

# The Rise and Fall of Accident Frequency

By Fritz Yohn

The secular decline in the rate of occupational accidents has been a well known phenomenon of the workers compensation marketplace of the past decade and has significantly colored the rates and performance expectations for the line. In reality, however, state-specific accident frequency rates continue to diverge markedly from the improving national trends in terms of level, stability and direction of movement. This unstable, cyclical behavior has greatly complicated the pooling of risk and pricing of insurance coverage.

While driven in part by the shifting mix of US employment, the nation-wide decline in accident frequency primarily reflects significant improvements in workplace safety through the combined efforts of employers, insurers and the Occupational Safety and Health Administration. Over the past six years, in fact, the US-wide accident rate for all private employers has declined by almost 18 percent, in 2002 reaching a rate of just 2.8 injuries and illnesses per 100 full-time workers per year. Were workers compensation priced and insured at the national level, the continuity and stability of such long-term declines in accident frequency would exert a profound, stabilizing

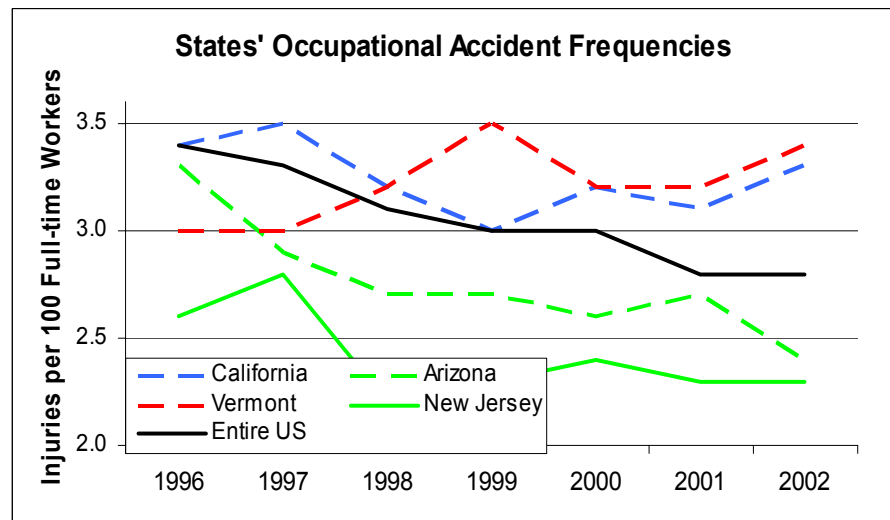
impact on the workers compensation insurance system. But, of course, it is not.

As shown in Chart 1, accident frequency rates in states such as Arizona and New Jersey have declined appreciably over the past six years, with Arizona recording an impressive 27% decline in its frequency rate for all private employers. At the same time, appreciable accident frequency

1996 and 2002 (latest data available).

At the industry level, the trajectory of accident frequency can be especially pronounced, even within those states recording overall improvement in frequency. For example, New Jersey experienced considerable deterioration in construction industry accident frequency over the 1996-2002 period, even though

**Chart 1 - Accident rates for all private employers for selected state.**

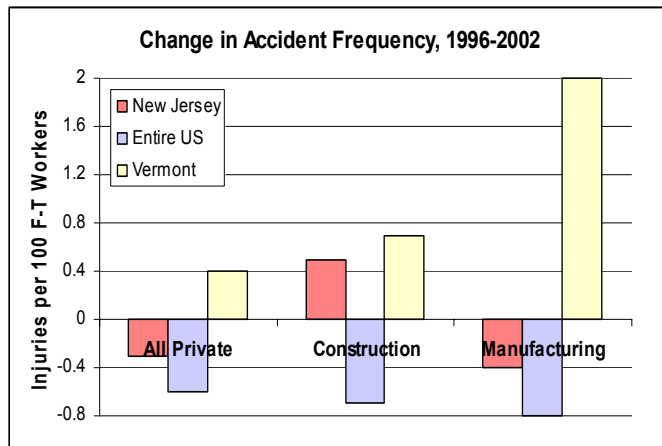


While the long-term trend in accident frequency is downward, significant variation in observed results still occurs and impacts profitability.

improvement has been illusive in states such as California and Vermont. Indeed, Vermont's accident rate actually increased some 13 percent, on balance,

the corresponding all-industries' accident frequency measure declined, as shown in Chart 2.

**Chart 2 – Change in Major Industries’ Accident Frequency**



Even in states experiencing overall improvement in accident frequency rates, individual industries can be experiencing serious deterioration. Despite only a modest increase in overall accident frequency in Vermont, the state experienced a dramatic surge in manufacturing workplace accidents, as well as an uptick in accidents in the construction sector.

In Vermont, a modest increase in aggregate accident frequency over the 1996-2002 period belied a very large surge in manufacturing’s accident frequency rate and a more moderate increase in that of the construction industry. Due to the backward-looking, aggregate process used in workers comp rate making, pronounced upswings in a major industry’s accident frequency – such as that recorded for Vermont manufacturing – can adversely affect underwriting experience for a set of industry-related class codes for a number of years before the higher accident frequency is fully manifest in the class-level rate structure.

While many factors can influence the observed accident frequency rate, one of the most important – and most cyclically variable – is the pace of business

activity in a given industry. Construction and manufacturing, due both to their impact on system-wide rate making and their volatility, are especially relevant examples. The extent of state-to-state and period-to-period variability in construction activity is illustrated in Chart 3 on the

growth of construction employment, which is a good proxy for the pace of economic activity in the sector.

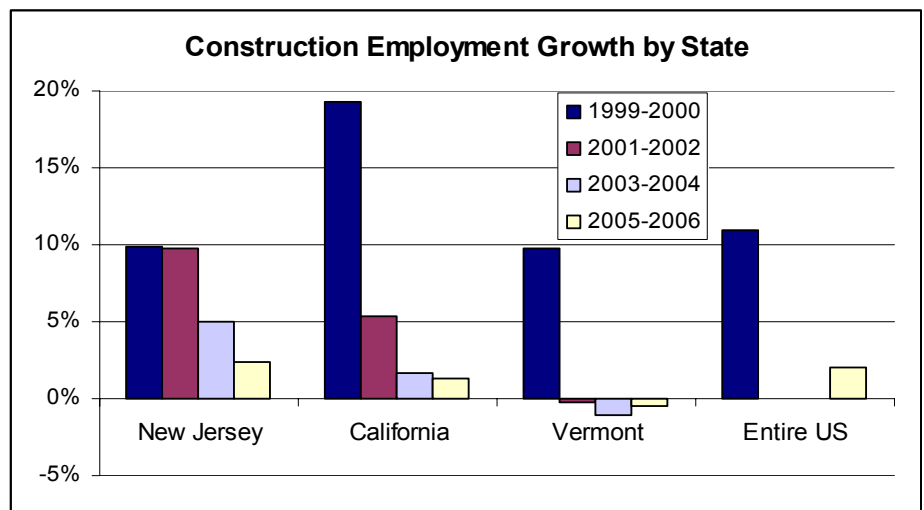
Over 1999-2000 (now the central part of the loss experience

time span for states’ workers comp rate making), California’s construction employment expanded at an exceptionally strong 19% annual rate – almost twice the national average growth. While this growth subsequently slowed, California has maintained positive growth over the entire 2001-2004 period, while nationally, construction employment has been flat.

In contrast with California, construction employment growth in New Jersey never reached such lofty heights in the late 90s. However, it has continued to grow through the recent recession and is forecast to expand at a 2% rate over the next three years. Vermont, on the other hand, has paralleled the national average by dropping to a negative growth status in 2001 and is projected to remain soft through 2006.

In construction, as in other

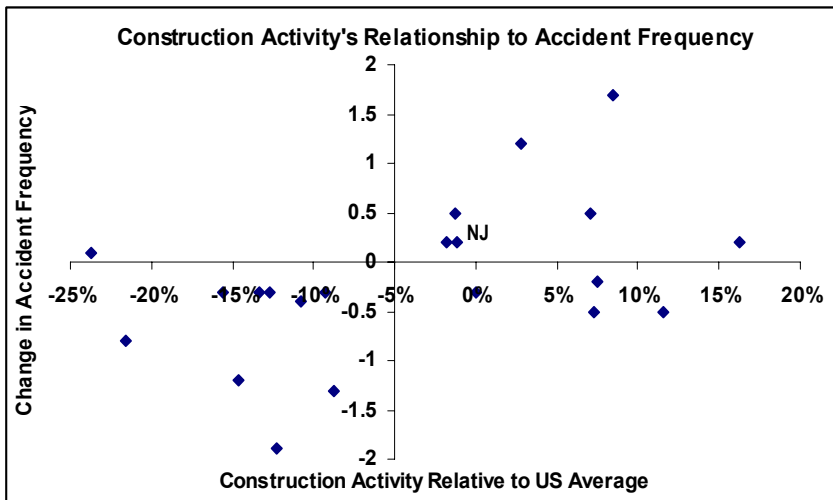
**Chart 3 – Recent and Forecast Growth in Construction Industry Employment**



One of the most important, and cyclically variable, factors in accident frequency trends is the pace of business activity.

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## Chart 4 – Correlation of Increased Production Activity and Accident Frequency



Rapid production growth in construction, as is the case in other sectors, often causes deterioration in overall accident frequency rates

sectors, rapid production growth often exerts a detrimental influence on occupational accident frequency, and through it, on incurred workers compensation loss experience, as Chart 4 shows. This negative impact flows through a number of employee characters and working condition factors. Consider, for example, that to meet the increased demand in periods of strong growth, employers will hire from a more shallow pool of workers who often lack experience, or rely more heavily on overtime – both known contributors to workplace accidents.

In Vermont, for example, the fraction of construction employees on the job for less than a year jumped markedly in 1997 as construction activity surged, and it remained quite high through 2000. The construction industries in both California and New Jersey, however, both have experienced a modest decline in the fraction of new job entrants, despite continued strong construction activity.

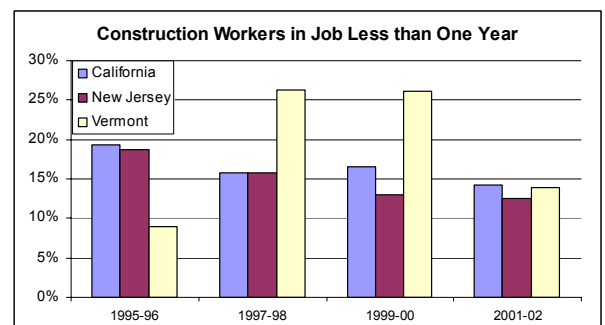
Periods of strong construction activity can also produce an increased use of overtime hours. As shown in Chart 6, Vermont's construction industry recorded much higher than normal overtime hours in the late 1990s, perhaps in part due to the state's more limited and geographically isolated workforce. Since then, overtime utilization in Vermont has moderated somewhat, but still remains well above the national average for the construction industry.

Overtime utilization in California construction peaked somewhat later (during the 1997-1998 period), but has moderated appreciably

since then. New Jersey has displayed yet a different pattern, with the rate of construction overtime use increasing moderately over the entire 1995-2002 period, as the pace of construction activity continued largely unabated.

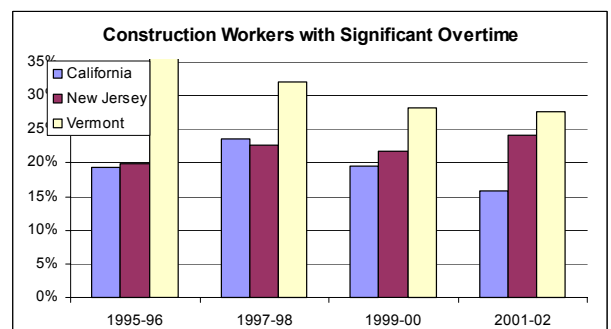
Expanding construction activity also influences a state's workers comp system through its tendency to spawn large numbers of new, smaller construction firms. These firms tend to employ less experienced workers and to have weaker accident prevention programs, and as a result, to have higher than average accident frequency rates.

## Chart 5 – Proportion of Employees Hired in Past Year

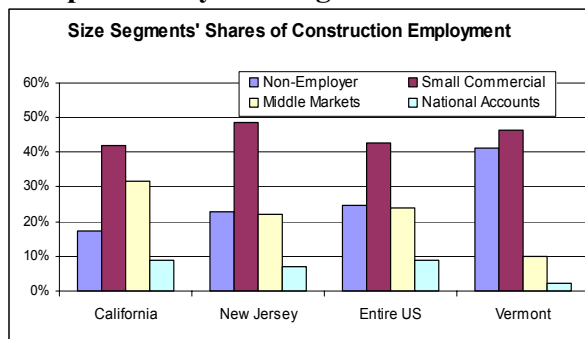


New job entrants, because they are less experienced, have an above-average likelihood of occupational injury. Rapid production growth can stimulate higher-than-usual workplace injuries.

## Chart 6 – Proportion of Employees Working Significant Overtime



## Chart 7 – Construction Industry Composition by Size Segment



### Robust construction growth tends to spawn many smaller firms which often hire inexperienced workers, have little in the way of accident prevention programs and are not

In Vermont, for example, smaller firms (non-employers and small commercial) accounted for a much higher than average share of the state's total construction employment in 2002. With respect to a carrier's underwriting results, increasing numbers of these smaller firms tend to intensify the impact of deteriorating accident frequency, since they are too new and small to be experience rated.

In contrast, in California, larger firms account for about 40 percent of total construction activity – more than three times the corresponding share in Vermont. Since most of these firms are large enough to be experienced rated – or indeed, may be self-insured – the impact of any construction-induced deterioration in accident frequency tends to be attenuated by the experience rating process.

While in-depth analysis of employee characteristics and working conditions might yield a more granular understanding of the factors driving deteriorating accident frequency, substantial

insights and practical value can be gained simply by monitoring industry growth rates.

Over the 2004-2006 period, construction industry employment growth is forecast to be quite muted for the US as a whole, averaging only one-half percentage point

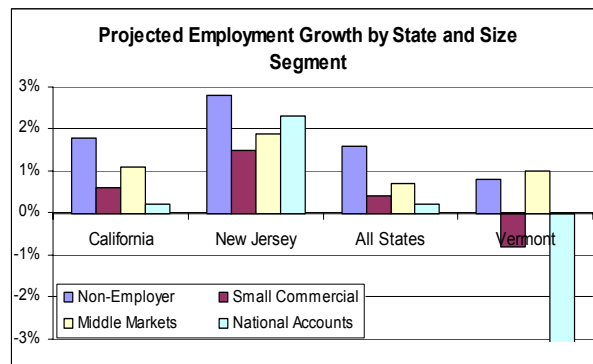
growth annually. Yet, employment in New Jersey's construction industry is forecast to average about 1.7% annually over this period, placing it in the ranks of the fastest growth states for construction exposures – likely with adverse development – along with the likes of Nevada and Arizona.

State-specific economic fluctuations have been shown to influence both employee characteristics and working conditions in specific industries. In turn, changes in these industry-specific factors have been shown to induce significant swings in occupational accident frequency – notwithstanding the long-term improvement in frequency that have been recorded. Given workers comp's backwards-looking rate-making procedures, such fluctuations in accident frequency only are reflected in workers comp rates with a substantial multi-year lag. During this period between frequency upswing and subsequent rate adjustment, rate adequacy can and does deteriorate markedly in

the comp classes associated with the affected industry.

In most cases, it is not possible for carriers to eliminate the lagged adjustment process that characterizes current workers comp rate making. However, the rise and fall of the business cycles causing the problem are: 1) state-specific, 2) industry-specific and 3) readily forecast with substantial accuracy. As a result, carriers can use knowledge of anticipated business cycle phenomenon to reduce their exposure to workers comp classes in specific states that are having or are forecast to have adverse development in accident frequency.

## Chart 8 – Projected construction employment growth 2004-2006



*Frederick Yohn is the developer of "MarketStance," a market analysis tool for U.S. commercial property-casualty insurers and a registered trademark of IntelliStance, LLC, in Middletown, Conn.*

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