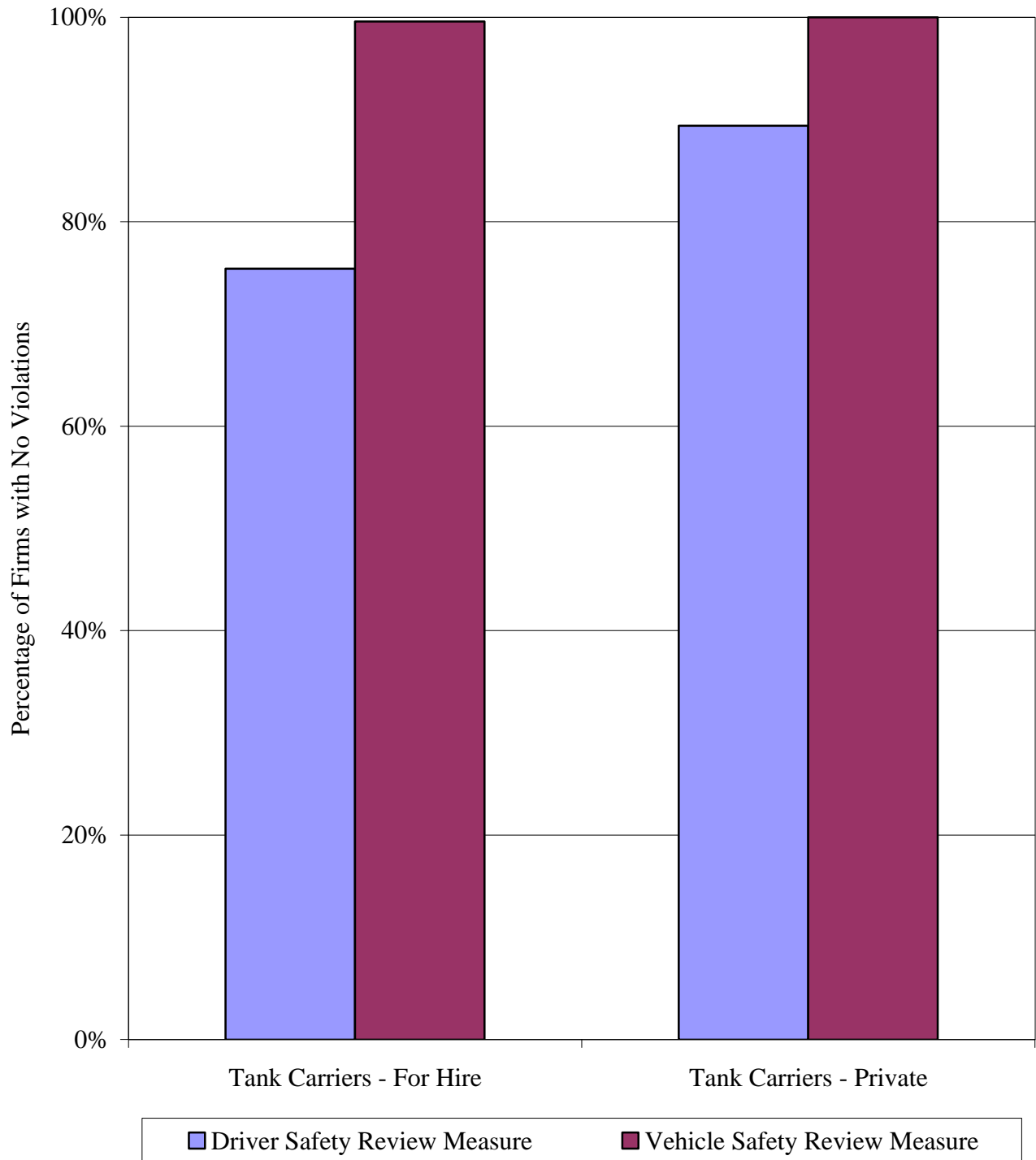


Figure 61
Tank
Safety Management Review Measure

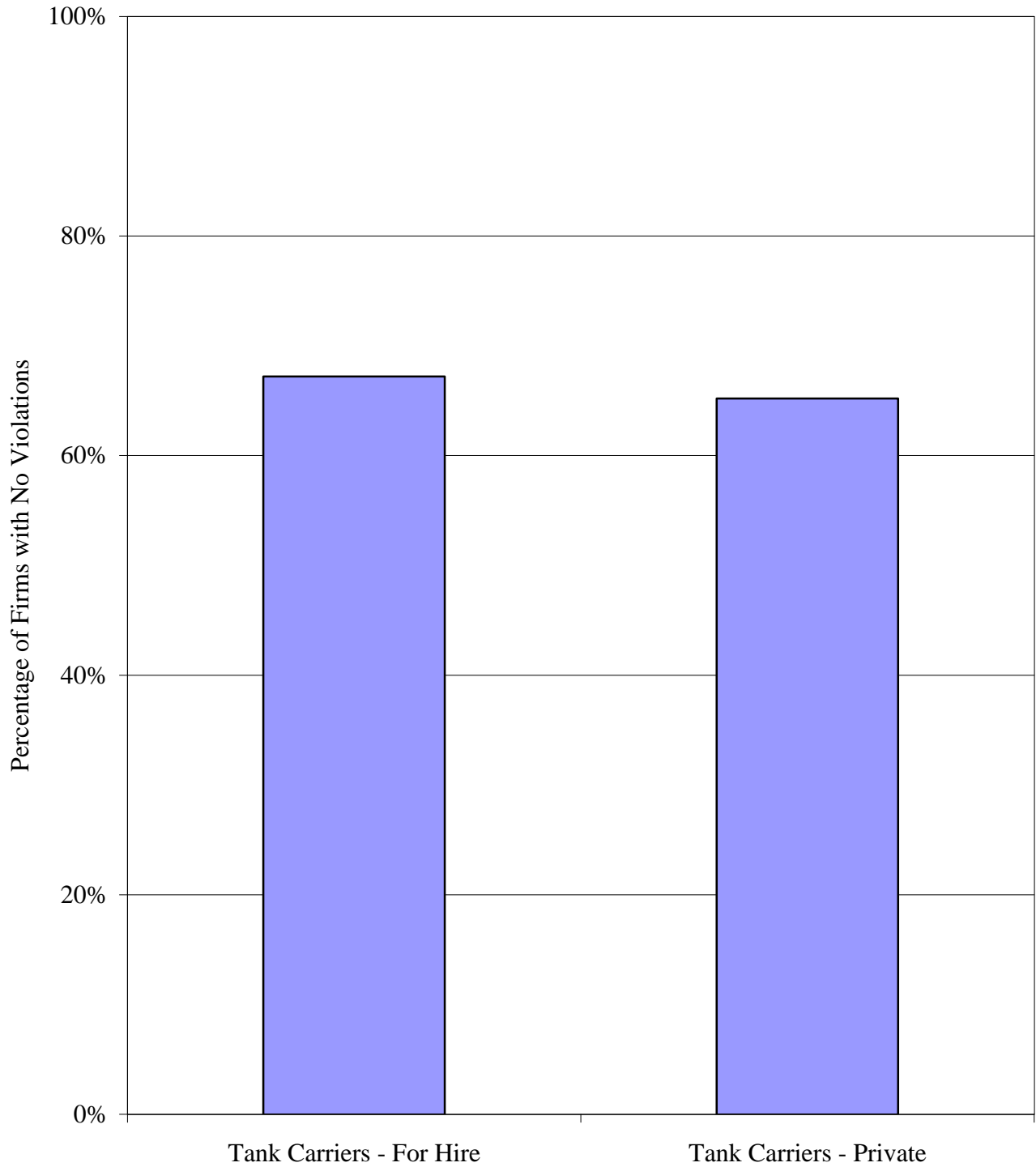


Figure 62
Tank
Enforcement Severity Measure

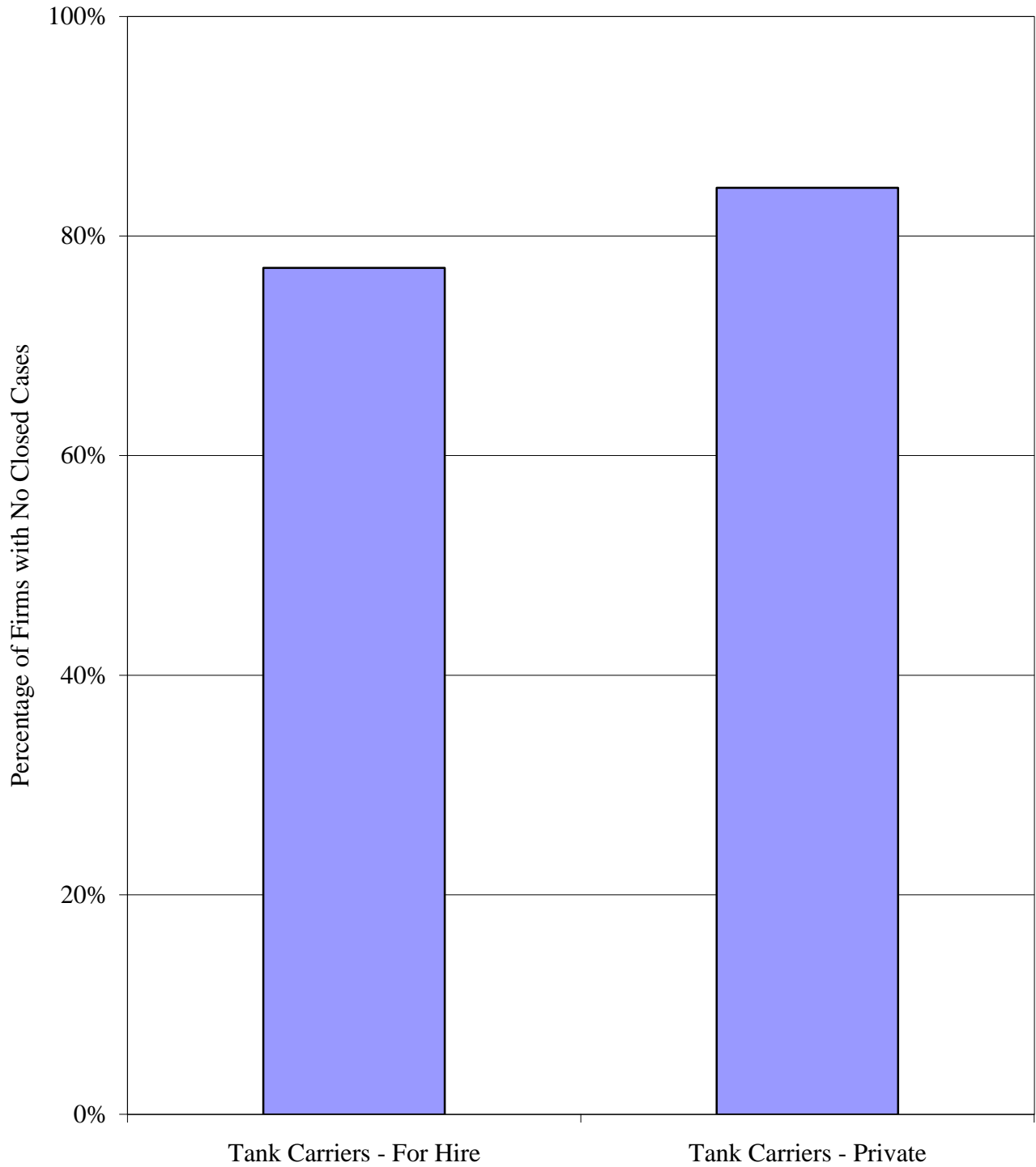


Figure 63
Bulk Materials (non-tank)
Overall Safety Review Rating: Most Recent CR

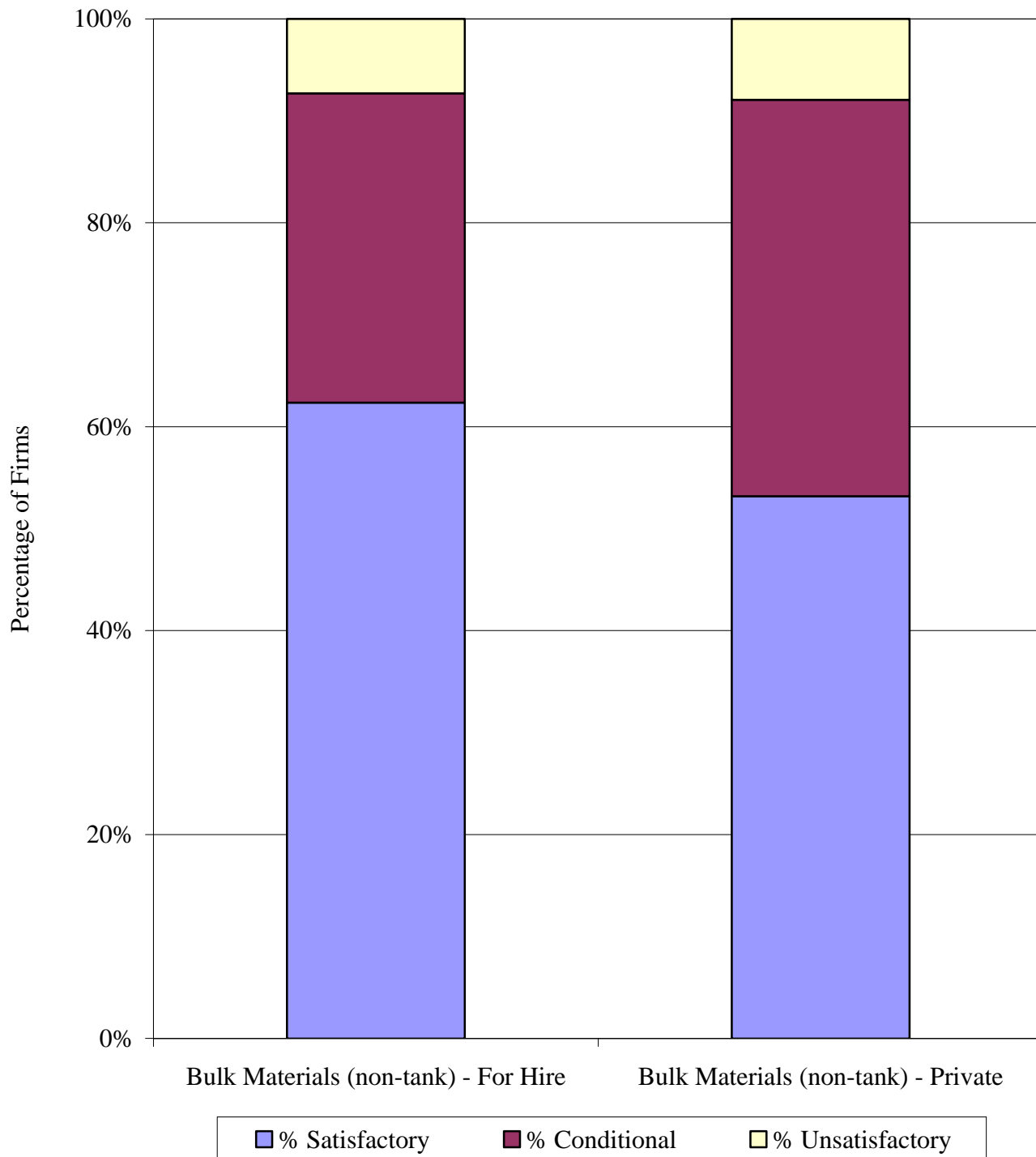


Figure 64
Bulk Materials (non-tank)
CR Results: 18 Months Prior to Database Development

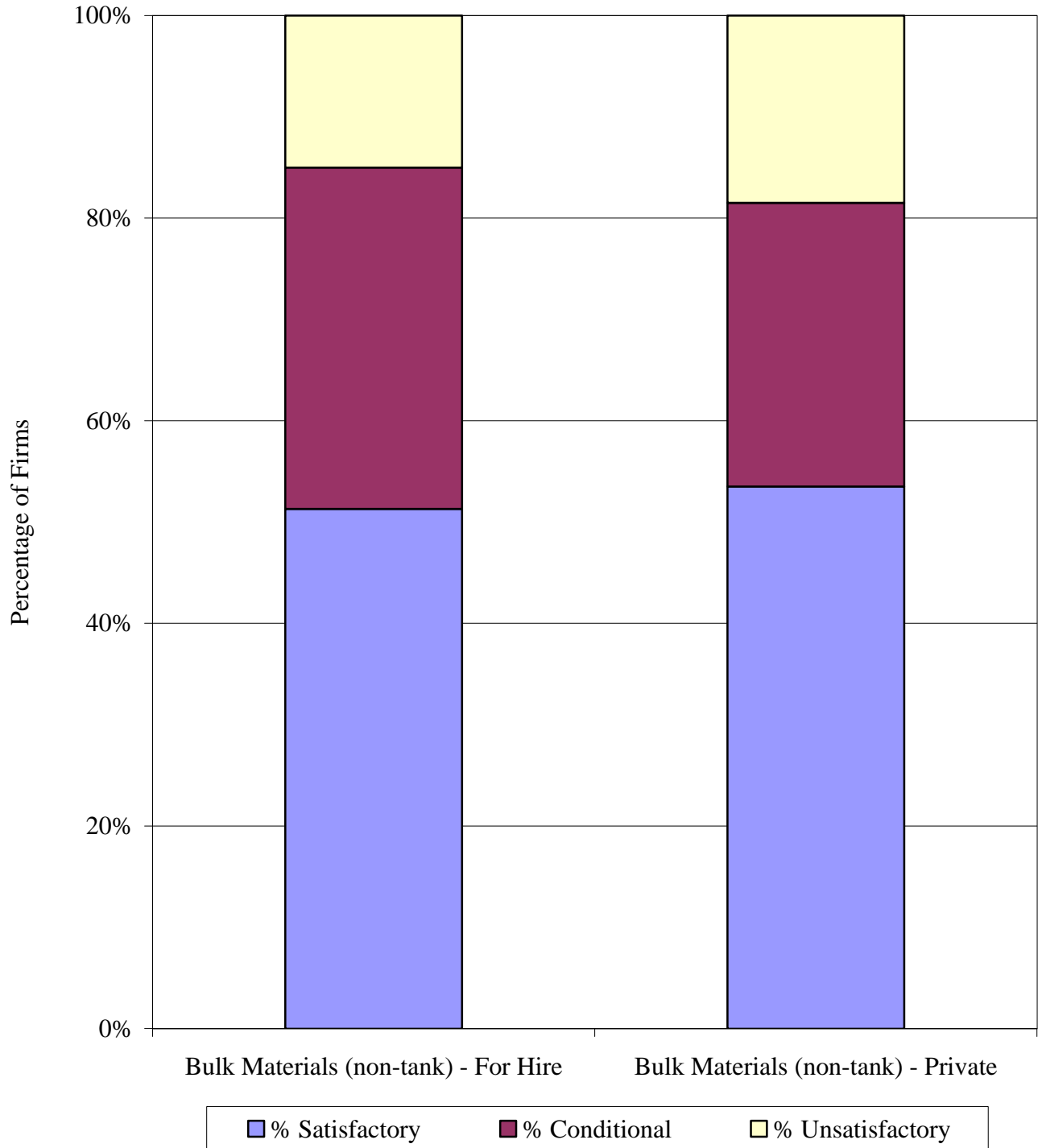


Figure 65
Bulk Materials (non-tank)
Recordable Crash Rate Comparison

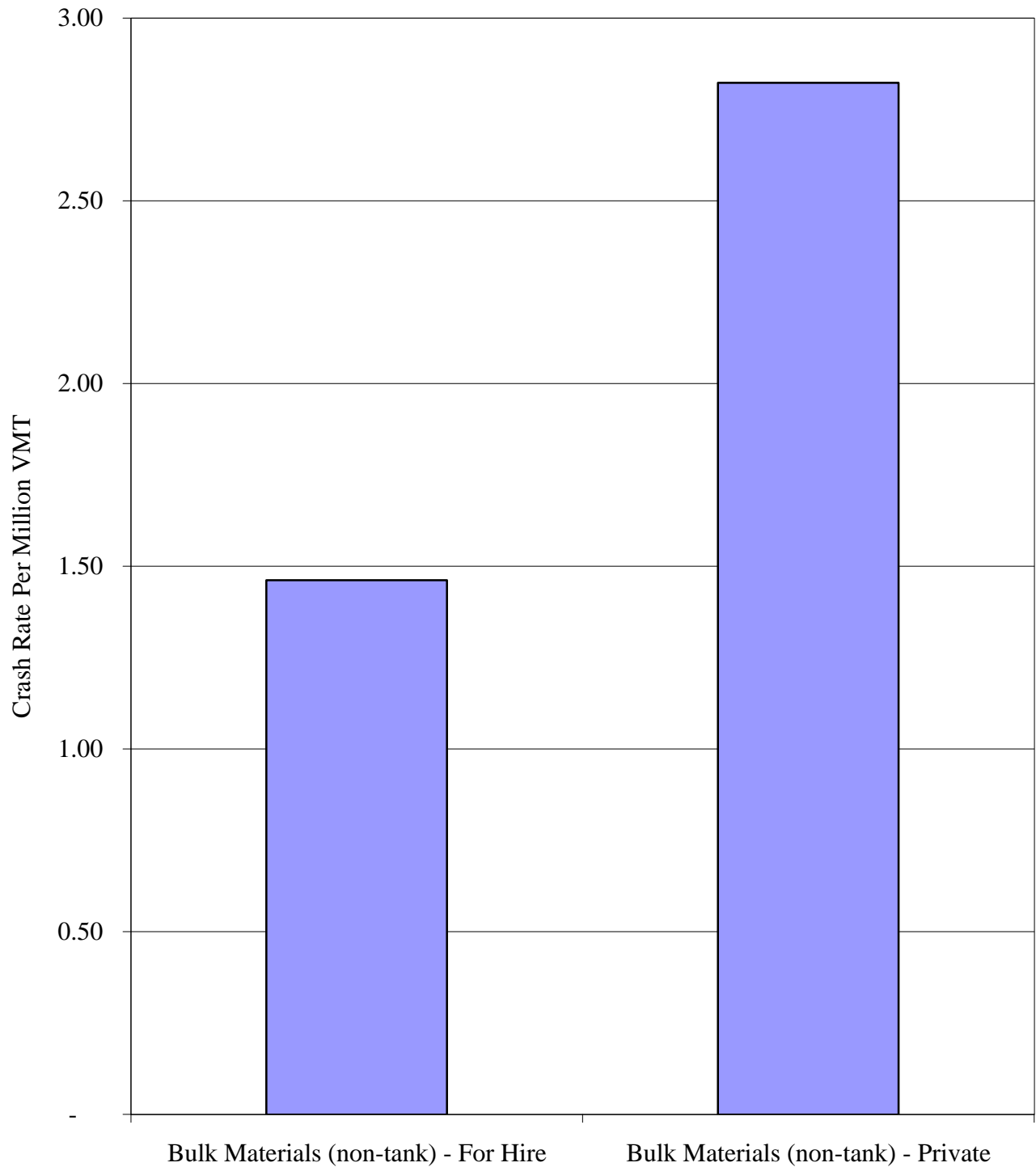


Figure 66
Bulk Materials (non-tank)
Driver and Vehicle Safety Review Measure

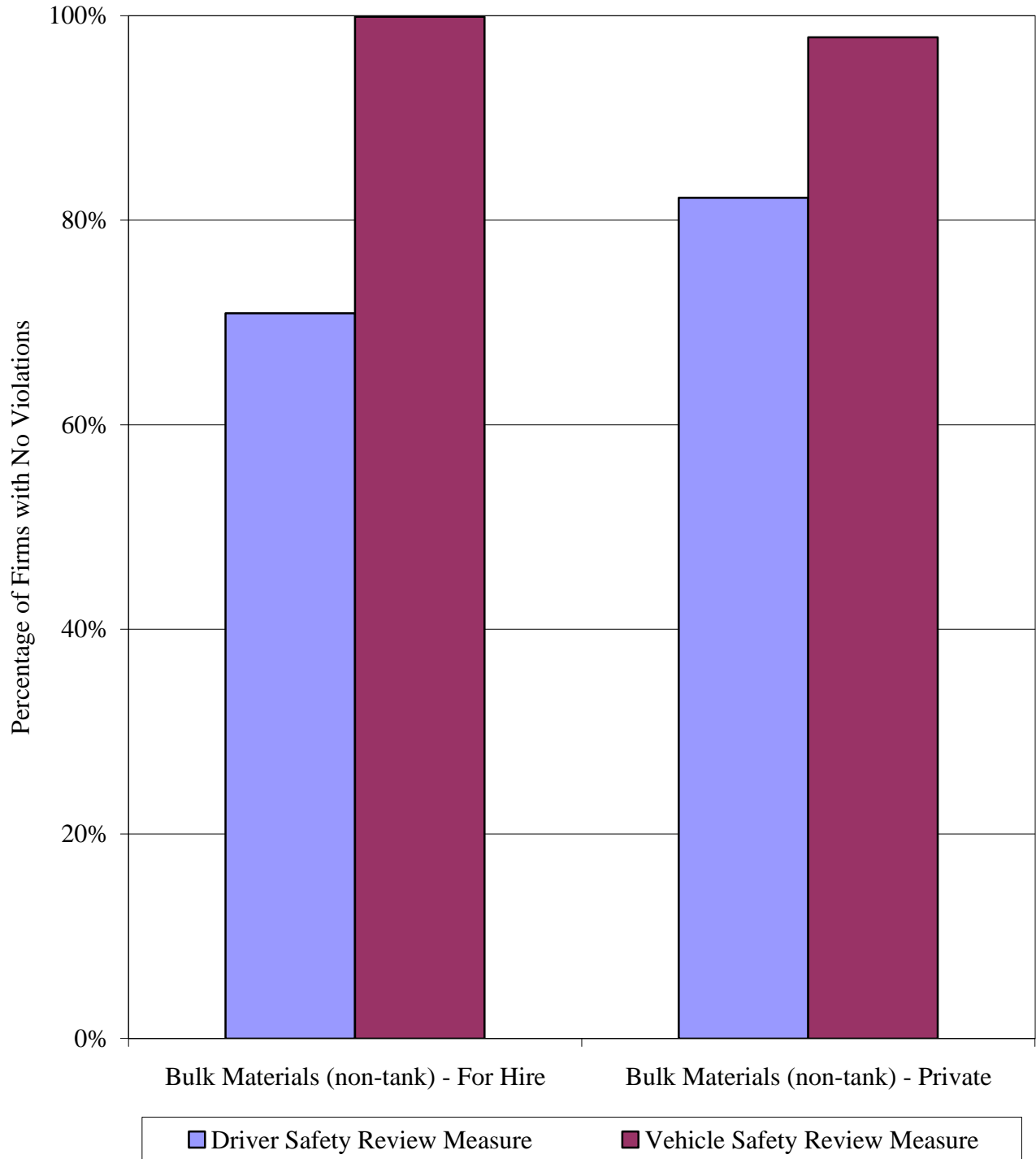


Figure 67
Bulk Materials (non-tank)
Safety Management Review Measure

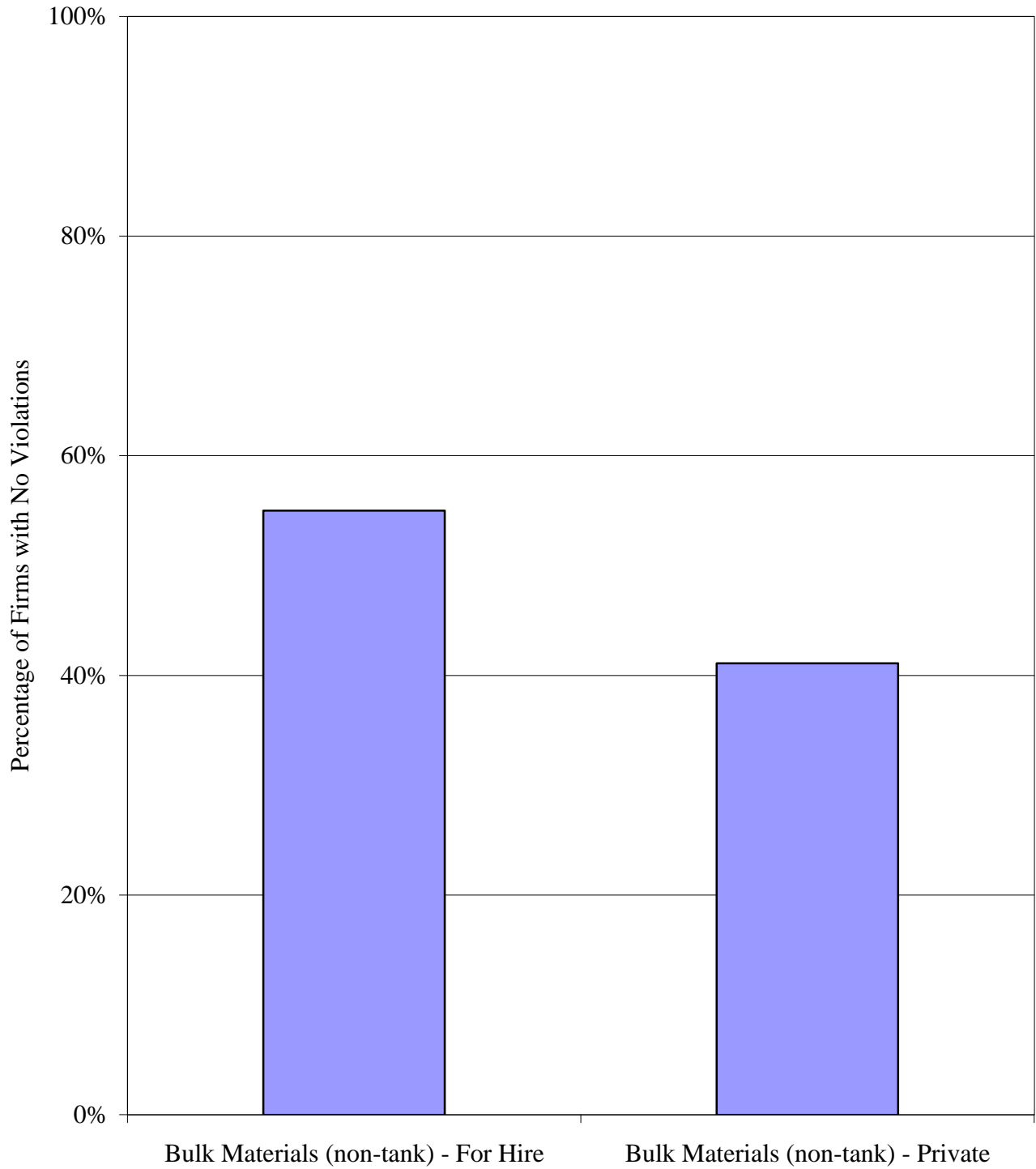


Figure 68
Bulk Materials (non-tank)
Enforcement Severity Measure

