

Risk, Reward and Analysis of Workers' Compensation Data in a Technical College System: A Pilot Study

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Abstract: Occupational injuries associated with college and university employees have not been studied in detail in the past. Few studies document relevant risks (frequency and severity rates) among college and university employees, and how to persuade Management to consider a new approach to safety and safety investment utilizing risk assessments. This paper aimed to analyze Workers' Compensation (WC) data from a Technical College System to identify losses, trends, and gaps in workplace injuries, and to investigate the risk priority numbers and future loss projections to measure their effect on the perception of upper Management's willingness to invest/support safety programs. A total of 3362 WC claims were examined (2009 – 2019), and incurred a \$14.4 million loss from occupational injuries. Of these, Medical accounted for 72.5%, Indemnity accounted for 24%, and Loss of Adjustment Expense (LAE) accounted for 3.7% of total claims paid. The top accident sources by risk priority number included: fall/slip/trip (same level; ice/snow; stairs); lifting/lowering; struck by; cut puncture/scrape; strain/sprain, pushing/pulling; fall slip, caught in/between object handled. A preliminary pre- vs post-survey scores among upper Managements indicated Management would better support for safety outcomes by creating a mechanism for a presentation in a risk/reward format based approach to Management buy-in. This pilot study suggest that risk assessments are more than just metrics, rather risk assessments can be a comprehensive method to analyze data, present it in understandable and actionable ways, making it easier to gain support from Management team. This study findings may help to build a more effective safety management techniques associated with the risk assessment practices.

Keywords: Worker's compensation, Risk Assessment, Technical College System, Safety Management

1. Introduction and Background

One of the most effective ways to protect employees from injuries is having a robust health and safety program supported by upper Management. A unified approach is considered one of the most critical dimensions for a thriving safety climate (McGonagle et al., 2016). The National Institute of Occupational Safety and Health (NIOSH) investigated successful safety programs in the 1970s. One of the common characteristics of success was Management's commitment to safety. Businesses with positive safety cultures had reduced injury rates and lost time (Anderson & Chun, 2017). Further, when the employee perception of Management commitment is high, the degree of safe practice by workers is positively influenced. Support by upper Management translates into the understanding that safe behaviors are valued, and unsafe behaviors will be penalized. Demonstrated safety commitment by Management is a leading indicator of safe behaviors by employees and is considered vital in protecting worker safety (McGonagle et al., 2016). Although many studies provide evidence showing upper Management support is necessary for a successful safety program, studies focused on *achieving* support are lacking. The key to collaboration is that upper Management must understand the losses in terms of dollars in order to be compelled to accept change (Bakash, 2017). This strategy is well known and is documented in several other articles reviewed. The National Safety Council estimates in 2017, the total economic cost of work injuries was \$161.5 billion (National Safety Council, 2019). Looking

at past incidents by analyzing Workers' Compensation data can provide powerful insights into implementing prevention strategies (Abdolhamidzadeh et al., 2011). Even though traditional approaches to safety often result in taking action after an employee is injured, data mining of Workers' Compensation claims can provide valuable insights into preventing incidents and injuries in the workplace (Utterback et al., 2014). Workers' Compensation claim data provides case-specific information, such as date of injury, source of injury, and employee class. Additional data, such as medical and indemnity costs, are also usually available. Using a robust dataset is useful for injury surveillance (Nestoriak & Pierce, 2009). Using past data to identify hazards and address them before an injury is a productive approach. Avoiding direct and indirect costs of worker injuries and illnesses is effective in promoting a healthy work environment (OSHA, 2016). A search for research specifically related to injuries on college or university campuses resulted in one article that dealt specifically with student-worker injuries. This study concluded injuries to students were highest during spring and summer terms, and injury rates were twice the general industry national average. The study concluded colleges and universities should create a uniform tracking mechanism in order to develop methods to prevent injuries unique to college and university populations (Thygerson & Ou, 2013). With this in mind, Workers' Compensation data from the Wisconsin Technical College System was analyzed to identify losses, trends, and gaps in workplace injuries. Systematic analysis of Workers' Compensation claims data of the Wisconsin Technical College System can provide key insights on contributing factors of occupational injuries needed for enhancing safety outcomes.

The objectives of this pilot study were to: (1) analyze a ten-year loss run of a Technical College System Worker's Compensation Data, and develop a presentation based on literature findings to best educate and persuade executive Management to value or prioritize safety; (2) identify whether the presentation of the loss-run results changes the perception of executive Management regarding the Management support for the safety programs; and (3) recognize the perceptions of how the presentation affected the Management team's perception of priority and outlook for safety plans.

2. Methods and Procedures

The Wisconsin Technical College System uses lagging metrics, provided by United Heartland, to measure safety performance and build safety programs (UHI, 2019). United Heartland Insurance Company is the sole provider for Workers' Compensation claims for the entire Wisconsin Technical College System. Quarterly, each College is provided frequency and severity data from United Heartland. Data includes frequency and severity by policy year; frequency and severity comparisons year-to-year; paid, reserves and open claims; frequency and severity comparisons between medical and Indemnity; top ten accident sources by severity; and loss ratios. Further breakdowns of accident sources are provided for slips, trips, and falls, and manual material handling (UHI, 2019). Methods consist of a thorough analysis and creation of a risk-based presentation of the ten years loss-run United Heartland Compensation data. The dataset used in this proposal does not contain any personal information or employer information. The data was analyzed utilizing a statistical analysis in Excel. Pre and post-presentation surveys were conducted with members of the District Mutual Insurance Board measuring the perception of traditional statistics versus using risk priority numbers and projection results (e.g., comparing outlier claims to high-frequency/lost-to-no cost claims). Participants in the study are executives from Wisconsin Technical Colleges. The board consists of a Chair, Treasurer, Secretary, and two other members. The president of DMI was included. The presentation was pre-recorded and delivered online, and the surveys were conducted online due to the COVID-19 Pandemic.

3. Results

From July 1, 2009, until June 30, 2019, the Wisconsin Technical College System incurred a \$14.4 million loss from occupational injuries (UHI, 2019). In addition to direct costs, there are indirect costs, such as the cost of hiring temporary or permanent replacement workers, training, reputation, equipment repair, and equipment damage not reflected direct costs. In order to create a factual presentation seeking upper Management support and collaboration, United Heartland provided ten-year loss-run data for the Wisconsin Technical College System. An analysis of this data using Microsoft Excel was completed (Table 1). A total of 3362 claims were examined. Of these, Medical accounted for 72.47%, Indemnity accounted for 24%, and Loss of Adjustment Expense (LAE) accounted for 3.70% of total claims paid. The dataset had 1788 zero-dollar claims, representing 53.18% of the claims. The largest claim in the dataset was \$1.14 million. The average paid only claim was \$8,330.

Table 1. The total amount paid over a 10 year period (2009 – 2019)

N=3362	Paid Medical	Paid Indemnity	Paid LAE	Total Paid
SubTotal	\$10,461,887	\$3,440,463	\$534,203	\$14,436,554
Percent of Total Paid	72.47%	23.83%	3.70%	100.00%
Average \$/Claim	\$3,112	\$1,023	\$159	\$4,294
Median \$/Claim	\$0	\$0	\$0	\$9
Count \$0 claim	1788	3033	2382	1629
Percent \$0 claim	53.18%	90.21%	70.85%	48.45%
Paid-Only Avg \$/claim	\$6,647	\$10,457	\$545	\$8,330
Max \$ Claim	\$760,878	\$347,909	\$28,216	\$1,137,004
Percent Max of SubTotal	7.27%	10.11%	5.28%	7.88%

A percentage of high dollar claims (outliers) were removed to reduce the impact on the entire dataset. Loss-run datasets can include some unusual data points that are not typical of the rest of the data (El-Basyouny & Sayed, 2010). Table 2 depicts the data with outliers included and excluded for comparison. A total of 76 claims (2.36% of total claims) were removed. The result is the maximum impact of subtotal reduced from 7.88% to .78%.

Table 2. Outliers removed (top chart). Outliers included (bottom chart)

N=3286	Paid Medical	Paid Indemnity	Paid LAE	Total Paid
SubTotal	\$4,806,899	\$1,116,669	\$270,841	\$6,194,409
Percent of Total Paid	33.30%	7.74%	1.88%	42.91%
Average \$/Claim	\$1,463	\$340	\$82	\$1,885
Median \$/Claim	\$0	\$0	\$0	\$8
Count \$0 claim	1788	3032	2367	1629
Percent \$0 claim	53.18%	90.18%	70.40%	48.45%
Paid-Only Avg \$/claim	\$3,054	\$3,384	\$272	\$3,574
Max \$ Claim	\$43,243	\$31,235	\$18,333	\$48,567
Percent Max of SubTotal	0.90%	2.80%	6.77%	0.78%
Percent of original paid	45.95%	32.46%	50.70%	42.91%

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After removing the outliers, the median dollar claim was \$9.00, and the average claim was \$4,294.

Trending Worker's Compensation loss-run data is vital in determining the success of initiatives in a safety program (CDC, 2015). If repeat injuries are occurring in a particular job or task, a change must be made to prevent future losses. Trending injury data is a method to track repeated injuries over a specific time frame. An analysis of injury data can examine patterns, rate changes, and trends over time (CDC, 2015). The count of claims is trending downward from 318 in 2009 to 180 in 2018. The average cost per claim is trending downward from \$1,710 in 2009 to \$1,625 in 2018. The total paid is trending level, indicating that overall total claims paid over time is steady.

A risk analysis was completed on Class Codes (Table 3). A risk priority number (percent total count multiplied by percent total paid) was assigned to the Class Codes with the highest risk priorities. Class codes 8868 (College Professional Employees and Clerical) and 9101 (College All Other Employees), accounted for 83.33% of injury frequencies and 42.70% of

the total amount of benefits paid. The Wisconsin Compensation Rating Bureau issues the Class Codes (Wisconsin Compensation Rating Bureau, 2020).

Table 3. Risk priorities numbers by classification code

Class Code	Count	% Count	Paid Medical	Paid	Paid LAE	Total paid	%totalPaid	Avg Paid	RPN	Priorities
5403	1	0.03%	\$216	\$0	\$8	\$224	0.002%	\$224	0.00000%	
7380	5	0.15%	\$3,488	\$0	\$25	\$3,513	0.024%	\$703	0.00004%	
7422	1	0.03%	\$1,715	\$0	\$0	\$1,715	0.012%	\$1,715	0.00000%	
7610	7	0.21%	\$16,904	\$0	\$18	\$16,921	0.117%	\$2,417	0.00024%	
8868	1487	44.23%	\$2,590,969	\$612,079	\$157,044	\$3,360,092	23.275%	\$2,260	10.29440%	1
8869	10	0.30%	\$6,113	\$0	\$32	\$6,145	0.043%	\$614	0.00013%	
9101	1281	38.10%	\$2,186,684	\$504,590	\$113,715	\$2,804,989	19.430%	\$2,190	7.40319%	2
9447	11	0.33%	\$811	\$0	\$0	\$811	0.006%	\$74	0.00002%	
9999	483	14.37%	\$0	\$0	\$0	\$0	0.000%	\$0	0.00000%	
Totals	3286	97.74%	\$4,806,899	\$1,116,669	\$270,841	\$6,194,409	42.908%			

A risk priority analysis (percent count multiplied by percent total paid) was conducted on accident sources. The top ten accident sources by risk priority number are: fall, slip, or trip, same level; fall, slip, or trip injury ice or snow; lifting and lowering; struck or injured; miscellaneous; cut puncture, scrape, injured; strain or injury pushing or pulling; fall, slip, or trip on stairs; strain or injury by reaching; and caught in, under, or in-between object handled (Table 4).

Table 4. Risk priority numbers by accident source

	Count	%count	Paid Medical	Paid Indemnity	Paid LAE	Total paid	%Totalpaid	Avg/Claim	RPN	Priorities
Fall, slip, or trip injury on same level	572	17.01%	\$1,021,201	\$212,099	\$51,713	\$1,285,013	8.90%	\$2,247	1.51441%	1
Fall, slip, or trip injury on ice or snow	401	11.93%	\$771,217	\$123,976	\$22,886	\$918,079	6.36%	\$2,289	0.75851%	2
Lifting and Lowering	235	6.99%	\$518,833	\$153,238	\$42,219	\$714,291	4.95%	\$3,040	0.34585%	3
Struck or injured, miscellaneous	341	10.14%	\$307,710	\$49,909	\$37,201	\$394,820	2.73%	\$1,158	0.27739%	4
Miscellaneous - other	236	7.02%	\$237,962	\$83,598	\$27,393	\$348,954	2.42%	\$1,479	0.16968%	5
Cut, puncture, scrape, injured by miscellaneous	243	7.23%	\$162,906	\$16,414	\$615	\$179,934	1.25%	\$740	0.09009%	6
Strain or injury by pushing or pulling	105	3.12%	\$240,950	\$99,797	\$23,886	\$364,632	2.53%	\$3,473	0.07888%	7
Fall, slip, or trip injury on stairs	117	3.48%	\$214,483	\$58,725	\$11,272	\$284,480	1.97%	\$2,431	0.06858%	8
Strain or injury by reaching	100	2.97%	\$221,587	\$103,389	\$6,385	\$331,360	2.30%	\$3,314	0.06827%	9
Caught in, under, or between object handled	110	3.27%	\$143,895	\$52,933	\$5,168	\$201,997	1.40%	\$1,836	0.04578%	10

The results table (Table 5) are sorted by risk priority number (percent count multiplied by percent total paid). The table contains the average claims counts, range of average paid claims, median paid per claim, and total benefits paid over a ten-year loss run. The chart predicts future loss projections based on historical data. Policy Class Codes 8868 (College Professional Employees and Clerical) and 9101 (College All Other Employees) ranked in the top five priorities for injury frequency and severity. The combination of injuries in these two Policy Class Codes is predicted to result in a total of 150 claims in 2020 with average paid claims between \$500 and \$3,900. A total predicted loss of \$386,000 is expected in 2020.

Table 5. Risk assessment with priority numbers and future projections

Priority	Policy Class	Cause code	Range, # Claims	Est 2020 # Claims	Range, Average Paid per Claim	Est 2020 Avg Paid per Claim	Median Paid Per Claim	Range, Total Claims Paid	Est 2020 Total Claims Paid
1	8868	Slip,Trip,Fall	70-70	70	\$1,800-\$2,723	\$1,800	\$212	\$165,000-\$190,580	\$165,000
2	8868	Overexertion	14-20	14	\$3,939-\$7,000	\$3,939	\$388	\$78,789-\$120,000	\$79,000
3	8868	Struck-by	14-18	14	\$1,000-\$2,070	\$1,000	\$266	\$28,000-\$28,978	\$28,000
4	9101	Slip,Trip,Fall	36-36	36	\$2,945-\$3,200	\$2,945	\$7.50	\$106,036-\$135,000	\$106,000
5	9101	Overexertion	16-31	16	\$500-\$3,240	\$500	\$422	\$0-\$100,444	\$8,000
6	9999	All	30-53	30	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Total/Average				180		\$1,697	\$216		\$386,000

Pre and post presentation statistical survey results are shown in Figure 1. The survey consisted of ten Statements on a 5-point Likert Scale ranging from 1 (strongly disagree) to 5 (strongly agree).

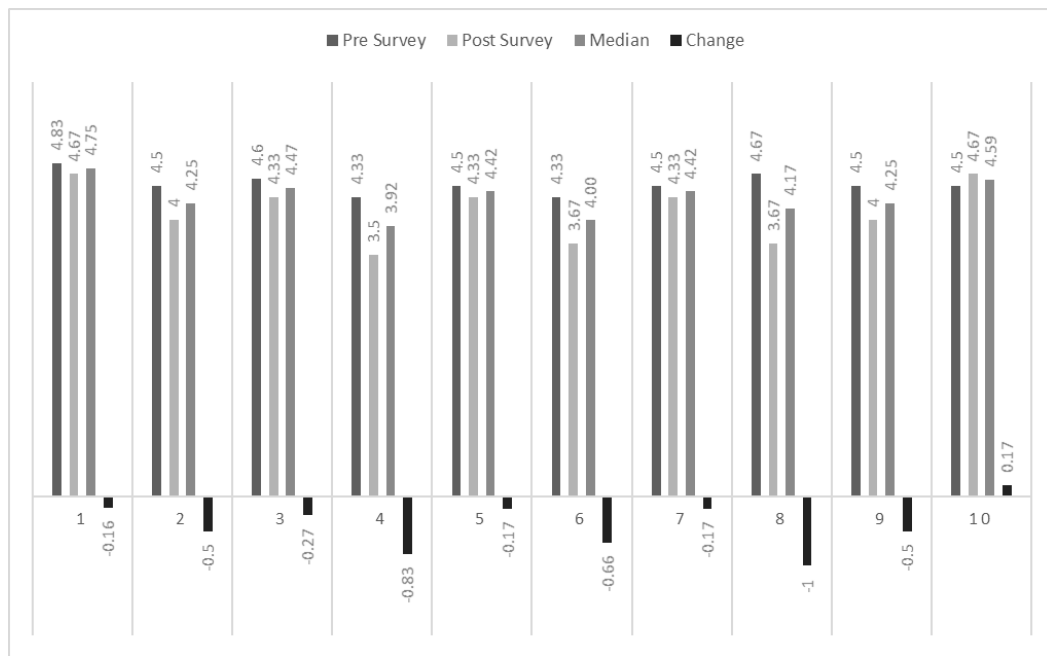


Figure 1. Pre and post Survey Results

The mean of the pre-survey was 4.53 and the mean of the post survey was 4.12. The difference in mean between the two surveys is -0.41 . The only positive change was to Statement ten. The mean changed from 4.5 to 4.67 post presentation (Figure 1). Statement 5 received a favorable trend by losing a pre-survey neutral score. The Pearson Correlation is 0.56; however, it is non-significant as only three board members participated in the final survey. Nonetheless, the surveys allowed for comments and feedback. Two comments were made. The first comment stated that education and encouraging employees to treat the workplace as if it were their own home are important factors. The second comment stated that “if the culture of ‘if you see something, say something’ results in prompt response to remove/eliminate a safety risk goes a long way in obtaining employee buy-in of safety programs.”

4. Discussion and Limitations

This pilot study accomplished the objectives: an analysis of ten-year loss-run data and the creation of a risk-based workbook; a presentation to executive Management; and pre and post-surveys. The analysis indicated that overall, the frequency of injuries occurring in the Wisconsin Technical College System are decreasing; however, the total dollar amount paid remains steady, indicating injury severity is very much a concern. As shown in Table 5, the risk priorities for the System has been documented. If the trend stays on course, the Wisconsin Technical College System can conservatively expect 150 claims on the top 5 risk priorities and to pay Worker's Compensation benefits of \$386,000 in 2020. According to a study conducted by EDUCAUSE and the Association of Institutional Research, 80% of higher education leadership consider analytics a priority for success (Bichsel, 2012). This is reflected in the pre and post-survey results. The pre-survey results mean averaged 4.51 out of 5 (1 strongly disagree to 5 strongly agree) on all survey questions. Statements 2 and 10 were directed at risk assessments. Statement 2 had a mean response of 4.5, and Statement 10 had a mean response of 4.5. Pre-survey results indicate very strong support for risk assessments and validation of the supporting research. This is not all that surprising, as insurance companies evaluate risks, and client risk reduction is in their best interest. The post-survey, while incomplete due to COVID-19 complications, also indicated strong support for risk assessments. The presentation focused on the benefits of risk assessments and, therefore, survey questions not directly related to risk assessments might have received lower rankings. Statements where there was a lost neutral score could be because there was a positive change or because the neutral participant didn't participate in the post-survey. However, this preliminary study indicated that risk assessments are more than just metrics. Risk assessments are methods to analyze data, present it in understandable, actionable ways, making it easier to gain support from Management.

The lessons learned from this research study can be carried forward into future research. For example, the recommendation of selecting participants that directly supervise safety professionals, as well as utilizing a survey tool that can anonymously measure pre and post attitudes toward survey questions, will improve the quality of the results. In addition, expanding the risk assessment tool to include the analysis of injuries by the month of the year, day of the week, and time of day may provide useful data. This will further refine results making assessments more granular and useful. Additional features will provide more benefits to safety professionals and possibly more buy-in with supervisors. The timing of surveys should be re-evaluated to determine advantages and disadvantages relative to the presentation. It is difficult to make reliable conclusions because of non-significant data results. Because survey responses are not identifiable, participants may not have changed their attitudes toward survey questions.

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