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The Analysis Division analyzes motor carrier and highway safety crash trends, monitors patterns in motor carrier inspection rates, evaluates program effectiveness in reducing crashes, and researches crash causation and exposure data. It also conducts cost/benefit analyses and regulatory flexibility analyses to address new or revised regulations and policies, and coordinates information and data analysis with information and analysis specialists in the resource centers.



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## New Entrant Safety Research

*Deregulation of the motor carrier industry combined with a period of sustained economic growth has resulted in sizeable increases in the number of new motor carriers entering interstate operation. Discussions with key stakeholders in the motor carrier safety environment and previous academic studies have suggested that the safety performance and regulatory compliance of these "new entrants" may be significantly worse than the performance and compliance of more experienced carriers.*

### Introduction

Several years ago, the Office of Motor Carrier and Highway Safety (OMCHS) undertook a multi-year research effort to define an improved process for motor carrier safety fitness determination. A critical aspect of this research involved gathering and integrating the ideas, concerns, and suggestions of numerous motor carrier safety stakeholders (individuals and organizations that are affected by and/or have an interest in the process).

A principal source of this input was a series of eight nationwide meetings. The characteristics of an ideal process were determined from these meetings, written comments, interviews, and observations. The limitations of the current process were identified, and an improved, comprehensive, integrated approach to determining motor carrier safety fitness was formulated. The improved process consisted of three components: SafeStat, an automated, data-driven analysis system; a Progressive Compliance Assurance Program; and the New Entrant Program.

For the purpose of this research, a "new entrant" was defined as a recently formed carrier initiating interstate operations (or intrastate hazardous materials or passenger operations), or a previously operating carrier initiating interstate operations (or intrastate hazardous materials or passenger operations) for the first time.

### Purpose

Key motor carrier safety stakeholders and researchers reviewed the current safety fitness determination process and concluded that one of its most conspicuous limitations was the lack of a prequalification program and monitoring for new motor carriers. Currently, motor carriers can begin interstate operations simply by registering with the U.S. Department of Transportation (USDOT) and obtaining the required insurance. In contrast, in other industries performing commercial operations, particularly in the transportation sector, a new business must satisfy certain safety requirements before it can begin.

A second and more compelling argument in favor of a new entrant program relates to a study performed in 1988 by Professors Corsi (of the University of Maryland Business School) and Fanara (of the Howard University School of Business and Public Administration) that showed that new motor carriers had higher crash rates and lower rates of compliance with the Federal Motor Carrier Safety Regulations (FMCSRs) than carriers of record (i.e., established carriers). The authors identified the existence of what they described as a *safety learning curve* for new entrants. That is, new carriers exhibit higher compliance rates and improved performance (i.e., lower crash rates) as they accumulate experience with safety management policies and procedures.



This investigation examines the need for and the possible elements of a program to improve the safety performance and regulatory compliance of new entrants. It focuses specifically on regulatory compliance and crash rates as they relate to a motor carrier's time in interstate operations.

## Methodology

This study revisited the 1988 Corsi-Fanara analysis, this time using the markedly improved safety performance data now available in the Motor Carrier Management Information System (MCMIS), and expanding the coverage to include all carriers, not just the ICC-regulated (for-hire) carriers included in the original study.

Researchers performed two analyses to confirm the existence of a safety performance (i.e., crash rate) learning curve, and one study to confirm the exis-

tence of a safety regulation compliance learning curve. In all three analyses, the age of the carrier was calculated from the date that the carrier's USDOT registration Form MCS-150 information was entered into the MCMIS Census File. This date was used as the best available approximation of the date that the carrier began interstate operations.

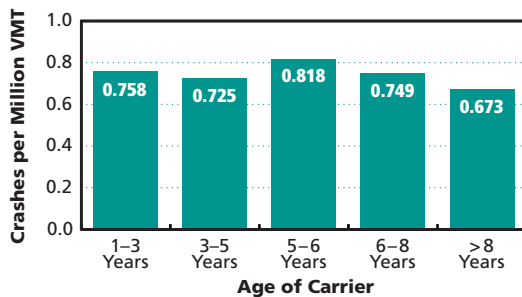
## Findings

The **Compliance Review Crash Rate Analysis** used data from compliance reviews that were conducted between April 1993 (when the USDOT definition of a crash changed) and June 1997 (the latest data available at the time this study was conducted). The data were broken out according to the age of the carrier at the time of the review. Weighted mean, or overall, crash rates [recordable crashes per million vehicle miles traveled (VMT) weighted by VMT] were calculated for each age group. This calculation is equivalent

### Compliance Review Crash Rate Analysis

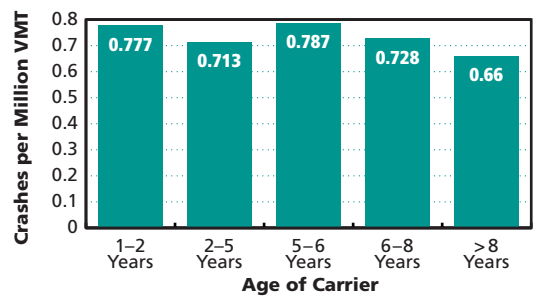
**Figure 1**

**Overall Crash Rate by Age of Carrier**  
All Carriers (23,575 CRs)



**Figure 2**

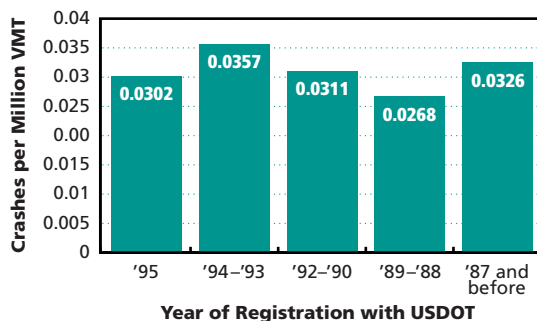
**Overall Crash Rate by Age of Carrier**  
Authorized For-Hire Carriers (11,023 CRs)



### State-Reported MCMIS-NGA Crash Rate Analysis

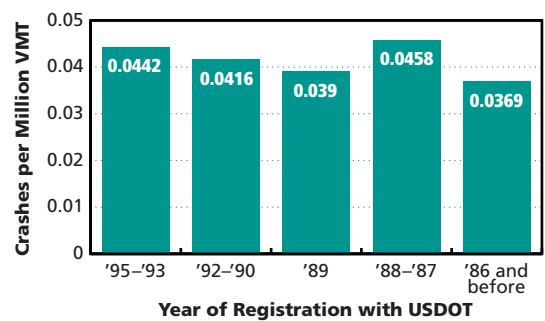
**Figure 3**

**Overall Crash Rate by Year of Registration with USDOT**  
All Carriers (28,507 Carriers)



**Figure 4**

**Overall Crash Rate by Year of Registration with USDOT**  
Authorized For-Hire Carriers (12,620 Carriers)



to calculating the aggregate crash rate in each group, i.e., dividing the total crashes in the group by the total VMT in the group and multiplying by 1 million.

The **State-Reported MCMIS-NGA Crash Rate Analysis** used calendar year 1996 MCMIS-NGA (National Governors' Association) crash data from the MCMIS Crash File and power unit data from the MCMIS Census File to calculate crash rates by age of carrier. The analysis included only carriers with non-zero power unit values that had received compliance or safety reviews since April 1, 1993. Consequently, the power unit information was more current than the original Form MCS-150 information.

The data were broken out into groups, based on the year the carrier registered with the USDOT, i.e., the year the carrier's Form MCS-150 information was entered into the MCMIS Census File. Weighted mean, or overall, crash rates (MCMIS-NGA crashes per power unit weighted by power units) were calculated for all age groups. This calculation is equivalent to calculating the aggregate crash rate in each group, i.e.,

dividing the total number of MCMIS-NGA crashes in the group by the total number power units in the group.

Each analysis was first performed using data for all carriers. The analyses were then repeated using data only for authorized for-hire carriers, as in the Corsi-Fanara Study, to determine if the learning curve effect holds only for that carrier classification.

Although the most experienced carriers usually had the lowest overall crash rate, the results of the analyses as shown in **Figures 1–4** do not indicate the presence of a safety learning curve. The declines in crash rates from the least experienced carriers to the most experienced carriers exhibited patterns of variability, rather than the steady progressions that are characteristic of learning curves.

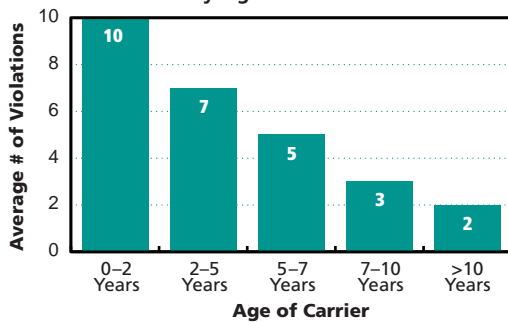
### Safety Compliance Violation Rate Analysis

To examine the existence of a safety regulation compliance learning curve, a study was performed using data on violations of acute and critical

## Safety Compliance Violation Rate Analysis

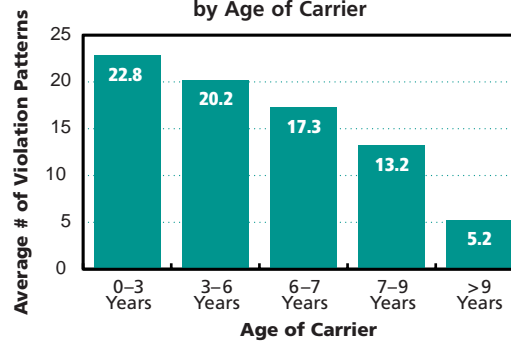
**Figure 5**

**Violations of Acute Driver Regulations/1,000 Drivers by Age of Carrier**



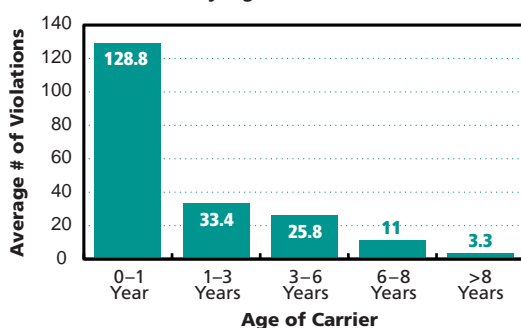
**Figure 6**

**Patterns Violations of Acute Driver Regulations/1,000 Drivers by Age of Carrier**



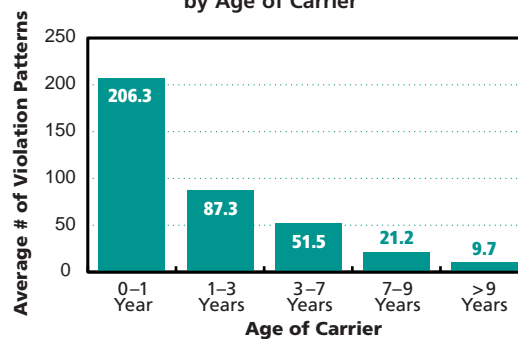
**Figure 7**

**Violations of Acute Safety Management Regulations/1,000 Drivers by Age of Carrier**



**Figure 8**

**Patterns of Critical Safety Mgmt. Reg. Violations/1,000 Drivers by Age of Carrier**



## Researcher

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## Distribution

This Analysis Brief is being distributed according to a standard distribution. Direct distribution is being made to the Resource Centers and Divisions.

## Availability

The study final report will be available from the National Technical Information Service, Telephone: (703) 605-6000.

## Key Words

prequalification, qualification, SafeStat, safety learning curve, Safety Evaluation Areas, stakeholders.

## Notice

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regulations from compliance reviews (CRs). The study used data from 23,016 CRs that were conducted between October 1, 1994 (when acute/critical regulations were first used to evaluate the five regulatory factors in a CR) and June 2, 1997 (the latest data available at the time this study was conducted). The data were broken out according to the age of the carrier at the time of the review. The age of the carrier was calculated from the date that the carrier's Form MCS-150 information was entered into the MCMIS Census File. The data were broken out into 11 groups, based on the age of the carrier at the time of the review:

(X = Age of carrier at review)

0<X< 1	Less than or equal to 1 year
1<X< 2	Greater than 1 year and less than or equal to 2 years
...	
9<X<10	Greater than 9 years and less than or equal to 10 years
10<X	Greater than 10 years

The data were also broken out by SafeStat Safety Evaluation Area (SEA), either Driver or Safety Management. For each SEA/age group combination, the average number of violations of acute regulations per thousand interstate drivers and the average number of patterns of violations of critical regulations per thousand interstate drivers were calculated. The results for the Driver SEA are shown in **Figures 5 and 6**. The results for the Safety Management SEA are shown in **Figures 7 and 8**.

The results show a substantial age-related pattern of compliance, i.e., the numbers of violations of acute regulations and patterns of violations of critical regulations in both SEAs were substantially higher for new entrants than for more experienced carriers. Furthermore, the rates declined in steady progression across age groups, showing clear evidence of a safety regulation compliance learning curve.

## Further Research

What can be done to assist new entrants in their efforts to improve their compliance with the FMCSRs? OMCHS is researching the development of a **New Entrant Program**, which would consist of two stages: prequalification and qualification. In the prequalification stage, a new carrier would receive educational material and then apply for both a USDOT number and "prequalified" status. The application would include an examination to measure the carrier's knowledge of the FMCSRs and applicable Hazardous Materials Regulations. Successful completion of these requirements would result in the issuance of a USDOT number and eligibility for the qualification stage.

In the qualification stage, the carrier would be monitored by SafeStat, using safety performance data from roadside inspections and crash reports. The carrier would also be subject to more intense surveillance than established carriers. After two years, a prequalified new entrant would be considered to be an established carrier. In addition, whenever sufficient safety performance data have been collected and analyzed by SafeStat, the carrier would receive an assessment of its safety status.

## Reference

Thomas M. Corsi and Philip Fanara, Jr., "Deregulation, New Entrants, and the Safety Learning Curve," *Journal of the Transportation Research Forum*, Vol. XXIX, No.1, 1988, pp. 3-8.