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Predicting and Preventing Severe Workplace Injuries

for Risk Management Professionals

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Part 1: Frequency Breeds Severity

- What is your organization's potential for severe workplace injuries?
- Where are these exposures greatest in your organization?
- How does your organization assess and reduce severity exposures?
- Is your organization's culture committed to reducing severity exposures?

If risk management executives consider these questions, it is likely that many would agree that the potential for severe workplace injuries presents significant and far-reaching challenges for their organizations. In particular, they may not be fully prepared to identify and address their workplaces' severity issues.

Serious workplace injuries continue to plague companies in the United States across a broad range of industries. Despite significant advancements in safety, equipment and technology, approximately 5,000 workplace fatalities occur annually and over 3 million people suffer a workplace injury from which they never recover. The impact on workers and their families can be immeasurable, taking a heavy toll on an organization for years to come.

Many companies become more safety conscious after a serious workplace accident and future workforces can reap the benefits. But even in these cases, knowing where and how to take action and strengthen the organization against such risks is not immediately clear.

Recognizing the far-reaching consequences of severe workplace accidents, PMA Companies designed a research study to obtain information to help our clients more accurately assess their severity potential. Specifically, we wanted to examine the risk control axiom, "frequency breeds severity" by looking at the following questions:

1. Do organizations that experience a severe event have increasing claims frequency prior to the event?
2. Do organizations with claims frequency rates above (worse than) their Standard Industrial Classification (SIC) peers, experience a greater percentage of severe events than their SIC peers with lower frequency rates?

In this white paper, we present the results of the *PMA Companies Severity Study*. We then provide a strategic overview of best practices to identify severity hot spots in an organization and an overview of the key steps to reduce severity exposures.

Part 2: PMA Companies Severity Study

In the *PMA Companies Severity Study*, we examined over 150,000 claims from 4,600 companies from our workers' compensation book of insured business, and identified 203 clients who had experienced one or more severe events (defined by PMA Companies as a workers' compensation claim with an incurred cost over \$250,000) in the 2008 and 2009 calendar years. We evaluated four years of loss data (2006 to 2009) for trending purposes.

Clients in the database represented diverse industries, including healthcare, manufacturing, and public entities, suggesting our findings will be relevant to a wide range of businesses. Company size ranged from less than 100 employees to 1,000 or more. Severe events involved fatalities and a broad range of other injuries, e.g., paralysis, amputations, and burns.

Primarily, we evaluated the extent to which organizational frequency was trending upwards for the 203 companies that experienced a severe event, possibly leading organizations to statistically expect a severe event (which is the expectation under the "frequency breeds severity" theory).

Using a simple measure of annual frequency rates (per million dollars of payroll), we identified the percentage of companies whose frequency rates were increasing during the year of the event and the two consecutive years prior to the event year. Results were obtained, by company, for both medical-only and lost-time frequency rates allowing us to evaluate underlying organizational trends for what might be generalized as *less serious* and *more serious* claim types.

We conducted a similar evaluation of companies that demonstrated a concurrent increase in both medical-only and lost-time frequency during the three-year periods, providing us with a look at how often these two issues moved in tandem for companies that experienced a severe event.

Findings from *PMA Companies Severity Study*

- 81.5% of the companies studied did not demonstrate a trend of an increased *lost-time* frequency (rate) in the three years prior to the event (chart 1).

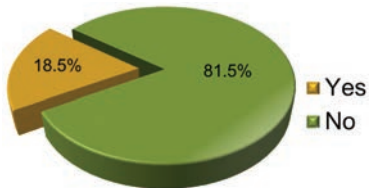


Chart 1:

Were *lost-time frequency rates* increasing progressively during the preceding 3-year period?

- 88% of the companies studied did not demonstrate a trend of an increased *medical-only* frequency (rate) in the three years leading up to the event (chart 2).

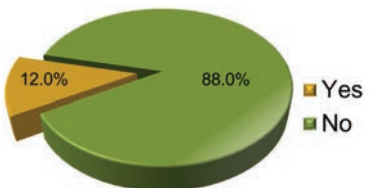


Chart 2:

Were *medical-only frequency rates* increasing progressively during the preceding 3-year period?

- 96.3% of the companies studied did not demonstrate an increasing frequency, combined trend *medical-only* and *lost-time* frequency rates moving in tandem, for the three years prior to the event (chart 3).

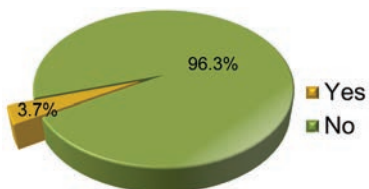


Chart 3:

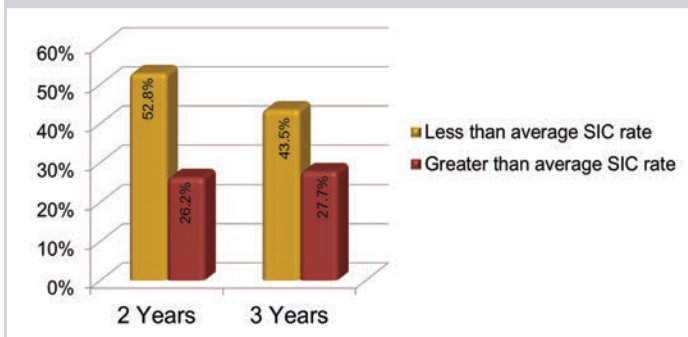
Were *medical-only and lost-time frequency deviation rates* increasing in tandem over the 3-year period?

SIC Code Comparison

A secondary study was conducted comparing companies with frequency rates higher than the SIC average for their business segment to companies with frequency rates lower than their SIC average. The purpose of this evaluation was to determine if companies performing “worse than” average had a higher percentage of severe events in our study than those with “better than” average performance. This was not, however, the case. Companies that performed “better than” their industry average had the same number (or a higher number) of the severe events in our study than companies that had frequency rates “worse than” their SIC average.

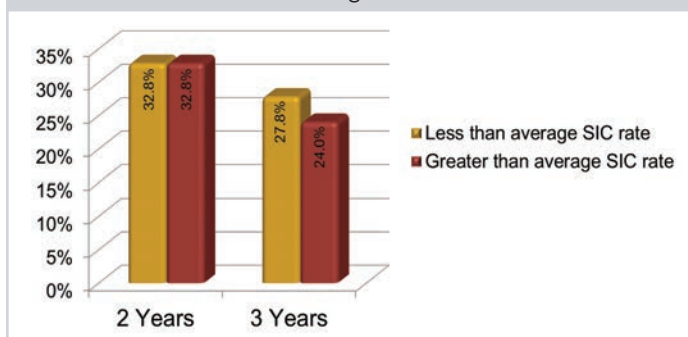
When evaluating the medical-only frequency rates, a greater percentage of companies for both the two year and three year periods of time, had frequency rates that were lower than (or “better than”) their SIC average.

Chart 4: Comparing Companies with Frequency Rates Above and Below the Average for Their SIC: Medical-only



When evaluating lost-time frequency rates, an equal or greater percentage of companies, for both the two year and three year periods of time, had frequency rates that were lower than (better than) their SIC average.

Chart 5: Comparing Companies with Frequency Rates Above and Below the Average for Their SIC: Lost-time



While the lost-time frequency rates were less demonstrative than the medical-only frequency rates, there was still no evidence that companies with frequency rates better than or worse than their SIC average performed differently from a severity perspective.

PMA Companies Severity Study Conclusions

Based upon our study, we offer the following insights:

1. Organizational frequency does not appear to be the only strong predictor of organizational severity.
2. Severity potential should be evaluated independent of loss frequency, although some correlation between frequency and severe events was evident in our study. A causal relationship, however, was not pursued in these cases.

Our data suggests additional study is needed to advance a more modern view of severity—incorporating additional factors relating to frequency, as well as factors that may be unique to severity.

3. Based on the low correlation between organizational frequency and severity in this study, we believe that organizations need to explore additional ways to evaluate and address severity exposures.

Despite the limitations of the “frequency breeds severity” axiom, it is important to keep in mind that increasing accident frequency is a serious concern for organizations and needs to be addressed.

Thought Provoking Questions for Risk Managers Arising from the PMA Companies Severity Study:

- 1 **Should organizations have confidence that their severity exposures** are controlled based upon a steadily declining frequency trend—or frequency rates consistently less than their industry's average?
- 2 In organizations with adequately controlled frequency, **where are the additional risk exposures** that need evaluation?
- 3 **Do senior executives receive and understand information** regarding severity exposures, and routinely communicate the potential for severity exposures to their organizations?
- 4 **Does a focus on reducing loss frequency** make an organization statistically less likely to suffer a severe event?
- 5 **Do severity exposures stem from specific loss sources** or from more difficult-to-identify factors, such as complicit workplace cultures, unusual/atypical events, and/or other organizational or inherent systemic flaws?
- 6 **Is there a better way to predict organizational severity exposures** than relying upon frequency trends?

These questions suggest the need for the development of a more effective approach to addressing severity exposures.

Part 3: Identifying Severity Potential in Your Organization

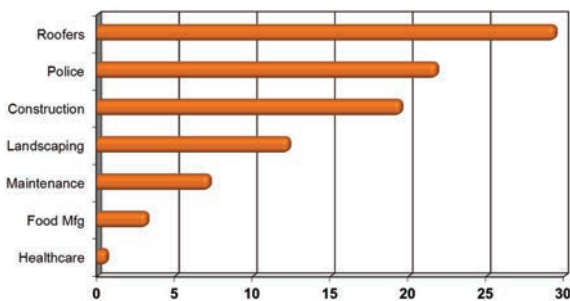
We recommend conducting a data-driven assessment of your organization's severity potential. In this stage, explore both internal and external data resources to help develop a detailed list of your severity exposures. The following illustrates four key places to look for information.



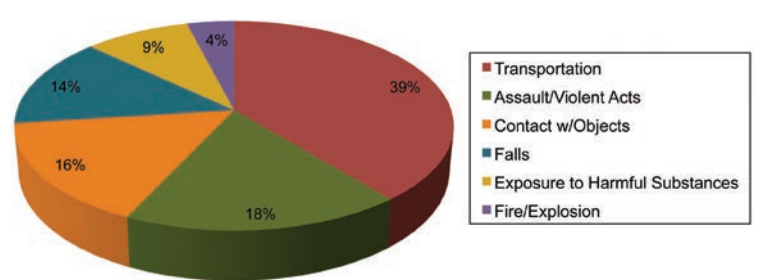
Bureau of Labor Statistics (BLS) (http://www.bls.gov/iif/osh_nwrl.htm#industry)

Research and governmental agencies can provide extensive data to help you assess your severity potential. The Bureau of Labor Statistics provides extensive data on workplace accidents. For example, BLS provides fatality rates by occupation—see chart below. Organizations can use this information to prioritize their departmental and/or occupational focus when assessing severity potential. BLS also categorizes the leading types of fatal events which can also serve as a self-assessment tool for your organization.

(BLS) Occupation Fatality Rates:
Per 100,000 Workers



(BLS) Overall Fatality Trends: Event Types
Manner In Which 4,547 Fatal Work Injuries Occurred - 2010





OSHA Search Function (by SIC Codes) (<http://www.osha.gov/pls/imis/accidentsearch.html>)

Another valuable government resource is the Occupational Safety and Health Administration (OSHA). On-line tools provide a method of researching workplace injuries and fatalities by SIC codes. Access an SIC code search on the OSHA website. Then, look up your organization's SIC code for the fatal and catastrophic events that have been investigated by OSHA.



PMA Companies Study Loss Leaders

The study narrowed the injury types to a list of 20 classifications. The surprising statistic for PMA was that injuries sustained from slips and falls on the same level surfaces (i.e., flat walking surface and not stairs) were the leading classification accounting for 20.5% of the injuries. While musculoskeletal cases were expected to be in the top 5 and were, other types were expected and were not in the top 5. Motor vehicle related cases accounted for 6.3% of the injuries, and machine related injuries were associated with less than 4% of the claims.

Top Ten Injury Types Resulting in Severe Workers' Compensation Claims

1. Falls, Same Level	20.5%
2. Strains, Lift Heavy Object	17.2%
3. Falls, Heights & Ladders	11.2%
4. Patient Handling	8.1%
5. Struck by Object	7.7%
6. Motor Vehicle Accident	6.3%
7. Strains, Awkward Postures	4.8%
8. Strain, Pushing/Pulling Task	4.8%
9. Caught In Machine	3.3%
10. Fork Lift	1.9%

The table to the right represents PMA's top ten injury types for workers' compensation claims with incurred costs of between \$250,000 and \$3.3 million.



Your Organization's Experience

Another key step is to examine your organization's internal loss performance data. You can obtain this data from your insurance carrier or TPA workers' compensation loss runs, as well as from your OSHA logs. This data will help reveal accident trends, as well as clues to where your severity exposures lie. Increases in frequency provide meaningful data. For example, examine the losses that in the past have led to severe claims. Also, look for hidden clues in near misses and accident reports.

Reducing Risk: Assessing Risk Through Observations, Evaluations, and Prioritizing Exposures

We recommend being familiar with the following reference: ANSI's Risk Management Standard Z690.1-3-2011

In addition to relying on your organization's historical loss and industry data, it's important to observe your workplace exposures by completing a thorough assessment of your facilities. American National Standards Institute (ANSI) Z690.1-3-2011 provides the framework for conducting this type of assessment. Actively search for potential exposures, taking a fresh perspective when observing your workplace exposures.

After identifying severity exposures, organizations need to assess these risks, evaluate the probability and potential severity of the loss and prioritize exposures. An assessment matrix can be useful in providing structure in ranking and prioritizing your severity exposures. For example, the ANSI and the American Society of Safety Engineers (ASSE) offers ANSI/ASSE Z590.3-2011 – *Prevention Through Design*: a matrix to help assess the severity of the injury/illness versus the likelihood of that exposure occurring.

Assessment matrixes can help you do the following:

- Visualize your risks
- Recognize incident probability
- Identify severity associated with a specific job function
- Prioritize risk reduction measures
- Set priorities and rank the risk associated with job functions

Assessing and managing risk is an ongoing process since organizational risk is not static!



Guidelines for Implementing a Severity Reduction Program:

- **Focus on frequency issues and severity potential.** Many organizations are effective at—focus on—accident frequency and loss leader trends at the expense of severity issues. Oftentimes, it is only after a severe injury has occurred that organizations effectively address severity exposures.
- **Low frequency can't provide assurance that a severe event won't occur.** As the *PMA Companies Severity Study* underscores, even companies with a good a long-term loss history and strong safety performance should invest the time and commit the resources to severity reduction. Leaders in organizations with an excellent loss performance history need to realize that severe injuries do occur in well-performing organizations with effective counter measures in place.
- **Use language and examples personalized for your company to describe severity events.** Organizations need to “customize” their own definition of severity events and examples based upon their company’s risk exposures to gain organizational commitment.
- **Severity exposure reduction needs to be driven by senior management.** Identifying and reducing severity exposures in organizations can present challenges that are very different from the more tangible goal of impacting loss leaders. Obtain buy-in from senior management before beginning your initiatives.

Part 4: Best Practices for Severity Factor Reduction (SFR)

1 **The first step in reducing severity is obtaining senior-level commitment** to identifying and impacting severity exposures. This may require a different way of thinking about risk management. Take for instance a company focused primarily on frequency driven data analysis. Decisions are made related to production, efficiency, and safety based on a model of reducing adverse events that occur often.

This is still a good method in reducing loss; however, it falls short in preventing many of the high cost events. We can speculate as to why, but consider the last time your organization had a senior level meeting to discuss possible “what-if” scenarios? Within the context of the PMA study, we observed many organizations actively working to prevent slip and fall hazards and working to eliminate musculoskeletal exposures. As our study shows, these injury types can result in severe and costly injuries, but how do these same organizations research other possible work practices that may lead to severe injuries? Do they consider how their management decisions may impact loss potential?

2 **Utilize consistent and organized methods and tools** for severity assessment to identify, rate, and prioritize exposures.

3 **Involve your employees** in the assessment of organizational pockets of severity. Proactively go out and speak with employees, asking where they believe the highest potential for injury exists. It’s also important to foster a culture of open communication that facilitates employees speaking up about exposures without fear of repercussion. Providing a mechanism for employees to report exposures anonymously is also helpful.

4 **Once you have identified exposures, allocate resources and staff responsibilities to implement corrective action.** Be vigilant in observing that corrective action has taken place and validate it. Monitor your severity-reduction plan on an ongoing basis.

5 **Communicate with your employees** on severity exposures and corrective actions.

Conclusion

The results of the *PMA Companies Severity Study* indicate the need for organizations to begin re-examining the predictive value of organizational frequency with respect to severity potential. In our study, organizational frequency was not a reliable predictor of a severe event occurring. A relatively small percentage of the companies studied had claims frequency rates increasing prior to the severe event. Likewise, companies with “good” performance (below their SIC average) were as likely, if not more likely, to experience a severe workplace injury. As a result, we consider the predictive value of organizational frequency nominal and embrace a more expansive view of predicting severe events.

We recommend a strategic approach to severity reduction, implementing a best practices type of program outlined in this paper. Your severity program should be executed and aligned with your organization’s overall strategic risk management plan.

Industry Research Into Severity

The safety profession is currently undergoing research on whether the “frequency of accidents breeds severity.” The American Society of Safety Engineers (ASSE), the National Safety Council, and other professional safety agencies have been weighing the profession’s various opinions on adherence to the Heinrich Accident Triangle/Frequency Breeds Severity model in predicting severity events. This white paper outlines research conducted by PMA Companies designed to advance current thinking regarding organizational severity exposure.

About PMA Companies

PMA Companies (www.pmacompanies.com) provides risk management solutions and services, specializing in workers’ compensation and offering property and casualty insurance, in the U.S. Headquartered in Blue Bell, PA, PMA Companies is a member of Old Republic Companies. Old Republic International Corporation (NYSE: ORI) is one of the nation’s 50 largest publicly held insurance organizations.

PMA Companies includes **PMA Insurance Group**, specializing in workers’ compensation, and other commercial property & casualty insurance products; **PMA Management Corp. and PMA Management Corp. of New England**, providing results-driven TPA and Risk Services specializing in workers’ compensation and liability; **Midlands Management Corporation**, offering program administration specializing in excess workers’ compensation and specialty casualty claims services.

PMA Companies Severity Study Parameters and Comments

PMA Companies Severity Study examined workplace frequency and severity as defined by very specific parameters, including the following:

- *Organizational* frequency was the focal point versus the individual’s injury frequency or a task-specific injury frequency.
- In our evaluation of organizational medical-only and lost-time frequency rates, we did not measure the *behavioral safety observations* that may have contributed to the underlying frequency problem. Although important, behavior safety measures are outside the scope of this study.
- No attempt was made to correct the *integrity* of the injury recording intent of the companies in the study. To this extent, macro data related to an organization’s injury data has flaws and limitations.
- We established a time period of three years (two years in some cases) for the frequency trend. A shorter time period may have yielded different results, however, the two-year data in our SIC comparison does not indicate a large shift with a shorter time frame.
- Severity in our study was defined in financial terms and based on *incurred cost figures* at the time the data was extracted from our database.
- Incurred costs move upward or downward over time, referred to as the “maturing” of the data. Claims costs for severe injuries, however, tend to trend upward over time. Thus, our database, even with some expected changes over time, had an adequate degree of reliability for the purposes of our study.

In acknowledging these and certain other limitations, our actuarially reviewed study presents findings that are counter to “frequency breeds severity”.

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