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Motor Carrier Effectiveness

Feedback Report
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EXECUTIVE SUMMARY

- Questionnaire data were obtained from 379 top managers of trucking companies; these data were supplemented with information from the *TTS Blue Book of Trucking Companies*.
- Fifty percent of the companies in the sample were truckload (TL) carriers, 35% were specialized commodities (SC) carriers, and 15% were less-than-truckload (LTL) carriers.
- The average length of a haul was 450 miles.
- On most background and descriptive characteristics, SC firms resembled TL firms more than they did LTL firms.
- Driver quit rates ranged from 0% to 250%; the average quit rate was 27%, and half the companies had quit rates of over 10%. Quit rates were higher in the TL and SC segments than in the LTL segment.
- The major reasons for quitting concerned pay and benefits, time away from home, and problems with dispatchers.
- Driver discharge rates were higher in companies that used flawed processes to select and hire drivers.
- Most respondents considered their companies' performance to be better than that of other companies in the industry; most respondents also thought that their companies were performing at the same level as, or at a higher level than, they were performing three years ago.
- Drivers are paid an average of about $30,000 per year, with pay and benefits being higher in LTL companies than in TL or SC companies.
- Driver pay is generally reported to be market- or seniority-driven.
- Compensation innovations and the use of incentive compensation for drivers are rare among trucking companies.
- Drivers are recruited most often through newspaper advertisements and walk-in applications.
- Medical and drug tests are the most commonly used selection tools for drivers.
- Accidents, moving violations, and customer complaints play the largest roles in driver performance assessment.
- Training programs focus most often on accident prevention and safe driving.
- Unionized drivers have better pay, benefits, and grievance procedures than non-unionized drivers; unionized companies have lower quit rates and lower financial performance than non-unionized companies.
- Focus on driver compensation, staffing, training, and performance appraisal is recommended for motor carriers to reduce turnover and improve financial performance.

SECTION I

INTRODUCTION

Much continues to be written about the "acute driver shortage" in the trucking industry, and turnover rates among drivers (as compared to employees in other industries) are reported to be astronomical. For instance, turnover rates among *drivers* are estimated to range from 38% to 200% (Corsi & Fanara, 1988),[1] but turnover rates among *employees in general* are estimated nation-wide to be only about 1.1% (Taylor, 1991)![2] There are many opinions about why turnover rates are so high among drivers, but few good answers. Also, most examinations of driver turnover rates ignore other important factors such as safety, efficiency, effectiveness, and profitability among motor carriers.

The study reported here is a comprehensive examination of human resource practices used by motor carriers to recruit, hire, and motivate drivers. It concerns the effects of these practices on a variety of outcomes (e.g., turnover, performance, safety), and it tries to identify the driver-related practices that relate to success in the trucking industry. This study sought to answer questions such as: What practices are related to turnover, safety, and efficiency among drivers? What effects do driver turnover, safety, and efficiency have on the bottom-line performance of a trucking company? Do certain kinds of driver-related practices lead to better financial performance? Do different kinds of trucking companies need different kinds of driver-related practices to be successful in the industry?

Systematic, data-based answers to these and similar kinds of questions are invaluable in designing and improving ways to manage drivers. Perhaps one reason that driver turnover continues to be a problem is that solutions are often based on anecdotes and "gut feels" rather than on solid information. For these reasons, this study is designed to provide a comprehensive assessment of the driver-related practices that "work," the causes and effects of driver turnover, safety, and efficiency, and the practices that lead to greater success in the trucking industry.

This study was sponsored by the Mack-Blackwell National Rural Transportation Study Center (created and supported by the U.S. Department of Transportation). The purpose of this study is to provide trucking professionals with data rather than hunches, anecdotes, and conventional wisdom to guide their human resource decisions. The study represents a significant advance in knowledge about human resource practices in the trucking industry. In the following pages, we describe the background, the methods and sample, and the results of the study.

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[1] Corsi, T., & Fanara, P. 1988. Driver management policies and motor carrier safety. *Logistics and Transportation Review, 24*: 153-164.

[2] Taylor, G.S. 1991. Using performance appraisals of dispatcher to reduce driver turnover. *Transportation Journal, 30*(Summer): 49-55.

SECTION II

BACKGROUND LITERATURE

This section discusses three issues:

- Need to study driver-related human resource issues
- Lessons from previous research
- Suggestions for improvement

Need to Study Driver-Related Human Resource Issues

The deregulation of the trucking industry through the passage of the Motor Carrier Act of 1980 brought drastic changes to the industry (Corsi &Grimm, 1987). The impact of this legislation resulted in changes in the competitive strategies of companies both within the TL (Corsi & Grimm, 1987; Corsi & Stowers, 1991) and LTL (Corsi & Stowers, 1991; Corsi, Grimm, Smith & Smith, 1991; Corsi, Grimm, & Feitler, 1992) segments of the industry. Innovations such as the emergence of advanced truckload firms (ATLFs) (Corsi & Grimm, 1989; Corsi & Stowers, 1991) and changes in the use of owner-operators (Corsi & Grimm, 1987) is indicative of the strategic shifts in the TL segment. These changes, along with other environmental changes, have brought to the forefront issues about how motor carriers should be managed. Paramount among these is how the human resources, particularly *drivers*, should be managed.

One of the most immediate changes on the industry brought on partially as a result of deregulation was an overall increase in the use of owner operators instead of company drivers (Corsi & Grimm, 1987). Corsi and his colleagues (Corsi & Grimm, 1987; Corsi and Stowers, 1991) found that the number of owner operators rose in all segments of the industry, including TL, LTL, and household goods. The only exception to this were ATLFs. These firms have specific strategies that maximize the use of capital assets through efficient scheduling, and large scale purchasing of equipment (Corsi & Stowers, 1991). Components of the ATLF strategy includes focus of marketing efforts on so-called high density corridors, use of only company drivers, use of sophisticated computer based load matching and scheduling capabilities, and use of driver teams or relay drivers (Corsi & Stowers, 1991).

Although it is apparent that deregulation had an effect on the way carriers manage their drivers, there is an even more influential environmental phenomenon. In both the motor carrier popular press and the academic literature, a great deal of interest is centered on the *management of drivers* due to perceived driver shortages in the last several years. Exacerbating driver shortages, the trucking industry has been plagued by rampant driver turnover (Taylor, 1991). This amplifies the effects of the shortage of qualified drivers and makes it all the more important for carriers to focus on driver management issues. Several authors have begun to examine the influence of human resource management practices (e.g., selection techniques and recruiting practices) on drivers intentions to quit, driver turnover and other relevant outcomes. The following is a review of the literature that, directly or indirectly, focuses on driver human resources practices and their effectiveness in the trucking industry.

Lessons from Previous Research

Quit rates in the trucking industry have been estimated to be between 38% and 200% (Taylor, 1991), a figure severely at odds with the nationwide median turnover rate of about 8.4% (Bureau of National Affairs, 1993). Although it is possible that many of the reasons drivers quit may have more to do with the job itself and not the way they are managed by their companies, many drivers appear to be obtaining new jobs in other trucking companies instead of getting out of trucking altogether. It is, therefore, more plausible that there are specific factors *in the direct control of management* that help to cause turnover. Most of the articles focusing on driver turnover acknowledge this and thus focus on factors within carriers, such as the human resource practices used for drivers, that may directly influence driver quit rates and other related issues.

For instance, Taylor (1991) highlighting on the *driver-dispatcher interaction*, discussed the usefulness of dispatcher performance appraisals in reducing driver turnover. Likewise, Lemay, Taylor, and Turner (1993) studied management policy as it relates to driver turnover (Lemay, Taylor, & Turner, 1993), and Beilock and Capelle (1990) investigated driver loyalty to their occupation. Finally, McElroy, Rodriguez, Griffin, Morrow, and Wilson (1993), studied the relationship between driver characteristics, work practices, and driver attitudes.

In their study of thirteen motor carriers and over 3900 drivers, McElroy et al. (1993) found that the *longer* individuals had been a truck drivers, the more they had negative attitudes about their work, pay, and advancement opportunities. In addition, the average length of time drivers were typically away from home was positively related to negative feelings about their job. The authors also found that drivers were very interested in opportunities for job enlargement, additional training, and participative management. Furthermore, interest in these factors was positively related to length of tenure. This study suggests that veteran drivers are extremely dissatisfied with current employment policies and working conditions, and that they are anxious to voice their opinions and participate in decision-making in the organization.

Beilock and Capelle (1990) found that drivers were less likely to express an intention to leave the industry if they had received formal training, were owner operators, were in their 30s, 40s, or 50s, had previous driving experience, and were less educated. While these studies provides some empirical evidence of the factors that influence drivers' decisions to stay in the industry, they do not provide insight into the factors that influence drivers' decisions to move from carrier to carrier. In addition, they provide little guidance to carriers who wish to develop programs to reduce driver turnover.

Suggestions for Improvement

Focusing on the *driver-dispatcher relationship*, Taylor (1991) addressed the potential influence that dispatchers have on driver quit rates. Basing much of the discussion on the proper use and expected results of performance appraisals, he argued that performance appraisals of dispatchers be used to create and reinforce desired dispatcher and driver behaviors, and thus reduce driver turnover.

Lemay and Taylor (1988) reviewed current methods of *recruitment* in the industry and suggested several strategies carriers could use to increase the overall effectiveness of their recruiting

efforts. Some of these strategies focused on expanding the target pool of driver recruits by focusing more on minorities and groups that are currently not in the driver workforce. These individuals could include other employees of the company currently serving in non-driving roles.

Recruiting activities of the trucking industry were also addressed by Southern, Rakowski, and Godwin (1989) in their survey of 148 trucking company personnel managers. These managers reported believing that pay was the most important factor in drivers' choice of motor carriers for employment. In this sample, consistent with expectations, advertising average pay levels, per mile rates, and hourly wages were the most often used methods of recruiting new drivers. Managers also reported that the tractor condition, company reputation, and the amount of time home were also used frequently in recruiting drivers. These three factors were believed by personnel managers to be important to drivers, but of much less importance than pay. This is demonstrated by the fact that less than one-third of the personnel managers mentioned condition of equipment, reputation of company, and amount of time not on the road, as significant incentives that drivers value, while more than two-thirds mentioned pay (Southern, Rakowski, & Godwin, 1989). Although this study shows how carriers recruit and what they feel is important to drivers, it does not tell us what is most important to drivers themselves and which methods of recruiting yield the highest number of qualified applicants. Thus, further research must address these issues.

The high rates of turnover among motor carriers has also brought more attention to the processes used to *select and hire* drivers. Harrington (1994), like many researchers in the management sciences, suggests that use of an extensive screening and selection process may lead to increased driver performance and organizational effectiveness. He argued that higher levels of performance, customer satisfaction, and safety in private carriers involves the use of application forms, interviews, written tests, road tests, driving record checks, background investigation (criminal, credit, employment history, multiple CDL), and physical ability tests (Harrington, 1994). Additionally, written psychological tests were considered useful in ascertaining such things as safety awareness, occupational suitability, customer service orientation, and driver knowledge. While Harrington=s (1994) work provides a good framework for the study of selection in the trucking industry, no empirical work to date has examined the influence of these practices on important organizational outcomes in the industry.

The use of a *safe driving incentive system* as a strategy to enhance the profitability of a trucking company was proposed by Morton (1984). For Conoco and its fleet of trucks, major savings were achieved in insurance costs and the costs of operation through such incentives.

In regard to driver human resource management issues, although there has been some emphasis in the literature to date, there is still a great need for further studies that examine broader range of practices and their effects on relevant driver behaviors and company performance measures. We have only begun to understand the precise reasons why drivers choose the profession and remain with or leave a particular carrier. We also know very little about the effective management of driver behavior and more effective methods of motivating drivers to perform at higher levels. Research on driver incentive compensation systems is also sparse, as is research on other human resource management innovations in the industry. Given that these issues are of utmost importance to carriers, it is important to conduct systematic investigations about the *causes* and *consequences* of, and strategies for *amelioration* of driver turnover. It is also important to assess the extent to which

factors that relate to driver shortages are also related to other indicators of effectiveness such as financial performance and operating efficiency.

The study reported here provides information about these issues. Although the results reported here are primarily descriptive, the data base enables answers to many of the issues discussed above.

SECTION III

STUDY SAMPLE AND METHODS

This section discusses two points:

- Study sample
- Methods and measures

Study Sample

The original population for this study consisted of 3104 trucking firms that reported information to the Interstate Commerce Commission (ICC) and were included in the 1993-1994 *TTS Blue Book of Trucking Companies*. Since an important objective of this study was a systematic examination of organizational policies and procedures for permanent company drivers across the trucking industry, it was imperative that the firms included in the study have a sufficient number of employees to have established formal human resource policies. Thus, the first criterion for inclusion in the study was that the trucking company have at least 30 total employees in either the 1991, 1992, or 1993 calendar year data. In all, 1430 companies met this criterion. The second criterion for inclusion was that the company be listed in the most recent version (1993 calender year) of the data. This resulted in the deletion of 261 companies and a revised sample of 1169 companies. Of these, 97 more were excluded because they had gone out of business in the interim, or because they had no company drivers and used "owner-operators" exclusively. The remaining 1072 companies met all relevant criteria and were considered the final sample for the study.

Methods and Measures

Following initial mail and telephone contacts, a 24-page questionnaire was mailed to the highest-level human resource manager in each company remaining in the final sample. Several follow-up contacts were made with each potential respondent. In all, completed questionnaires were returned by 379 companies, yielding a response rate of 36%. These 379 responses form the major data base for the study.

The questionnaire was developed through a multi-step procedure: an extensive review of the human resource management literature and the trucking literature yielded a list of issues it was important to study and potential questions with which to study these issues; issues and questions went through several iterations to hone, clarify, and streamline their focus; drafts were pretested among representatives of the trucking industry and experts in the trucking industry; the final questionnaire incorporated input and learnings from all previous steps.

The 24-page questionnaire contained the following major sections: (1) Organizational background information; (2) Driver turnover; (3) Driver personnel policies; (4) Personnel and human resource practices; (5) Labor-management relationships; (6) Personnel, human resource or safety department; (7) Your (i.e., the respondent's) perceptions; (8) Top management team's perceptions; (9) Business strategy; and (10) Organizational performance and effectiveness.

There was some diversity in the organizational position of respondents. For instance, some respondents were owners or top managers for the company, while some were members of Accounting and Benefits departments. But, for the most part, respondents were the highest-level human resource professionals in the organization.

Data obtained through the questionnaires were supplemented with information contained in the *TTS Blue Book*. This information is reported by trucking companies to the Interstate Commerce Commission and is available publicly. Information on performance and safety issues, information about the structural characteristics of the company (e.g., size, fleet, etc.), and so on, was available in the *TTS Blue Book* and was used in the study to enrich data obtained through questionnaires.

Summary of Key Points

- Data were obtained from top-level managers of 379 large trucking companies.
- Questionnaire data were obtained about a wide variety of human resource and personnel practices relating to drivers, about company and equipment background, and about company effectiveness and success.
- These data were supplemented with information contained in the *TTS Blue Book of Trucking Companies*.

SECTION IV

DESCRIPTIVE INFORMATION

This section discusses three points:

- Characteristics of companies in the sample
- Driver working conditions
- Fleet and equipment characteristics

Characteristics of Companies

Company Types

A total of 379 companies provided data for this study. Of these, 188 or about 50% could be classified as General Freight-Truckload (TL) carriers, 57 or about 15% could be classified as General Freight-Less than Truckload (LTL) carriers, and 130 or about 35% could be classified as Specialized Commodity (SC) carriers. Many characteristics and dynamics differ across these three types of carriers; when relevant, we report information separately for each type of carrier in the remainder of this document.

Another way to look at trucking companies is whether they are private or common carriers. We asked respondents how they classified their companies. Over two-thirds of the respondents (70%) reported that they were common carriers; a quarter (25%) said that they were contract carriers, and only a handful (4%) considered their companies to be private carriers.

Structural Characteristics

Information about structural characteristics of the companies in the sample is shown in Exhibit III.1. Our data support the common observation that TL and LTL firms are quite different in their characteristics and operations. The companies in our sample employed an average of 100 people. LTL firms were a lot larger in terms of number of employees (median=235) than were TL firms (median=99) or SC firms (median = 90 employees). On average, a dispatcher handled about 40 drivers; there were no marked differences between TL and LTL firms on this count, although fewer drivers reported to each dispatcher in SC firms.

About a quarter of the companies had unionized drivers, with unionization being much more prevalent in LTL (46%) and SC (31%) than in TL firms (13%). Unionized companies tended to have most, if not all, of their drivers covered under collective bargaining agreements.

These data indicate that LTL firms on the whole are larger, and are more likely to be unionized, than are TL firms. On most dimensions, SC firms resemble TL firms more so than they do LTL firms.

Driver Characteristics

A major focus of this study was the personnel approach used in the trucking industry with respect to drivers. To this end, we obtained information about the drivers used by the companies in our sample. This information is also shown in Exhibit III.1. On average, the companies in our sample employed about 60 drivers; once more, LTL firms used many more drivers than did TL or SC firms.

Most of these drivers were non-minority males. Less than 5% of the drivers in any of the groups were either minority or female. These data suggest that the demographic mix among truck drivers does *not* approximate that of the working population in general. This is particularly true in LTL firms, where fewer than one percent of drivers were female. We did not ascertain whether this is a self-selection effect, in that women and minorities prefer not to drive trucks, or whether this is a reflection of the personnel policies of trucking companies. In either case, the fact remains that the demographic composition of the driver work force is markedly different from the demographic composition of the overall national work force.

For all three groups, the average tenure for drivers was over two years. While turnover may be a problem, it also appears that, for the most part, motor carriers can maintain a stable driver work force.

Driver Working Conditions

We asked a number of questions about the conditions under which drivers performed their jobs. The answers to these questions are shown in Exhibit III.2. One set of questions concerned whether drivers drove in teams or relays. As the exhibit shows, only a small fraction (less than 7%) drove in teams *or* relays. LTL drivers were a little more likely than others to drive in relays, and a little less likely than others to drive in teams. For the most part, the trucking industry appears to treat drivers as individuals, and few driver combinations are used.

A major concern in the industry is the amount of time drivers spend on the road, and the amount of time they are away from their homes and their families. We asked several questions about these issues. On average, TL drivers were routed home about four times a month, or about once a week. Not surprisingly, LTL drivers were home almost every day. SC drivers were somewhere in between, being home essentially every other night. Fewer than a third (29%) of TL drivers were home every night and over half (57%) of the SC drivers were home every night, whereas over three-quarters (78%) of LTL drivers were able to do so. To the extent that time away from home is of concern to drivers, then, it is obvious that the problem is more severe among TL drivers than among LTL drivers.

The average haul for TL drivers was 500 miles, the average haul for SC drivers was 400 miles, and for LTL drivers the average haul was 337 miles. Again, shorter hauls among LTL firms are to be expected.

Many drivers consider their rigs to be their "homes away from home," and when they can retain their rigs, it is easier for them to personalize the rigs and make them feel more like home. It is useful to note that a vast majority of companies allowed drivers to retain their rigs, and only a few

followed a slipseat policy. TL firms were more likely to do so than LTL firms -- over 90% of TL, and about three-quarters of the others (76% of LTL drivers and 77% of SC drivers) had rigs permanently assigned to them.

We were also interested in the extent to which trucking companies used temporary drivers or "casuals" and owner-operators to do the runs. The data show that only a small proportion (less than 6%) of the hauls were done by casuals. Since temporary drivers are arguably less skilled and experienced than permanent drivers, it is useful to note that they carried only a small fraction of the load. They were a little more likely to be used by LTL firms than TL firms. Owner-operators, on the other hand, were more common, especially among TL firms. Roughly one-fifth of pick-ups and deliveries in TL and SC firms (19.86% for TL and 21.71% for SC) were done by owner-operators, as opposed to a minuscule fraction (2.43%) among LTL firms.

Fleet and Equipment Characteristics

The success of a motor carrier depends to some extent, not only on the ways in which drivers are managed, but also on the fleet and equipment that it uses. For this reason, several questions in the questionnaire focused on fleet and equipment characteristics. Information on these characteristics is shown in Exhibit III.3. Overall, the companies in our sample owned about 50 tractors, with LTL firms owning an average of twice as many (107) tractors as TL (50) or SC (45) firms. The companies tended not to rent or lease tractors; ownership of tractors was the rule rather than the exception. For the most part, these tractors were conventional -- fewer than one-fifth of the tractors were cabovers (about 19% for TL, about 15% for SC, and about 14% for LTL). TL firms were a little more likely to use cabover tractors than were LTL firms. On average, the tractors owned by TL firms (median age = 3 years) were a little newer than those owned by LTL firms (median age = 5 years); SC firms were in between (median age = 4 years). LTL firms also owned many more trailers (median = 249) than did TL firms (median = 137) or SC firms (median = 104), but the trailers LTL firms owned were again a bit older (8 years) than those owned by TL firms (5 years).

The bulk of the fleet for both TL and LTL firms consisted of dry vans. In the case of LTL firms, dry vans made up about 90% of the fleet; for TL firms, they represented about half (49%) of the fleet. The remainder of the fleet consisted of refrigerated or flat bed trailers, and tankers made up only a small fraction (<5%) of the fleet for these two groups. By contrast, tankers made up the largest proportion (38%) of the fleet for SC firms.

We were also interested in the on-board technological sophistication of the trucks in the fleet. Only a small proportion of the trucks (<20%) had on-board computers -- TL trucks were more likely to have these than LTL trucks. Almost all TL trucks (>90%) had AM/FM radios, tape or CD players; a smaller fraction of LTL trucks ($\simeq$70%) had these. CB radios were common in TL trucks -- almost 80% were equipped with these. By contrast, fewer than half of the LTL trucks had CB radios. This probably reflects the fact that TL trucks make much longer hauls than do LTL trucks.

Other technological equipment was reported with lower frequencies. About 40% of TL trucks, and about 23% of LTL trucks, had on-board diagnostic systems. About a quarter of the trucks were equipped with on-board systems to communicate with dispatchers. Fewer than 10% of

the trucks were equipped with cellular telephones. Cellular phones were most likely to be found in SC trucks (17%).

In all, these data suggest that sophisticated technological equipment, although not rare, is also not the norm in the trucking industry. For the most part, TL trucks are more likely to carry such equipment than are LTL trucks, perhaps reflecting the differences in the nature of the work executed by them respectively.

Summary of Key Points

- Fifty percent of the companies in the sample were truckload carriers, 35% were specialized commodities carriers, and 15% were less-than-truckload carriers.
- The companies employed an average of about 100 people, with LTL carriers being much larger than TL or SC carriers.
- Most drivers in all kinds of motor carrier companies were non-minority males.
- TL drivers were routed home about once a week; LTL drivers were home almost every day; and SC drivers were home about every other day.
- The average haul-length was 500 miles for TL trucks, 400 miles for SC trucks, and a little over 300 miles for LTL trucks.
- Most drivers, especially in TL companies, had their rigs permanently assigned to them.
- TL carriers owned an average of about 50 trucks; SC carriers owned an average of about 45 trucks; and LTL carriers owned an average of just over 100 trucks.
- Most trucks were under five years old.
- Sophisticated technological equipment was not common on-board trucks, but was a little more likely to be found on TL than on LTL trucks.
- On most characteristics, SC firms appeared more similar to TL than LTL firms.

SECTION V

DRIVER TURNOVER

This section discusses three points:

- Driver turnover rates
- Reasons for driver turnover
- Effects of driver turnover

Driver Turnover Rates

We asked respondents to report information about their overall turnover rates among drivers (i.e., turnover from all sources), as well as the discharge rates and quit rates for drivers. A summary of this information is shown in Exhibit IV.1.

Quit rates among drivers ranged from 0% to 250%, with an overall median quit rate of 10%.[3] TL firms had higher quit rates than did LTL firms, but the highest quit rates were observed in SC firms. The median quit rate among SC carriers was 16%, among TL carriers it was 13%, whereas it was only 2.5% among LTL carriers. These summaries are based on information provided by 178 respondents.

Information about *discharge rates* was provided by 186 respondents. Overall, discharge rates were lower than quit rates, but followed the same pattern. Discharge rates ranged from 0% to 53%, with a median of 2%. The median discharge rate among TL and SC carriers was 2.5%, as compared to a rate of 1% among LTL carriers.

These data suggest that trucking companies are less likely to dismiss drivers than are drivers to quit working for the company. The reasons why drivers quit their jobs thus assume paramount importance. If driver turnover is to be reduced, the focus must be on those factors that make drivers stay or leave. Reasons for driver turnover are discussed later in this section.

Total turnover rates for the year 1994 were reported by 227 of the 379 respondents. These rates were higher than simply the sum of the quit and discharge rates, probably due to other turnover reasons such as retirement or death. Total turnover rates ranged from 0% to 300%, and were again higher among TL and SC firms (medians = 29.5% and 30% respectively) than among LTL firms (median = 4.5%).

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[3] When there are some unusual values (e.g., most companies have turnover rates under 100% but one company has a turnover rate of 500%, the median is a better representation of the "average" value than is the arithmetic mean. The median is the point below which 50% of the scores are observed; conversely, 50% of the scores fall above the median. Both mean and median values are shown in Exhibit IV.1.

Overall, the turnover rates reflect the fact that driver turnover is a much more serious problem in the TL and SC than the LTL sector. More drivers quit TL and SC firms; TL and SC firms fire more drivers and, in all, there is higher total turnover among TL and SC firms.

Reasons for Driver Turnover

We were interested in knowing how often drivers quit to go to another trucking company, as opposed to quitting to get out of trucking altogether. Our respondents indicated that, on average, 90% of the drivers go to other trucking companies, and only about 10% of the drivers get out of trucking altogether. This distribution applied regardless of carrier type. Apparently, it is not the driving job *per se* that leads to driver turnover. Rather, it is the particular characteristics of driving for a *specific* company that accounts for the quit rates.

Since driver turnover is of serious concern in the trucking industry, we approached the reasons for driver turnover in three different ways: (1) we looked at the reasons drivers report for their turnover; (2) we looked at the "real" reasons for driver turnover (i.e., reasons respondents thought drivers quit their jobs); and (3) we looked at the factors that were statistically related to driver turnover. Each of these is discussed below.

Driver-Reported Turnover Reasons

We asked respondents how often drivers mentioned various factors as reasons for their quitting. Their responses are summarized in Exhibit IV.2. Four reasons stand out as important: better driving jobs elsewhere, better pay elsewhere, too much time away from home, and problems with dispatchers. These data support some aspects of conventional wisdom while refuting others. It is generally agreed that time away from home is a serious problem, especially for long-haul drivers. Our data support this. At the same time, many people argue that driving jobs are well-paid and that money is not a factor in driver turnover. Our data refute this. It has also long been recognized that dispatchers are key players in determining the relationship between the driver and the company. The fact that problems with dispatchers rank high as a potential reason for driver turnover underscores the importance of proper training and orientation, not just for drivers, but for dispatchers as well.

"Real" Turnover Reasons

We also asked respondents the extent to which they thought a variety of factors were the "real" reasons why drivers quit their jobs. The responses are shown in Exhibit IV.3. Once again, four reasons stand out as important: better driving jobs elsewhere, better pay elsewhere, too much time away from home, and long hours. It is encouraging to see that three of the top four reasons overlap between the two groups. At the same time, it is also interesting to note that although drivers report problems with dispatchers, our respondents don't consider that as critical as the fact that drivers must drive long hours. We do not have the data here to determine the extent to which dispatchers may in fact account for some turnover among drivers. Nonetheless, it seems important that companies take a good look at the interactions between drivers and dispatchers to assess whether driver turnover can be reduced through dispatcher training.

We had also identified a number of other potential reasons for driver turnover through a search of the literature and through interactions with trucking professionals. Most of these reasons did not show up in either the driver-reported or respondent-reported issues. Factors such as the quality of cabs, low engine power, too many layovers, and boredom, although often cited as reasons why drivers quit, simply were not salient in our data.

Overall, the primary problems, based on our respondents' reports, concern pay, time away from home, and dispatcher interactions. These must be the first thrust in any attempt to reduce driver turnover. We should point out that these issues are relevant to driver *quit* rates, and do not necessarily apply to discharge or total turnover rates.

Statistically Derived Reasons

We also conducted several statistical analyses to determine which factors were related to driver turnover. In these analyses, we used the TL and SC/LTL difference as a "control," i.e., we accounted for this factor statistically so that the companies were comparable on the other dimensions that we were interested in exploring.[4] We looked separately at factors related to quit rates and factors related to discharge rates in these statistical analyses.

Factors Related to Quit Rates. A number of factors specific to the driving job were related to quit rates. A major factor was times home per month. The more often drivers were routed home, the lower the quit rates. This finding is consistent with the lower quit rates among LTL than among TL carriers -- LTL drivers are home almost every day, whereas TL drivers are home only about once a week.

We also compared quit rates with respect to various structural characteristics of the companies in the sample. We found that the larger the company (i.e., the higher the number of employees it has), the higher the quit rate. This is probably due to the fact that the larger the company, the more likely it is to experience communication difficulties, bureaucratic problems, and impersonal employer-employee relationships. We also found that older companies had lower quit rates than younger companies. This may be because older companies over the years have learned what works best for them; younger companies are still struggling with this issue.

We looked at the human resource/personnel policies used with drivers as they relate to quit rates. We found that higher pay, specifically higher average pay per year for a typical driver, was associated with lower quit rates. This is not surprising, and it also substantiates the reported reason that drivers often quit for better pay elsewhere. Likewise, the more attractive the benefits package offered to drivers, the less likely they are to quit. Job security, in the form of guaranteed work and pay per pay period, was also associated with lower quit rates. Although we explored a variety of other human resource/personnel factors, we did not find strong relationships with quit rates. This suggests that reward and compensation systems are critical in enhancing driver retention.

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[4] More detailed information on these analyses can be obtained by contacting one of the authors.

We explored whether sophisticated on-board technological equipment was related to quit rates, and we found that indeed it was. Surprisingly, it appears that the use of this kind of equipment *increases* rather than decreases turnover. It is ironic that many companies installed these devices to reduce driver turnover (Bell, 1992).[5] Indeed, these systems may lead to greater efficiency. At the same time, they also increase turnover. This may be because electronic systems increase job demands for drivers, resulting in a loss of job control and greater stress and strain. Be that as it may, it would be prudent to assess the trade-offs between increased efficiency on the one hand, and increased quit rates on the other hand, before sophisticated electronic devices are installed on-board.

Factors Related to Discharge Rates. The statistical results with respect to discharge rates were markedly different from those with respect to quit rates. Company size and company age were the only two factors related to both discharge and quit rates. Larger and younger companies had higher discharge rates than did smaller and older companies. It may be that larger companies fire more drivers because they have better systems for tracking and monitoring driver performance. It may also be that older companies, with more experience behind them, are better at selecting drivers in the first place, obviating the need to fire them later.

The most powerful factor in explaining discharge rates was the driver selection procedure. In examining the selection procedure, we looked at two considerations: (a) the selection ratio, or the proportion of applicants who are hired (this reflects how choosy a company can be in its hiring), and (b) the extent to which "good" selection devices (e.g., performance tests, technical knowledge tests) were used in selecting which drivers to hire. The idea here is that if the "right" drivers are hired in the first place, there is little need to fire them later. What we found is that a *combination* of the two factors was related to discharge rates. When the company could be choosy (i.e., it had a lot of applicants for each driver position), *and* when it used good selection techniques, the discharge rates were dramatically lower. These findings make sense. When you can be choosy, and when you make rational choices, the people you hire are probably productive. But if you have to hire anyone who applies, it doesn't matter how good your selection techniques are. Likewise, it doesn't matter how choosy you are if you use "bad" techniques to make your choices.

Overall, these statistical analyses suggest that many human resource practices are related to driver quit rates, but that it is how drivers are selected that is most critical in determining discharge rates.

Effects of Driver Turnover

Another issue of importance is the extent to which driver turnover in fact *matters*. If driver turnover has no effect on company performance and success, then the fact that there is high turnover among drivers becomes perhaps a minor hassle. If, on the other hand, there is a major impact on the bottom-line, then it is crucial to address the issue and implement strategies to reduce it.

We asked respondents whether driver turnover had helped them, hurt them, or made no difference on a number of dimensions. Their responses are shown in Exhibit IV.4. About a third

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[5] Bell, L.A. 1992. Satellite systems boost efficiency, competitiveness of truckload carriers. *Traffic World*, *229*(March): 26-27.

of the respondents considered turnover to have hurt them on most dimensions. Particularly notable were the effects on profits and efficiency, and on overall costs. (This is a little at odds with our statistical analyses, reported in the next section.) Other factors negatively affected by turnover included service quality, customer satisfaction, on-time deliveries, driver accident rates, and insurance costs.

Surprisingly, a few respondents thought that turnover had actually *helped* them on a number of dimensions. This is perhaps because turnover brings in new blood to the company. It may also be because turnover eliminates "bad" drivers. On these issues, we did not separate quit rates and discharge rates, but we assume that it is the discharge rates, or the firing of "bad" drivers, that some respondents see as helpful.

The factor that turnover seemed to have the lowest effect on was the breadth of services provided. Over three-quarters of the respondents saw no difference on this factor as a result of turnover.

Overall, many respondents thought that driver turnover had hurt them; still, a bulk of them did not think that it had made a great deal of difference one way or the other.

Summary of Key Points

- Driver quit rates had a mean of about 27% and a median of about 10% overall, being higher than that in the TL and SC segments, and lower than that in the LTL segment.
- Discharge rates averaged about 2% -- motor carriers are less likely to fire drivers than drivers are to quit work with them.
- The bulk of drivers who quit (90%) go to other trucking companies; only a few (10%) quit driving altogether.
- The major reasons reported by drivers for turnover are better jobs elsewhere, better pay elsewhere, too much time away from home, and problems with dispatchers.
- Respondents think the major reasons for drivers quitting are better jobs elsewhere, better pay elsewhere, time away from home, and long hours.
- Statistical analyses show that driver quit rates are higher when drivers are away from home a lot; they are higher in larger and younger companies, they are higher when financial rewards are low, and they are higher when trucks are equipped with electronic monitoring systems.
- Statistical analyses also show that discharge rates are higher in larger and younger companies, and that they are higher when the processes used to select and hire drivers are flawed.
- Driver turnover is seen by respondents as having a negative impact on profits, efficiency, and overall costs.
- Many respondents do not think that driver turnover makes much difference one way or the other in overall company success.

SECTION VI

COMPANY PERFORMANCE AND PRODUCTIVITY

This section discusses four points:

- Overall company performance in 1994
- Performance compared to industry counterparts
- Performance over time
- Relationships with company performance

Overall Company Performance in 1994

We asked respondents to provide information on a number of performance measures for the year 1994 (i.e., the year immediately preceding the survey). About two-thirds (229 of 379) gave us this information, and it is summarized in Exhibit V.1. Because there can be marked differences among carrier types on these measures, the information is also summarized separately for TL, LTL and SC carriers in the exhibit.

One set of measures concerned the amount of work done by the company and included number of miles driven, pick-up and delivery pounds per hour, dock pounds per hour, average tons per load, and loads per year. The data show that LTL carriers drove an average of over 8 million miles, SC carriers drove an average of 6 million miles, and TL carriers drove just over 5½ million miles. Pick-up and delivery pounds per hour ranged from an average of 32,650 for SC carriers, through 12,500 for TL carriers, to 2423 for LTL carriers. Dock pounds per hour were a little over 5000 for TL and SC carriers and about half that (2423) for LTL carriers. Average loads were also bigger for TL (21 tons) and SC (24 tons) than for LTL carriers (11 tons). On the other hand, SC carriers carried the greatest number of loads (median = 24 thousand per year), followed by LTL carriers (median = 16 thousand per year) and TL carriers (median = 13,600 per year).

A second set of measures included cost estimates, specifically insurance costs per truck and driver costs per mile. TL and SC carriers had higher insurance costs per truck ($3251 and $3220 respectively) than LTL carriers ($2200), but the reverse was the case for driver costs. LTL drivers cost an average of $1.02 per mile, but SC and TL drivers costs were less than half this amount ($.40 and $.34 respectively). In other words, truck expenses are lower in the LTL segment, but driver costs are higher in this segment, compared to the other two segments.

The remaining measures concerned factors that were potentially affected by driver behaviors: DOT accident frequency ratio, traffic violations per driver, equipment violations per truck, and driver absenteeism rate. DOT accident ratio was highest among SC firms (.88) followed closely by LTL firms (.80), with TL having a substantially lower ratio (.55). TL carriers averaged one traffic violation per driver, whereas LTL and SC carriers averaged one violation every two drivers. All three groups averaged about one equipment violation per truck. Finally driver absence rates were about twice as high (2%) among SC firms than among LTL firms (1%), with TL firms falling in between (1.5%).

The survey data were supplemented with information obtained from the *TTS Blue Book* for the year 1994. Information on six critical measures is shown in Exhibit V.2. The operating ratio ranged from 77.02 to 111.13, SC firms generally having higher, and LTL firms lower, ratios than TL firms. Net profit margin was highest among LTL firms (median = 2.65) and lowest among TL firms (median = 1.95). Return on equity, however, was lowest among SC firms (median =12.79). The largest revenue per mile, revenue per ton, and revenue per ton-mile were also observed among LTL carriers, with medians of 3.12, 119.48, and .45 respectively.

Taken together, these data show that there are wide variations across the three carrier types on performance dimensions. Generally, TL and LTL carriers are quite different on these measures, but SC carriers sometimes resemble TL carriers and other times resemble LTL carriers more. LTL carriers tend to show better financial measures of performance than SC and TL carriers.

Performance Compared to Industry Counterparts

We asked respondents to compare the performance of their companies with the performance of other companies in the industry. Their answers, based on responses from all 379 respondents, are shown in Exhibit V.3. Very few respondents reported that their experiences were *worse* than those of other companies. Surprisingly, a large number reported themselves as being *better* than others. This is particularly notable with respect to discharge rates, where as many as *72%* saw themselves as being better. On-time deliveries, on-time pick-ups, consistent transit times, and driver accident rates were other outcomes where a bulk of respondents saw themselves as being better than others.

Logically, only about half the companies can be better than others, which means that half should be worse than others. It is not possible for as many as three-quarters of the respondents to be better than others. The data in Exhibits V.1 and V.2 also suggest that there are wide variations in performance across companies. The information shown in Exhibit V.3 implies, then, that a number of respondents may have an unrealistically "rosy" picture of their company performance, a picture that does not necessarily correspond with the hard data. It would be useful to examine how one's own company stacks up against industry averages on the hard measures. Such an examination would be invaluable in deriving a pragmatic estimate of performance, determining potential problems, and designing and implementing remedial steps.

Performance Over Time

Respondents also compared the experiences of their companies *now* with experiences three years ago. The resulting assessments are shown in Exhibit V.4. Again, very few companies reported having deteriorated. Labor costs is the factor with the highest proportion of reported deteriorations, and that proportion is *3.3%*!

For the most part, companies reported being about the same now as they were three years ago. Factors on which improvements were reported most often were equipment breakdowns, "logging" compliance, driver accident rates, and insurance costs. It may be that the companies in our sample have taken steps in the recent past to upgrade their equipment, to provide driver training, and to offer incentives for driver compliance with safety regulations. Whatever the reason, over two-fifth of the respondents reported improvements in these areas.

The lowest rates of improvement were noted with respect to labor costs and administrative costs. Just under one-fifths of the respondents reported being better on these counts. Again, equipment upgrades, driver training, safety and compliance incentives, etc., add to administrative and labor costs, as does inflation. Although we cannot make unequivocal assertions, it is possible that these factors account for the fewer improvements noted in the cost areas.

Relationships with Company Performance

We analyzed the extent to which various measures of company financial performance were related to other factors of interest. Specifically, we focused on operating ratio, net profit margin, and return on equity, as reported in the *TTS Blue Book* for the year 1994. We considered these three variables to cover a *range* of financial performance measures.

The first issue of interest was whether measures of turnover (quit rates and discharge rates) were related to financial performance. To our surprise, we detected no systematic relationship. Companies with higher quit rates did *not* have worse financial performance than those with lower quit rates. It appears that, although driver turnover may be expensive, its effects do not show up in global financial measures.

We also explored the extent to which financial performance measures were related to the use of various human resource practices (these are discussed in greater detail in Sections VI and VII). Again, we did not find systematic relationships with measures of driver selection, performance appraisal, compensation, training, etc. This may be because various gains and losses cancel one another out in overall financial measures; it may be that the benefits of better human resource practices are realized only *over a long period of time*; or it may be that human resource practices have little effect on the bottom line. It is critical to investigate these explanations further, and we hope to be able to do so.

The only human resource factor that *was* consistently related to financial performance was unionization. Unionized companies had worse financial performance than did non-unionized companies. It is likely that this finding also explains the absence of a relationship between quit rates and performance. Unionized companies had lower quit rates *and* lower financial performance, whereas non-unionized companies had higher quit rates *and* better financial performance.

Overall, our statistical analyses revealed few systematic relationships with financial performance. In all likelihood, the effects of management policies and practices on financial performance are extremely complex, and require sophisticated statistical examinations to sort them out. We hope to follow up with such examinations.

Summary of Key Points

- Many performance differences are noticeable between TL and LTL carriers, with SC carriers looking more like TL carriers on some counts and more like LTL carriers on other counts.
- LTL carriers look better than TL and SC carriers on measures of financial performance.

- Most respondents consider their companies to be better than others in the industry; this is particularly true with respect to layoff rates, on-time deliveries and pick-ups, consistent transit times, and driver accident rates.
- Most respondents think their companies are either the same as, or better than, they were three years ago; improvements are reported most often with respect to equipment breakdowns, "logging" compliance, driver accident rates, and insurance costs. Improvements were reported least often for labor costs and administrative costs.
- Measures of financial performance were generally unrelated to driver quit rates and also to various human resource practices.

SECTION VII

DRIVER COMPENSATION AND BENEFITS

Driver compensation and benefits emerged as critical factors related to quit rates. For this reason, driver compensation and benefits are addressed specifically in this section. Other human resource practices relevant for drivers are contained in the next section. This section discusses three points:

- Characteristics of driver compensation and benefits
- Factors affecting driver pay
- Incentive systems and compensation innovations

Characteristics of Driver Compensation and Benefits

We asked a number of questions about *how* drivers were paid, and *how much* drivers were paid. Answers to these questions are contained in Exhibit VI.1. By far the vast majority (median = 85%) of TL drivers were paid on the basis of miles driven, at a rate of about 26¢/mile. In contrast, the vast majority (72%) of LTL drivers were paid hourly, at an average rate of $13.75/hour. Both the average hourly rate and the average per mile rate were higher for LTL drivers than for TL drivers.

We asked about annual pay rates for *new*, *typical*, and *senior* drivers. Drivers started out at about $30,000/per year in TL and SC firms, and at about $32,000/year in LTL firms. In general, a typical driver earned about $5,000/year more than that. Senior drivers could make as much as $50,000/year, but most typically made just under $40,000 in TL firms and just over $40,000 in LTL firms. Some senior drivers made as little as $19,000/year in TL firms.

Generally speaking, two conclusions are evident from this information: (1) LTL firms are more likely than TL firms to pay drivers on an hourly basis; and (2) pay rates are higher in LTL firms than in TL firms. Recall that turnover rates are also higher in TL than in LTL firms, and that compensation and benefits were related to quit rates according to drivers, according to respondents, and according to our statistical analyses. The lower pay rates offered by TL firms provide a significant clue about reasons for quitting in the trucking industry. Recall also that TL drivers were much less likely to be represented by unions than LTL drivers. The lower pay rates among TL drivers may reflect this differential union status.

Several questions concerned the benefits offered to drivers. Answers to these questions are shown in Exhibit VI.2. Almost all of the respondents offered health insurance benefits. LTL and SC firms paid 100% of the health insurance premiums, whereas TL firms paid an average of about 90% of the premiums. About three-quarters of the SC and LTL carriers (78% and 73% respectively) offered disability insurance, picking up the premium for this insurance in most cases. TL firms were less likely to offer this benefit (only 63% did so), and paid an average of about 90% of the premiums. Eighty to ninety percent of the companies also offered life insurance, and picked up all of the premium for this benefit.

Drivers earned 10 days of paid vacation per year. In addition, LTL carriers offered an average of 5 days of paid sick leave and 8 days of paid holidays per year. TL and SC carriers offered *no* paid sick leave and only 6 paid holidays per year.

As with direct compensation, the benefits package offered by LTL firms is considerably superior to that offered by TL firms and, to a lesser extent, by SC firms. This reinforces our earlier point that differences in financial compensation may largely account for turnover differences across carrier types.

Factors Affecting Driver Pay

We asked about the factors that influenced the *base* pay rates for drivers. Answers are shown in Exhibit VI.3. The strongest influences on base pay were industry wage rates, skill requirements of the job, and local wage rates. Because local and industry wage rates are important in setting base compensation, we also asked respondents how their driver wage rates compared to both of these rates. In general, about 12% of the respondents had rates lower than the local labor market, about 38% of the respondents were about the same, and the remaining 50% of the respondents had rates higher than the local labor market. Compared to *industry* wage rates, about 15% of the respondents reported that their drivers were paid less, 48% that their drivers were paid about the same, and about 37% that their drivers were paid more. Although the bulk of the respondents reported paying rates at or above the local and industry markets, drivers still quit to work for other companies for better pay. This is puzzling. It may be that respondents have an unrealistic picture of market wages; it may also be that drivers capitalize on the presumed driver shortage to increase their wages.

Traditional job evaluation factors consist of skill, effort, responsibility, and working conditions. Skill requirements, as noted above, did affect base pay rates, perhaps because of DOT requirements for certification and licencing. The remaining job evaluation factors -- responsibility, effort, and working conditions -- were reported infrequently as affecting base pay rates.

Setting base compensation is often a matter of balancing internal and external equity considerations, with internal equity or relative internal worth being assessed through job evaluations, and external equity or relative external worth being assessed through market surveys. In setting driver pay rates, the data suggest that much greater emphasis is given to external equity and market considerations than to internal equity and job evaluation considerations. Driver pay is market-driven, perhaps out of necessity in an attempt to control turnover.

Not all drivers, even within one company, are paid at the same rate. As we saw, senior drivers make more money than new drivers, for example. We asked respondents about seniority and other considerations that account for differences in pay across drivers. Their answers are shown in Exhibit VI.4. Clearly, the most critical difference was in seniority -- trucking companies pay for seniority among drivers, perhaps in an attempt to promote driver retention. Fuel mileage and number of hours worked seemed least important in pay differentials across drivers, and the responses were mixed and varied with respect to other performance-related factors such as accident rates, performance levels, and traffic violations.

Overall, these data suggest that driver pay levels are market-driven -- companies peg driver wages to the local labor market and the trucking industry, and companies give pay increments for

seniority. Pay is arguably the most critical tool in attracting and retaining the best drivers. Our respondents appear to strive for this through market- and seniority-based driver pay.

Incentive Systems and Compensation Innovations

We asked about incentive systems and compensation innovations used to motivate better work from drivers. Responses are shown in Exhibit VI.5. The data show that incentive systems and compensation innovations were not very prevalent in the trucking industry. The most common incentives/innovations were market-based pay, individual performance-based incentives, and non-monetary recognition awards. Further analyses of these data showed no major differences across carrier types, although LTL firms used individual incentives less often than others.

Compensation innovations were even rarer. Virtually none of the responding companies used innovations such as broad-banding, all-salaried drivers, and lump-sum salary increases. Likewise, group- or organizational-level incentives were rare. Employee Stock Ownership Plans, gainsharing plans, team bonuses, etc., were seldom used with drivers.

In all, these data indicate that trucking companies follow extremely conventional approaches to driver compensation. There is little experimentation and innovation, and there is little attempt to tie financial rewards to valued behaviors.

Summary of Key Points

- Drivers are paid about $30,000/year, but driver pay ranges from $17,000/year to $70,000/year.
- TL drivers are generally paid by the mile, whereas LTL drivers are generally paid by the hour.
- Compensation and benefits levels are higher in the LTL than in the TL and SC segments of the industry.
- Driver pay rates are generally market- and seniority-driven.
- Most respondents reported paying at or above the local labor and industry markets.
- Compensation innovations and the use of incentive compensation are rare in the trucking industry.
- To the extent that incentives *are* used, they are used at the individual level rather than at the team or organizational level.

SECTION VIII

OTHER HUMAN RESOURCE PRACTICES

This section discusses five points:

- Driver staffing practices
- Driver performance assessment
- Driver training
- Innovative programs
- Labor-management issues

Driver Staffing Practices

Since trucking companies often discuss driver shortages, it is useful to know how they go about recruiting and attracting potential drivers. We asked respondents about the extent to which they used a variety of recruiting approaches. Their answers are contained in Exhibit VII.1.

By far the most common source of new drivers were newspaper advertisements. This is not surprising given that newspaper advertisements have long been popular as recruiting approaches for a variety of jobs, although it is not clear whether drivers actually rely on this source to obtain job information. The second most common recruiting source was walk-ins. Reliance on walk-ins is common in some industries, but the use of walk-ins is not really a method of recruiting -- it is more an indication of the *lack* of a formal recruiting program. The remaining sources were used little among the trucking companies in our sample, although at least a few respondents reported using each of them.

There were no major differences across carrier types in the approaches to recruiting. That is, all carrier types tended to rely primarily on newspaper advertisements and walk-ins as their primary sources for new drivers.

This lack of emphasis on recruiting is a little surprising. Generally, recruiting is de-emphasized when there is a surplus of labor and even small recruiting efforts yield a plentiful supply of qualified employees. In view of the driver shortages that motor carriers seem to experience, it may be useful to give more emphasis to alternative sources of recruiting such as roadside billboards and radio and television advertisements.

Higher quit rates were associated with the use of some of these recruiting sources such as trade magazines and career fairs. What is more disconcerting is that higher quit rates were also associated with the use of newspaper advertising, something that trucking companies place heavy reliance on. Prudence would suggest, then, that the recruiting systems used among motor carriers be thoroughly re-examined and, if necessary, overhauled.

Another staffing issue concerns the selection process used for drivers, i.e., how decisions are made about which applicants to hire. Selection is perhaps the key to effective staffing. For this reason, we asked respondents about the extent to which they used different kinds of selection

techniques. Some of these techniques are considered substantially better than others. Respondents' answers are shown in Exhibit VII.2.

Apparently, motor carriers use a wide variety of selection devices. Predictably, medical examinations and drug tests were given great weight in the selection process. Almost all respondents gave some weight to these, and most gave them a "lot" of weight.

Reference checks, background checks, and application form data were the devices to which the next greatest weight was given. Some weight was given to interviews, and a little to physical ability tests, technical knowledge tests, and job sample tests. Some techniques were given virtually no weight by the bulk of the respondents. These included mental ability tests, personality tests, honesty/integrity tests, and biographical information questionnaires.

There were few major differences across carrier types in the types of selection techniques used and in the relative weight given to these techniques. LTL carriers placed slightly more weight on the "better" selection techniques than others but, for the most part, these differences were not great.

In general, the use of, and the weight given to, any of these selection techniques was unrelated to driver quit and discharge rates. This is not surprising. Our earlier analyses showed that it is the *combination* of selection ratio and good selection techniques that is associated with discharge rates, not the use of any particular technique in isolation.

It is interesting to note that selection techniques that are generally considered "good" (i.e., techniques that tap into job- and performance-related knowledge, skills, and abilities, such as technical knowledge tests and job sample tests) are not prevalent among motor carriers, whereas techniques that are often problematic (i.e., techniques that do not provide good job- or performance-related information, such as unstructured interviews) are quite common. We noted earlier that the use of good selection techniques, combined with a favorable selection ratio, leads to lower discharge rates. But if motor carriers do not use good selection techniques, then they run the risk of hiring drivers who do not perform well and who must be terminated eventually. The infrequent use of good selection techniques, therefore, in part accounts for the discharge rates prevalent among motor carriers.

The use of good selection approaches is not as important when the pool of applicants from which to choose is very small. But among trucking companies, a median of 25 drivers was hired in the past year, and the median number of applicants for these positions was 100. This is a favorable situation, in that only one out of every four applicants must be hired. This situation lends itself particularly well to using good selection techniques. A rigorous selection program would most likely be beneficial in reducing discharge rates and in improving overall driver performance.

Driver Performance Assessment

The process of performance assessment is critical for improving or maintaining employee performance. We asked respondents about the factors that were considered in judging the performance of drivers. Responses are shown in Exhibit VII.3.

By far the most important factor was the number of accident-free miles driven. Over 90% of the respondents gave this factor a lot of weight, and fewer than 1% reported not considering it at all. Another critical factor was the number of citations for moving violations. Fewer than 2% of respondents gave it no consideration, and over three-quarters (76%) gave it a lot of weight. A third factor influencing driver performance assessment was customer/client complaints. Once more, fewer than 2% of respondents gave this factor no consideration.

Other measures of driver performance were sometimes considered but were not as often heavily weighted. Factors such as gas mileage and truck performance did not emerge as being nearly as salient in assessing the performance of drivers.

We also asked respondents about four sources that could contribute performance information about drivers, i.e., supervisors/dispatchers, other drivers, customers/clients, and the public. For the most part, our respondents indicated that performance information was more likely to come from supervisors/dispatchers and customers/clients than from other drivers or the public at large.

It appears, then, that factors that would cause external problems (moving violations, accidents, customer concerns) are given weight in performance assessment for drivers. More internally driven factors (e.g., number of miles driven, gas mileage) are not as crucial. Our analyses also showed that the use of any of these factors for performance assessment was not systematically related to driver quit or discharge rates or to measures of financial performance.

Although performance is assessed on various external factors, and although respondents indicated that this information is used to make personnel decisions (e.g., pay raise, discharge) and to improve driver performance, our earlier analysis shows that performance factors were not given much weight in setting driver compensation. Recall that pay rates are largely determined by market and seniority considerations, and that performance was not a major factor in pay differences across drivers. There is some inconsistency in respondents' reports -- they say they use performance information for personnel decisions; they also say that performance information does not affect driver pay. It is possible, of course, that performance information is used only negatively, in that bad drivers are fired. If that is the case, it is unfortunate. Much can be gained from using performance information *positively*, i.e., to stimulate improved performance through incentives.

Driver Training

Driver training has important implications for motor carrier safety and operating performance. We asked respondents *how much* and *what kinds* of training they provided to their drivers.

The majority of respondents provided at least 20 hours of training, beyond school for licencing requirements, before a new driver was sent out on the road. Nearly 80% of respondents provided less than one full week of training (40 hours), and just over 10% provided over three weeks (120 hours) before sending a driver on the road. The training time was longer for TL (median = 16 hours) than LTL carriers (median = 9 hours), but by far the longest pre-on-the-road training period was among SC carriers (median = 30 hours).

We also asked how many hours of formal training a typical driver received in a year. On average, drivers got about 10 hours of training per year, although a few companies provided as many as 100-200 hours per year. About a quarter (24%) provided 4 hours or fewer, and about a quarter (24%) provided 20 hours or more. There were no major differences across carrier types in the amount of on-going driver training; TL carriers had a median of 9 hours and LTL and SC carriers had a median of 10 hours each. Overall, ongoing formal driver training programs did not appear to be a major priority among motor carriers.

We also asked about the *types* of training given to drivers. This information is shown in Exhibit VII.4. The most common training focus was safe driving/accident prevention training, given a lot of weight by over two-thirds (70.5%) of the respondents. On-the-job training was also important, being given a lot of weight by just under two-thirds (64%) of respondents. The rarest form of training was computerized simulation training, perhaps because the technology required for this is relatively new and quite expensive. Training in people skills was also seldom provided.

Statistical examinations of training types showed no systematic relationships with quit or discharge rates or with financial performance. No systematic relationships with *amount* of training were observed either.

All in all, it appears that training is not a major focus among motor carriers. By far the most central focus of training programs is safe driving and accident prevention, and the longest pre-job training occurs among SC carriers, perhaps due to the specialized nature of these jobs.

Labor-Management Issues

We noted earlier that about a quarter of the companies in the sample had unionized drivers, with unionization being most prevalent in the LTL segment. The International Brotherhood of Teamsters was most likely to represent drivers, covering 100% of the drivers in unionized LTL firms and 96% of the drivers in TL firms. The Teamsters Union was a little less common among SC firms.

We were interested in investigating whether unionized firms managed their drivers differently than did non-unionized firms. Not surprisingly, we found that average pay and benefits were better among unionized motor carriers. Unionized carriers were also more likely to have seniority-based pay raises and better grievance procedures. On the other hand, unionized carriers were *less* likely to use various kinds of bonuses and financial incentives to stimulate driver performance, or to measure driver performance systematically. There were no differences in terms of the use of innovative programs such as quality circles, and there were no differences in the way drivers were recruited or selected, in the amount of training provided to drivers, or in the extent to which information was shared with drivers.

We conducted further analyses to examine whether driver quit rates were affected by unionization. Indeed, unionized carriers had lower quit rates than did non-unionized firms. We explored the reasons behind this relationship, and found that the two major factors that accounted for the higher quit rates among non-unionized forms were *pay* and *the number of times drivers are routed home*. In other words, if non-unionized firms had the same wage levels as unionized firms, and if non-unionized firms routed their drivers home as often as unionized firms do, the quit rates between the two would most likely be quite comparable.

Recall that unionized companies had lower financial performance than did non-unionized companies. This may be because of the higher pay and benefits seen in unionized firms. It may also be because the costs and benefits of unionization take time to be manifested in the bottom line.

Innovative Programs

We asked respondents about a number of "innovative" programs they might use with their drivers. These programs are quite prevalent among non-driving employees in large companies, and it would be useful to know the extent to which they encompass drivers as well. The responses are shown in Exhibit VII.5. We wanted to know if any of these programs covered at least 20% of the drivers in a company. The responses showed that by far the most commonly reported practice was the use of open-door policies. Over four-fifths of the respondents in all three carrier types reported using this. About a quarter of respondents also reported using management by objectives. Particularly rare was the use of quality circles, which is at odds with the population of companies in general, but which may be attributable to the specialized nature of the driving job.

Summary of Key Points

- Drivers are recruited most often through newspaper advertisements and walk-in applications.
- Medical and drug testing is common for screening potential drivers, and cognitive and technical ability tests are rare.
- Accidents, moving violations, and customer complaints play the largest roles in assessments of driver performance.
- Dispatchers and customers are the most frequent sources of information about driver performance.
- Drivers receive about 20 hours of training before going on the road, and they typically receive 10 hours or less of formal training every year after that.
- Training programs focus most often on accident prevention and safe driving.
- Unionized drivers tended to have better pay, benefits, and grievance procedures than non-unionized drivers. There were no major differences in recruiting, selection, training, etc., between unionized and non-unionized companies.
- The most commonly reported innovation was the use of open-door policies; quality circles were relatively rare among drivers.

SECTION IX

CONCLUSIONS

Recruiting, retaining, and motivating good drivers has been of concern in the trucking industry in the past, and chances are that it will continue to be of concern. This study was designed to provide information-based insights about ways in which these concerns can be addressed fruitfully and realistically, and about avenues for ameliorating driver turnover problems. What does the information in this study say about these issues? It points to several areas that motor carriers might look to in their search for ways to enhance their overall success.

Driver rewards and compensation must continue to be addressed systematically. The results are consistent across-the-board. One reason for high turnover among drivers is pay (and benefits). But many carriers pay drivers below market, and certainly when the whole compensation package is taken into account, TL drivers are in much worse shape than LTL drivers. Not only are the former away from home more often, they are usually paid less and have a less desirable benefits package. Obviously, increasing driver pay is expensive. At the same time, these costs must be weighed against the high costs of turnover, against the accident rates for inexperienced drivers, against the loss in equipment, etc. On balance, giving drivers (and especially the better and more experienced drivers) more money and better benefits may more than offset the direct and indirect costs of high turnover and the resulting inefficiencies and hazards.

On a related matter, financial incentives are rarely attached to driver performance, and indeed many internal performance measures are not given a great deal of weight. Thus, there is little reason for drivers to do their best, to drive efficiently and to maintain their rigs in good condition. It may be useful to explore ways in which financial incentives can be tied to desired driver behaviors -- on-time deliveries, safe driving records, etc. This does not necessitate additional expenditures. Rather, it entails shepherding financial resources to achieve maximum benefits.

To be effective, these systems must use as rewards and incentives things that are *important* to drivers -- money, benefits, more nights at home, etc. Often, people advocate the use of symbolic rewards such as gold stars. Indeed, non-monetary rewards were among the few incentives respondents reported using. But we must ask ourselves the question: "Would *we* work harder simply to earn a gold star?" The answer is probably no. Why, then, would we expect drivers to work harder for gold stars? A good incentive system attaches rewards that *employees* value, not rewards toward which employees are indifferent. Non-monetary rewards such as gold stars can be useful, but not when used *instead of* money. Rather, their maximum utility is realized when they are used in conjunction with, that is to complement, monetary rewards.

Staffing issues also offer a fertile area for improvement. To the extent driver shortages are apparent, the recruiting avenues must be expanded. Some carriers advertise on trailers, but most do not. This appears to be quite an inexpensive recruiting strategy. Radio and television advertising, while more costly, would probably also yield large returns. Confining recruiting to newspapers and walk-ins seems unduly restrictive, particularly when there is a shortage rather than a surplus of good drivers.

Most motor carriers ignore good selection techniques in favor of less beneficial ones. Hiring the right people is a major key to success, and every effort must be made to hire only the "right" people -- people who have the ability *and* the motivation to perform well. Medical and drug testing may be necessary, but they are not sufficient to ensure the right hires. These devices must be supplemented with accurate ability and motivation information (information that is *unlikely* to be gleaned from unstructured interviews) for good decisions to be possible. If turnover rates among drivers are of concern, it is important to re-examine the ways in which drivers are selected and hired.

Another area of concern includes the amount and kinds of ***training*** that drivers *are* versus *should be* given. Clearly, safe driving training and accident prevention training are important. But are they enough? Does the driver merely need to be accident-free to be considered a good driver? Or should drivers be trained in logistics, equipment maintenance, etc., such that they arrive on time, they keep their rigs free from problems, they can trouble-shoot when necessary, etc.? Our report does not lend itself to offering prescriptions about exactly what kinds of training should be offered. What our report does do is highlight what is currently happening, and point to areas for exploration. The final decision about what makes sense must, of course, be made in the context of the relevant situational constraints and considerations.

Similarly, it is important to determine the ***performance areas*** that are critical for drivers, and the best sources of performance assessment information with respect to these performance areas. Are on-time deliveries important? Is courtesy to customers important? Again, this study cannot establish the areas of driver performance that must be assessed; what it does do is show the factors that are currently considered in assessing driver performance, and point to potential improvements. In addition to identifying critical areas of performance assessment, it is also important to get performance information from the right source. Sometimes dispatchers are indeed the best source of information about driver behaviors. Recall, however, that problems with dispatchers often emerged as a factor in driver turnover. It is important, then, to supplement information obtained from dispatchers with other information, whether that be "objective" performance information, or whether that be information from other drivers, customers, clients, etc.

In this context, it is important to point out that performance information should not be used merely as a "stick," i.e., for firing bad drivers. Performance information can be vital in designing effective incentive systems, i.e., in designing systems where by doing what the company wants them to do (be good performers), drivers get what *they* want to get (i.e., more money, better benefits, more nights at home, etc.).

In short, designing and maintaining effective human resource systems is not easy. There is no "cookbook" or "cookie-cutter" that can be used in all situations. Each situation and each carrier is unique, with a unique combination of assets, liabilities, and constraints. What is important is to determine systematically and comprehensively what will work best, and what the costs and benefits are. This report provides information that should be useful in making such judgments. This report cannot, and should not, outline the "one best way" to hire and motivate drivers.

REFERENCES

Arthur, J.B. 1994. Effects of human resource systems on manufacturing performance and turnover. *Academy of Management Journal, 37*: 670-687.

Bacharach, S. (1989). Organizational theories: Some criteria for evaluation. *Academy of Management Review, 14*: 496-515.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*: 99-120.

Bird, A., & Beechler, S. (1995). Links between business strategy and human resource management strategy in U.S.-Based Japanese subsidiaries: An empirical examination. In press, *Journal of International Business Studies.*

Bleilock, R. & Capelle, R. B. Jr. (1990). Occupational loyalties among truck drivers. *Transportation Journal*, 29(3): 20-28.

Boudreau, J., & Berger, c. (1985). Decision-theoretic utility analysis applied to employee separations and acquisitions. *Journal of Applied Psychology, 70*: 581-612.

Bureau of National Affairs. 1993. Quarterly report on job absence and turnover. *Bulletin to Management*.

Butler, J.E., Ferris, G.R., & Napier, N.K. (1991). *Strategy and human resources management*. Cincinnati, OH: South-Western Publishing Company.

Cascio, W.F. (1991). *Costing Human Resources: The Financial Impact of Behavior in Organizations*. Boston: PWS-Kent.

Conner, K.R. (1991) A historical comparison of resource-based theory and five schools of thought within industrial organization economics: Do we have a new theory of the firm? *Journal of Management, 17*: 121-154.

Corsi, T.M. & Grimm, C.M. (1989). ATLF's: Driving owner-operators into the sunset. *Journal of the Transportation Research Forum*, 29(2): 285-290.

Corsi, T.M. & Grimm, C.M. (1987). Changes in owner-operator use 1977-1985: Implications for management strategy. *Transportation Journal*, 26(3): 4-16.

Corsi, T.M., Grimm, C.M., & Feitler, J. (1992). The impact of deregulation on LTL motor carriers: Size, structure, and organization. *Transportation Journal* 31(2): 24-31.

Corsi, T.M., Grimm, C.M., Smith, K.G., & Smith, R.D. (1991). Deregulation, strategic change, and firm performance among LTL motor carriers. *Transportation Journal*, 25(3): 4-13.

Delery, J.E. (1993). *An interorganizational investigation of human resource management practices: The relationship between business strategy, job and task characteristics, and human resource management practices*. Unpublished doctoral dissertation, Texas A&M University, College Station.

Delery, J.E., & Doty, D.H. in press. Modes of theorizing in strategic human resource management: Tests of universalistic, contingency, and configurational perspectives. *Academy of Management Journal*.

Delery, J.E., Gupta, N., Ganster, M., Shaw, J.D., & Jenkins, G.D., Jr. (1996). Unions, human resource practices, and voluntary turnover. Paper to be presented at the annual meetings of the *Southern Management Association*, New Orleans.

Doty, D.H., & Delery, J.E. (1996). Defining the high performance work force: A systems perspective. Working paper, Syracuse University.

Dyer, L. (1985). *Strategic human resources management and planning.* Research in Personnel and Human Resource Management, 3: 1-30.

Eisenhardt, K. (1988). Agency- and institutional-theory explanations: The case of retail sales compensation. *Academy of Management Journal, 31*: 488-511.

Fombrum, C.J., Tichy, N.M., & Devanna, M.A. (1984). *Strategic human resource management. New York*: Wiley.

Flamholtz, E.G., & Lacey, J.M. (1981). *Personnel Management, Human Capital Theory, and Human Resource Accounting*. Los Angeles: Institute of Industrial Relations.

Golden, K., & Ramanujam, V. (1985). Between a dream and a nightmare: On the integration of the human resource management and strategic business planning processes. *Human Resource Management, 24*: 429-452.

Grimm, C.M., Corsi, T.M., & Smith, R.D. (1993). Determinants of strategic change in the LTL motor carrier industry: A discrete choice analysis. *Transportation Journal*, 32(3): 56-62.

Harrington, L.S. (1994). Smarter hiring. *Private Carrier*, 35(3): 20-27.

Honeycutt, T.L., & Rosen, B. (1996). Family friendly human resource policies, salary levels, and salient identity as predictors of organizational attraction. Paper presented at the Annual Conference of the Society for Industrial and Organizational Psychology, San Diego.

Huselid, M.A. (1995). The impact of human resource management practices on turnover, productivity, and corporate financial performance. *Academy of Management Journal, 38*: 635-672.

Huselid, M.A., Jackson, S.E., & Schuler, R.S. (1996). Technical and strategic human resource management effectiveness as determinants of firm performance. Manuscript submitted for publication.

Jackson, S.E., & Schuler, R. (1995). Understanding human resource management in the context of organizations and their environments. *Annual Review of Psychology, 46*: 237-264.

Jackson, S.E., Schuler, R., & Rivero, l. (1989). Organizational characteristics as predictors of personnel practices. *Personnel Psychology, 42*: 727-786.

Jacoby, D. (1990). Implementing strategic information systems in the transportation industry. *Transportation Journal, 29(2)*: 54-64.

Jones, G. (1984). Task visibility, free riding, and shirking: Explaining the effect of structure and technology on employee behaviors. *Academy of Management Review, 9*: 684-695.

Jones, G., & Wright, P. (1993). An economic approach to conceptualizing the utility of human resource management practices. *Research in Personnel and Human Resources Management*, 11.

Katz, D., & Kahn, R.L. (1978). *The social psychology of organizations* (2nd. Ed.). New York: Wiley.

Kleiner, M.M., Block, R.N., Roomkin, M., & Salsburg, S.W. (1987). *Human resource and the performance of the firm*. Madison, WI: Industrial Relations Research Association.

Lambert, D.M., Lewis, M.C., & Stock, J.R. (1993). Customer-focused strategies for motor carriers. *Transportation Journal, 33(1):* 21-28.

Lemay, S.A. & Taylor, G.S. (1988). Truck driver recruitment: Some workable strategies. *Transportation Journal, 28(*1): 15-22.

Lemay, S.A., Taylor, G.S., & Turner, G.B. (1993). Driver turnover and management policy: A survey of truckload irregular route motor carriers. *Transportation Journal, 33(2):* 15-21.

Lengnick-Hall, C.A., & Lengnick-Hall, M.L. (1988). Strategic human resource management: A review of the literature and a proposed typology. *Academy of Management Review, 13*: 454-470.

MacDuffie, J.P. 1995. Human resource bundles and manufacturing performance: Organizational logic and flexible production systems in the world auto industry. *Industrial and Labor Relations Review, 48*: 197-221.

McElroy, J.C., Rodriguez, J.M., Griffin, G.C., Morrow, P.C., & Wilson, M.G. (1993). Career stage, time spent on the road, and truckload driver attitudes. *Transportation Journal, 33(*1): 5-14.

McKelvey, B. (1983). Organizational systematics: Taxonomy, evolution, and classification. Berkeley, Ca: University of California Press.

Miles, R., & Snow, C. (1984). Designing strategic human resources systems. *Organizational Dynamics, Summer*: 36-52.

Milkovich, G.T. (1988). A strategic perspective on compensation management. *Research in Personnel and Human Resource Management, 6*: 263-288.

Morton, I. (1984). 'Better driving' incentive schemes boost profits. *Accountancy, 95(1) :* 126-128.

Mowday, R. (1985). Strategies for adapting to high rates of employee turnover. *Human Resource Management, 23*: 365-380.

Murphy, P.R. & Corsi, T.M. (1989). Modeling sales force turnover among LTL motor carriers: A management perspective. *Journal of Transportation, 29(*1): 29-37.

Murphy, P.R. & Corsi, T.M. (1988). Performance implications of the sales force strategies of LTL general freight carriers. *Journal of the Transportation Research Forum, 28*: 84-91.

Murray, V.V., & Dimick, D.E. (1978). Contextual influences on personnel policies and programs: An explanatory model. *Academy of Management Review, 3*: 750-761.

Pil, F.K., & MacDuffie, J.P. (1996). The adoption of high-involvement work practices. In press, *Industrial Relations.*

Penrose, E.T. (1958). *The theory of the growth of the firm*. New York: Wiley.

Powell, I., Montgomery, M. & Cosgrove, J. 1994. Compensation structure and establishment quit and fire rates. *Industrial Relations, 33*: 229-248.

Schneider, B. (1988). The people make the place. *Personnel Psychology, 40*: 437-453.

Schuler, R.S. (1991). Strategic human resource management: Linking people with the strategic needs of the business. *Organization Dynamics*, 21(3): 18-32.

Schuler, R.S., & Jackson, S.E. (1987). Linking competitive strategies with human resource management practices. *Academy of Management Executive, 1*: 207-219.

Schuler, R.S., & MacMillan, I. (1984). Gaining competitive advantage through human resource practices. *Human Resource Management, 23*: 241-256.

Shaw, J.D., Delery, J.E., Jenkins, G.D., Jr., Gupta, N., & Ganster, M. (1996). Predicting organization-level turnover in the trucking industry. Paper to be presented at the annual meetings of the *Academy of Management*, Cincinnati, OH.

Simon, H. (1957). *Administrative behavior* (2nd Ed.). New York: McGraw-Hill.

Southern, R.N., Rakowski, J.P., & Godwin, L.R. (1989). Motor carrier road driver recruitment in a time of shortages. *Transportation Journal, 27(4):* 42-48.

Taylor, G.S. (1991). Using performance appraisals of dispatchers to reduce driver turnover. *Transportation Journal, 30(4)*: 49-55.

Terpstra, D.E., & Rozell, E.J. (1993). The relationship of staffing practices to organizational level measures of performance. *Personnel Psychology, 46*: 27-48.

Ulrich, D. (1991). Using human resources for competitive advantage. In R. Kilmann, I. Kilmann, & Associates (Eds.), *Making organizations competitive*. San Francisco, CA: Jossey-Bass.

Von Bertalanffy, L. 1950. The theory of open systems in physics and biology. *Science, 3*: 23-29.

Walker, J., & Bechet, T. (1991). Defining effectiveness and efficiency measures in the context of human resource strategy. In R. Niehau & K. Price (Eds.), Bottom-line results from strategic human resource planning. New York: Plenum.

Wernerfeldt, B. (1984). A resource based view of the firm. *Strategic Management Journal, 5*: 171-180.

Williamson, O. 1975. *Markets and hierarchies*. New York: Free Press.

Wright, P.M., McCormick, B., Sherman, W.S., & McMahan, G.C. (1995). The role of human resource practices in petro-chemical refinery performance. *Paper presented at the annual meetings of the Academy of Management*, Vancouver, BC.

Wright, P.M., & McMahan, G.C. 1992. Theoretical perspectives for strategic human resources management. *Journal of Management*, 18: 295-320.

Wright, P.M., McMahan, G.C., & McWilliams, A. 1992. Human resources as a source of sustained competitive advantage: A resource-based view. *International Journal of Human Resource Management, 5:* 299-324.

Wright, P.M., & Snell., S.A. (1991). Toward an integrative view of strategic human resource management. *Human Resource Management Review, 1*: 203-225.

EXHIBITS

Exhibit III.1
Characteristics of Companies in the Sample

	Truckload	LTL	Specialized Commodity	Total
Organizational Structure				
Median Number of Employees	99	235	90	100
Percent of Sample with Unionized Drivers	13.3%	45.6%	31.2%	24.5%
Median Number of Hierarchical Levels	5	6	5	5
Median Number of Drivers Reporting to Dispatchers	40	40	37	39
Driver Characteristics				
Median Number of Drivers	52	120	50	61
Mean Percent Minority Drivers	4.20%	3.92%	4.62%	4.30%
Mean Percent Male Drivers	94.70%	99.02%	96.42%	95.99%
Median Length of Service	> 24 months	> 24 months	> 24 months	> 24 months

Exhibit III.2
Driver Working Conditions

	Truckload	LTL	Specialized Commodity	Total
Mean Percent Driving in Teams	6.08%	3.52%	5.32%	5.42%
Mean Percent Driving in Relays	2.94%	6.64%	3.45%	3.70%
Median Times Per Month Drivers Routed Home	4	26	15	10
Mean Percent Drivers Home Every Night	29.13%	78.30%	57.41%	46.44%
Median Length of Haul	500 miles	337 miles	400 miles	450 miles
Mean Percent of Drivers Permanently Assigned to Rig	93.49%	76.07%	77.36%	90.66%
Mean Percent Over-the-Road Hauls by "Casuals"	4.09%	5.85%	3.79%	4.25%
Mean Percent Over-the-Road Hauls by Owner/Operators	21.67%	8.06%	24.75%	20.66%
Mean Percent Pick-up/Deliveries by "Casuals"	3.88%	8.13%	3.69%	4.47%
Mean Percent Pick-up/Deliveries by Owner/Operators	19.86%	2.43%	21.71%	17.82%

Exhibit III.3
Equipment Characteristics

	Truckload	LTL	Specialized Commodity	Total
General Equipment Characteristics				
Median Number of Tractors Owned	50	107	45	52
Median Number of Tractors Leased	0	0	0	0
Mean Percent Cabover Tractors Owned	19.25%	13.88%	14.77%	16.92%
Mean Percent of Conventional Tractors Owned	79.63%	86.12%	84.48%	82.25%
Median Age of Tractors	3 years	5 years	4 years	4 years
Median Number of Straight Trucks Owned	0	8	0	0
Median Number of Straight Trucks Leased	0	0	0	0
Median Age of Straight Trucks	5 years	6 years	5 years	5 years
Median Number of Trailers Owned	137	249	104	134
Median Number of Trailers Leased	0	0	0	0
Median Age of Trailers	5 years	8 years	7 years	6 years
Mean Percent of Fleet That is . . .				
Dry Vans	48.78%	89.93%	10.84%	41.62%
Refrigerated	20.41%	5.13%	10.86%	14.85%
Flat Beds	20.43%	2.07%	17.94%	16.86%
Tankers	3.16%	.02%	38.31%	14.86%
Mean Percent of Trucks with . . .				
On-board computers	15.65%	8.38%	11.51%	13.15%
Satellite tracking	17.39%	5.21%	8.43%	12.52%
On-board systems to communicate with dispatchers	21.96%	27.09%	22.10%	22.75%
Truck diagnostic or performance monitoring systems	41.61%	23.35%	33.05%	36.07%
AM/FM radios, tape or CD players	93.82%	69.62%	91.75%	89.62%
CB radios	79.68%	44.00%	75.23%	73.25%
Cellular Telephones	8.45%	4.06%	16.81%	10.68%

Exhibit IV.1
Driver Turnover Rates

	Truckload	LTL	Specialized Commodity	Total
Quit Rates				
Mean	30.44%	6.18%	28.77%	26.92%
Median	13.00%	2.50%	16.00%	10.00%
Range	0%-250%	0%-23%	0%-175%	0%-250%
Discharge Rates				
Mean	7.47%	4.56%	6.79%	6.90%
Median	2.50%	1.00%	2.50%	2.00%
Range	0%-53%	0%-30%	0%-50%	0%-53%
Total Turnover Rates				
Mean	44.17%	15.65%	39.24%	39.28%
Median	29.50%	4.50%	30.00%	25.00%
Range	0%-300%	0%-140%	0%-200%	0%-300%

Exhibit IV.2
Reasons for Quitting Mentioned By Drivers*
(All Respondents)

How often do drivers mention the following as reasons for quitting your company?	**Percent Responding**		
	Never	**Some-times**	**Often**
Better pay elsewhere	7.9	65.0	27.1
Too much time away from home	25.8	53.0	21.2
Problems with supervisors/dispatchers	7.7	79.8	20.2
Health problems	12.2	86.7	1.1
Boredom	55.7	43.4	0.9
Long hours	11.5	77.6	10.9
Better driving jobs elsewhere	5.4	64.9	29.7
Change in career	11.4	80.6	8.0
Scheduling problems	17.8	74.0	8.2
Not enough driving hours/runs scheduled	22.1	71.1	6.8
Too many layovers	41.2	55.1	3.7
Inferior cabs	53.8	44.2	2.0
Low engine power	50.4	44.4	5.2

* For this exhibit, the responses "Rarely" and "Sometimes" are coded as "Sometimes", and the responses "Often" and "Almost Always" are coded as "Often."

Exhibit IV.3
"Real" Reasons for Drivers Quitting*
(All Respondents)

To what extent do you think the following are the real reasons why drivers quit working for your company?	**Percent Responding**		
	Not At All	**Some**	**A Lot**
Better pay elsewhere	15.0	64.3	20.7
Too much time away from home	35.8	43.5	20.7
Problems with supervisors/dispatchers	14.5	70.1	15.4
Health problems	28.5	69.5	2.0
Boredom	66.1	32.8	1.1
Long hours	16.8	65.5	17.7
Better driving jobs elsewhere	10.5	67.3	22.2
Change in career	23.8	69.4	6.8
Scheduling problems	27.3	64.7	8.0
Not enough driving hours/runs scheduled	38.9	54.9	6.2
Too many layovers	58.3	38.0	3.7
Inferior cabs	66.7	30.5	2.8
Low engine power	62.3	34.8	2.9

* For this exhibit, the responses "A Little" and "To Some Extent" are coded as "Some" and the responses "To a Large Extent" and "To a Very Great Extent" are coded as "A Lot."

Exhibit IV.4
Effects of Driver Turnover
(All Respondents)

Has turnover among drivers helped or hurt your company in the following areas?	**Percent Responding**		
	Hurt	**Made No Difference**	**Helped**
The quality of your services	30.8	64.6	4.6
Your profits	39.5	57.7	2.8
Your efficiency	36.8	58.9	3.3
Customer satisfaction	27.1	67.8	5.1
On-time deliveries	26.2	67.8	6.0
The breadth of services you provide	18.1	77.9	4.0
Your overall costs	37.3	59.3	3.1
Driver accident rates	30.1	63.9	6.0
Your insurance costs	20.5	73.8	5.7

Exhibit V.1
Company Performance in 1994

Truckload	**Median**	**Range**
DOT accident frequency ratio	.55	0-10
Insurance costs per truck	$3,251	$183-$12,000
Traffic violations per driver	1	0-6
Equipment violations per truck	1	0-7
Number of miles driven	5,500,000	100,000-250,000,000
Driver costs per mile driven	$.34	$.13-$2.50
Pick-up and delivery pounds per hour	12,500	250-50,000
Dock pounds per hour	5,500	549-80,000
Driver absenteeism rate	1.5%	0%-40%
Average tons per load	21	3-50
Loads per year	13,600	120-362,492
LTL	**Median**	**Range**
DOT accident frequency ratio	.80	0-9.8
Insurance costs per truck	$2,200	$529-$8,194
Traffic violations per driver	.5	0-3
Equipment violations per truck	1	0-7
Number of miles driven	8,228,500	417,000-600,000,000
Driver costs per mile driven	$1.02	$.33-$1.50
Pick-up and delivery pounds per hour	2,423	1,120-40,000
Dock pounds per hour	$2,950	1,300-12,500
Driver absenteeism rate	1.0%	0%-8%
Average tons per load	11	1-25
Loads per year	16,000	660-175,357
Specialized Commodity	**Median**	**Range**
DOT accident frequency ratio	.88	0-13.2
Insurance costs per truck	$3,220	$260-$12,000
Traffic violations per driver	.5	0-10
Equipment violations per truck	.99	0-4
Number of miles driven	6,000,000	100,000-294,000,000
Driver costs per mile driven	$.40	$.10-$1.70
Pick-up and delivery pounds per hour	32,650	15,300-50,000
Dock pounds per hour	5,200	1,138-13,800
Driver absenteeism rate	2.0%	0%-15.00%
Average tons per load	24	5-51
Loads per year	24,000	118-317,421
Total Sample	**Median**	**Range**
DOT accident frequency ratio	.74	0-13.3
Insurance costs per truck	$3,097	$183-$12,000
Traffic violations per driver	1	0-10
Equipment violations per truck	1	0-7
Number of miles driven	6,000,000	100,000-600,000,000
Driver costs per mile driven	$.36	$.13-$2.50
Pick-up and delivery pounds per hour	3,205	250-50,000
Dock pounds per hour	3,550	549-80,000
Driver absenteeism rate	1.0%	0%-40%
Average tons per load	22	1-50
Loads per year	15,500	120-362,492

Exhibit V.2

Financial Performance in 1994*

Truckload	Median	Range
Operating ratio	95.86	77.02-107.42
Net profit margin	1.95	(-6.23)-14.22
Return on equity	17.23	(-93.44)-118.63
Revenue per mile	1.19	.60-5.04
Revenue per ton	38.19	.98-189.65
Revenue per ton-mile	.08	.03-3.86
LTL	**Median**	**Range**
Operating ratio	94.35	80.45-111.13
Net profit margin	2.65	(-11.66)-19.05
Return on equity	18.29	(-33.04)-78.95
Revenue per mile	3.12	1.21-10.77
Revenue per ton	119.48	45.50-322.05
Revenue per ton-mile	.45	.02-3.17
Specialized Commodity	**Median**	**Range**
Operating ratio	96.58	79.94-110.89
Net profit margin	2.56	(-12.23)-15.35
Return on equity	12.79	(-39.47)-73.52
Revenue per mile	1.60	.93-10.39
Revenue per ton	24.71	5.17-531.93
Revenue per ton-mile	.11	.04-2.38
Total Sample	**Median**	**Range**
Operating ratio	95.95	77.02-111.13
Net profit margin	2.29	(-12.23)-19.05
Return on equity	14.57	(-93.44)-118.63
Revenue per mile	1.42	.60-10.77
Revenue per ton	41.53	.98-531.93
Revenue per ton-mile	.10	.02-3.86

* These measures of financial and organizational performance were collected from the *TTS Blue Book of Trucking Companies*. All data are for the 1994 calendar year.

Exhibit V.3
Comparison of Measures of Organizational Functioning with Other Companies in the Industry (All Respondents)

Compared to other companies in your industry, are your company's experiences in the following areas better, worse, or about the same?	Percent Responding		
	Ours Is Worse	About the Same	Ours is Better
On-time deliveries	0.0	37.7	62.3
On-time pick-ups	0.0	40.2	59.8
Consistent transit times	0.0	46.0	54.0
Ease with which drivers can locate pick-up and delivery sites	0.3	59.4	40.3
Drivers' friendliness to customers	0.0	54.9	45.1
Drivers' helpfulness to customers	0.0	51.4	48.6
Drivers' willingness to accommodate special customer needs	0.3	47.1	52.6
Adherence to special shipping instructions	0.0	53.6	46.4
Customer complaints concerning drivers	0.0	54.1	45.9
Miles driven per driver	0.0	79.1	20.9
Loss/damage history	0.3	54.3	45.4
Equipment breakdowns	1.4	47.6	51.0
"Logging" compliance	2.2	54.7	43.1
Drive accident rates	0.8	45.1	54.1
Fuel consumption	1.9	76.6	21.5
Speed limit compliance	0.8	67.3	31.9
Traffic safety rules compliance	0.5	60.8	38.7
Insurance costs	0.6	57.4	42.0
Quit rates	0.3	67.1	32.6
Layoff rates	0.8	26.9	72.3
Discharge rates	0.5	56.4	43.1
Absence rates	0.0	62.1	37.9
Grievance rates	0.0	48.6	51.4
Productivity	0.0	59.5	40.5
Driver-management relationships	1.1	52.8	46.1
Employee motivation	1.4	69.5	28.1
Employee performance	0.5	61.7	37.8
Labor costs	4.1	77.9	18.0
Administrative costs	1.4	78.4	21.6
Insurance costs	0.5	62.2	37.3
Overall company performance	0.3	52.3	47.4

Exhibit V.4
Comparison of Measures of Organizational Functioning
Three Years Ago and Now

Compared to what your company was like three years ago, are your companies experiences in the following areas now better, worse, or about the same?	Percent Responding		
	Worse Now	**About the Same**	**Better Now**
On-time deliveries	0.8	62.6	36.6
On-time pick-ups	0.8	63.4	35.8
Consistent transit times	1.1	62.3	36.6
Ease with which drivers can locate pick-up and delivery sites	1.7	63.8	34.5
Drivers' friendliness to customers	0.8	68.3	30.9
Drivers' helpfulness to customers	0.6	66.3	33.1
Drivers' willingness to accommodate special customer needs	0.8	64.9	34.3
Adherence to special shipping instructions	0.8	64.2	35.0
Customer complaints concerning drivers	2.5	66.9	30.6
Miles driven per driver	1.1	75.8	23.1
Loss/damage history	1.9	64.4	37.7
Equipment breakdowns	1.7	58.0	40.3
"Logging" compliance	2.5	56.7	40.8
Drive accident rates	3.0	55.1	41.9
Fuel consumption	1.7	65.4	32.9
Speed limit compliance	1.4	67.5	31.1
Traffic safety rules compliance	0.8	62.5	36.7
Insurance costs	1.7	57.1	41.2
Quit rates	1.9	67.9	30.2
Layoff rates	0.6	66.3	33.1
Discharge rates	0.5	74.4	25.1
Absence rates	0.5	76.5	23.0
Grievance rates	0.6	71.8	27.6
Productivity	0.3	70.4	29.3
Driver-management relationships	1.4	65.4	33.2
Employee motivation	1.3	71.4	27.3
Employee performance	0.8	72.4	27.8
Labor costs	3.3	79.3	17.4
Administrative costs	1.1	79.4	19.5
Insurance costs	1.4	66.3	32.3
Overall company performance	0.3	62.0	37.7

Exhibit VI.1
Characteristics of Driver Compensation

	Truckload	LTL	Specialized Commodity	Total
Driver Compensation				
Annual pay for a *typical* driver				
Median	$34,755	$37,500	$35,000	$35,000
Range	$17,000-$46,000	$21,000-$70,000	$22,000-$52,500	$17,000-$70,000
Annual pay for a *new* driver				
Median	$30,000	$32,000	$30,000	$30,000
Range	$12,500-$40,000	$19,000-$50,000	$17,000-$50,000	$12,500-$50,000
Annual pay for a *senior* driver				
Median	$38,500	$41,800	$40,000	$40,000
Range	$19,000-$65,000	$25,000-$70,000	$24,000-$65,000	$19,000-$70,000
Median percent drivers paid by miles driven	85.0%	20.0%	0%	40.0%
Median percent drivers paid hourly	0.0%	72.0%	2.0%	3.5%
Median rate per mile	$.26	$.32	$.27	$.26
Median rate per hour	$10.00	$13.75	$10.75	$11.00

Exhibit VI.2
Characteristics of Driver Benefits

	Truckload	LTL	Specialized Commodity	Total
Benefits				
Percent companies offering health insurance	98.8%	96.4%	99.2%	98.6%
Median percent health insurance premiums paid	90.0%	100%	100%	100%
Percent companies offering disability insurance	63.0%	72.7%	77.8%	69.7%
Median percent disability insurance premium paid	90.0%	100%	95.0%	100%
Percent companies offering life insurance	88.3%	80.4%	90.1%	87.6%
Median percent life insurance premium paid	100%	100%	100%	100%
Median paid vacation days per year	10 days	10 days	10 days	10 days
Median paid sick leave days per year	0 days	5 days	0 days	0 days
Median paid holidays per year	6 days	8 days	6 days	6 days

Exhibit VI.3
Factors Affecting Base Pay*
(All Respondents)

To what extent do the following influence the base rates you pay your drivers?	Percent Responding		
	Not At All	Some	A Lot
Local wage rates	20.6	48.3	31.1
Industry wage rates	6.9	41.4	51.7
Type of load carried	34.0	30.0	26.0
Working conditions	29.4	49.2	21.4
Desirability of work schedules	39.1	42.2	18.7
Responsibility levels of the job	26.0	46.3	27.7
Effort requirements of the job	24.4	48.9	27.7
Cost of living	21.8	58.1	20.1
Skill requirements of the job	17.6	44.4	38.0
Type and quality of equipment	29.8	45.9	24.3
Shipment loading/unloading requirements	21.7	43.9	34.4

* For this exhibit, the response "A Little" and "To Some Extent" are coded as "Some" and the responses "To a Large Extent" and "To a Very Great Extent" are coded as "A Lot."

Exhibit VI.4
Factors Affecting Pay Differences Across Drivers*
(All Respondents)

To what extent are difference in pay rates across your drivers based on the following factors?	Percent Responding		
	Not At All	Some	A Lot
Seniority	31.4	24.8	43.8
Driver performance	44.5	34.4	21.1
Number of hours worked	64.1	26.6	9.3
Number of miles driven	51.6	26.7	21.7
Driver accident rates	50.3	26.6	23.1
Traffic violations	57.7	28.7	13.6
Driver fuel mileage	65.5	25.2	9.3
Previous driving experience	50.9	25.1	24.0

* For this exhibit, the response "A Little" and "To Some Extent" are coded as "Some" and the responses "To a Large Extent" and "To a Very Great Extent" are coded as "A Lot."

Exhibit VI.5
Incentive Systems and Compensation Innovations*
(All Respondents)

To what extent does your company use the following incentive or bonus systems with drivers?	Percent Responding		
	Not At All	Some	A Lot
Individual incentives tied to individual performance	30.5	27.8	41.7
Work team/group bonuses tied to work team/group performance	77.9	14.9	7.2
Company-wide bonuses tied to company performance	61.8	20.7	17.5
Profit-sharing	56.2	17.9	25.9
Gainsharing	91.6	6.4	2.0
On-the-spot bonuses for exceptional performance	72.3	20.8	6.9
Non-monetary recognition awards for performance	31.9	35.9	32.2
Lump-sum salary increases	76.5	16.3	7.2
Market-based pay	27.7	30.6	41.7
Skill-based pay	50.6	30.1	19.3
Merit pay systems	61.2	26.2	12.6
All-salaried drivers	86.4	6.1	7.5
Broad-banding	89.9	6.6	3.5
Employee Stock Ownership Plans (ESOPs)	95.4	1.7	2.9
Two-tier wage systems	82.1	10.1	7.8

* For this exhibit, the response "A Little" and "To Some Extent" are coded as "Some" and the responses "To a Large Extent" and "To a Very Great Extent" are coded as "A Lot."

Exhibit VII.1
Driver Recruiting Sources*
(All Respondents)

To what extent do you use the following in recruiting drivers?	Percent Responding		
	Not At All	**Some**	**A Lot**
Newspaper advertisements	14.2	28.1	56.7
Union listings	88.3	10.0	1.7
Roadside billboards	89.1	10.3	0.6
Trade magazines	68.3	22.2	9.5
Trade schools	58.5	30.9	10.6
Advertisements on trailers	82.9	10.7	6.4
Radio or television advertisements	79.3	19.3	1.4
Recruiting bounties	53.9	29.3	16.8
Career fairs	69.4	25.8	4.8
Walk-ins	3.3	49.9	46.8
Military bases	79.6	17.9	2.5
Private employment agencies	81.5	17.1	1.4
State employment agencies	56.1	37.5	6.4

* For this exhibit, the responses "A Little" and "To Some Extent" are coded as "Some" and the responses "To a Large Extent" and "To a Very Great Extent" are coded as "A Lot."

Exhibit VII.2
Driver Selection Techniques*
(All Respondents)

How much weight is placed on the following in hiring drivers?	Percent Responding		
	Not At All	**Some**	**A Lot**
Unstructured interviews	26.6	43.1	30.3
Structured interviews	21.4	21.6	47.0
Mental ability tests	68.9	21.9	9.2
Physical ability tests	48.5	29.9	24.6
Technical knowledge tests	44.0	32.2	23.8
Performance or job sample tests	46.9	20.7	32.4
Personality tests	75.0	17.1	7.9
Honesty or integrity tests	74.6	13.6	11.8
Application forms	1.1	26.6	72.4
Background checks	1.1	9.8	89.1
Biographical information questionnaires	74.0	18.1	8.9
Reference checks	1.4	14.8	83.8
Medical examinations	3.1	12.5	84.4
Drug tests	0.6	1.6	97.8

* For this exhibit, the responses "Don't Use" and "No Weight" are coded as "Not At All", the responses "A Little Weight" and "Some Weight" are coded as "Some", and the responses "A Lot of Weight" and "A Great Deal of Weight" are coded as "A Lot."

Exhibit VII.3
Performance Assessment*
(All Respondents)

To what extent are the following factors considered in judging a driver's performance?	Percent Responding		
	Not At All	**Some**	**A Lot**
Number of miles driven	13.9	48.8	37.3
Percentage of on-time deliveries	8.9	29.4	61.7
Accident-free miles driven	0.8	8.9	90.3
Citations for moving violations	1.9	21.8	76.3
Average gas mileage	29.6	50.0	20.4
Other objective measures of driver behaviors	14.1	56.9	29.0
Truck performance	16.0	51.7	32.3
Customer/Client complaints	1.7	27.5	70.8

* For this exhibit, the responses "A Little" and "To Some Extent" are coded as "Some" and the responses "To a Large Extent" and "To a Very Great Extent" are coded as "A Lot."

Exhibit VII.4
Types of Training*
(All Respondents)

To what extent do you provide the following kinds of training for your drivers?	Percent Responding		
	Not At All	**Some**	**A Lot**
Technical skills training	22.3	50.3	26.4
General skills training	16.2	53.7	30.1
People skills training	33.8	55.2	11.0
Safe driving/accident prevention training	2.5	27.0	70.5
Customer service training	15.4	50.8	33.8
On-the-job training	5.6	30.3	64.1
Coaching	16.2	51.4	32.4
Classroom training	25.6	48.2	26.2
Computerized simulation training	91.1	7.5	1.4

* For this exhibit, the responses "A Little" and "To Some Extent" are coded as "Some" and the responses "To a Large Extent" and "To a Very Great Extent" are coded as "A Lot."

Exhibit VII.5
Innovative Programs

Percent responding that at least 20 percent of drivers were currently involved in each program or innovation.	Truckload	LTL	Specialized Commodity	Total
Survey feedback	22.7	14.3	15.1	18.2
Quality circles	5.2	5.4	8.4	6.3
Driver participation groups other than quality circles	12.1	12.5	13.4	12.6
Open-door policies	81.7	80.4	80.2	81.0
Management by objectives	26.4	26.8	23.1	25.4
Total Quality Management programs	19.0	27.8	20.5	20.9

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