MARSH RISK CONSULTING

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RISK MANAGEMENT AND OCCUPATIONAL SAFETY & HEALTH PROGRAMS TO REDUCE INJURY AND ILLNESS INCIDENCE RATES

COMMONWEALTH OF VIRGINIA,
DEPARTMENT OF HUMAN RESOURCE MANAGEMENT
OCTOBER 01, 2014

CONTENTS

1

Introduction

Marsh Risk Consulting conducted a study of occupational safety and health practices maintained by the Commonwealth of Virginia agencies. The study was promulgated by language included in Item 81, F.2 of Chapter 2, 2014 Special Session 1, which requires the Department of Human Resource Management to conduct a study with results due no later than October 1, 2014.

> *"The Department of Human Resource Management shall conduct a study, with the cooperation of all executive, legislative, judicial, and independent agencies, to include, but not be limited to, the impact of settling appropriate claims, the potential need for a risk management position in the Department of Human Resource Management to further assist state agencies not staffed with a risk management position, and the need for a risk management position for state agencies with a high incidence of claims who are not staffed with a risk management position. The department shall report its findings and cost savings recommendations for the state employee's workers' compensation program to the Governor and Chairmen of the House Appropriations and Senate Finance Committees no later than October 1, 2014."*

Richard A. Vohden, National Education, Public Entity Practice Leader and Senior Risk Consultant at Marsh Risk Consulting conducted this study on behalf of the Department of Human Resource Management, and the Commonwealth.

The study included a survey of basic occupational injury and illness prevention efforts all agencies should maintain in accordance with the Executive Order No. 109 (10), WORKPLACE SAFETY AND EMPLOYEE HEALTH.

Agency occupational injury and illness experience was evaluated. Agency injury frequency rates were calculated and those with high rates were identified. The Workers' Compensation Experience Modification Ratings for each agency were compared and those with rates deemed excessive and representative of ineffective safety and health programs were identified.

Combined, the comparison of occupational injury rates, Experience Modification Ratings and survey feedback, agencies that may benefit from staffing a dedicated safety / risk management officer were identified.

2

Agency Workers' Compensation Injury Experience

For fiscal years 2010 through 2012 the Commonwealth of Virginia incurred a combined $268,869,511 in workers' compensation losses attributable to employee occupational injuries and illnesses. Based on the number and value of those workers' compensation claims, the Experience Modification Rating (EMR) has been calculated to be 1.28. [1] The EMR is the best indicator of both past and future injury prevention and injury management experience.

Experience Modification Rate (EMR) has strong impact upon an organization in the private sector. It is a number used by insurance industry to gauge both the past cost of injuries and future chances of risk. The lower the EMR of the Commonwealth, the lower the cost allocation for worker compensation insurance coverage will be. An EMR of 1.0 is considered the industry average. Calculated at 1.28 for the Commonwealth, the value suggests occupational injury rates and the resulting loss cost of medical and disability benefits afforded under the coverage is 28% higher than the average for commercially insured Virginia employers with a job hazard profile similar to the Commonwealth's state agencies.

If an organization has an EMR greater than 1.0, the reasons are simple to understand. The number and value of workers' compensation claims that have occurred are in excess of the expected loss rates in comparison to the organization's peer group. In the business world, the insurance company would perceive the organization to be higher risk and would increase the workers' compensation premium it would deem necessary to fund the expected losses; an unacceptable situation for any business leader.

Oliver Wyman conducted the June 2013 actuarial study for the Commonwealth and included calculations of the Experience Modification Rates for the various agencies. (See Appendix, Figure 7-1).

In the private sector, Experience Modification Rates in excess of 1.20 are deemed excessive and may result in restrictive underwriting. In construction, a contractor with an EMR of 1.20 or greater will find it difficult to obtain contracts on projects managed by the top echelon of construction managers.

The vast majority of Commonwealth agencies maintain favorable EMR's. The summary of Agency EMR's on the following page offer indication that occupational safety and injury prevention initiatives should be reviewed including:

- Occupational safety policy
- Organization structure

[1] June 2013 Oliver Wyman Actuarial Study of 2010-2012 workers compensation claim experience

- Allocation of resources dedicated to preventing injuries and illnesses
- Assessment of job hazards
- Identification and communication of safe work practices and procedures
- Work observations for hazards and hazardous work activities
- Corrective action for risk factors contributing to past incidents

Agency Code	Agency Name	Experience Modification Factor
156	Department of State Police	2.34
777	Department of Juvenile Justice	2.17
702	Department for the Blind and Vision Impaired	1.97
912	Department of Veterans' Services	1.80
182	Virginia Employment Commission	1.78
121	Office of the Governor	1.76
720	Dept. of Behavioral Health and Developmental Services	1.69
209	University of Virginia Medical Center	1.52
402	Marine Resources Commission	1.45
301	Dept. of Agriculture & Consumer Services	1.44
213	Norfolk State University	1.44
942	Virginia Museum of Natural History	1.43
158	Virginia Retirement System	1.42
403	Department of Game and Inland Fisheries	1.38
103	Magistrate System	1.37
191	Virginia Workers' Compensation Commission	1.35
750	Department of Correctional Education	1.35
799	Department of Corrections	1.35
146	Science Museum of Virginia	1.34
425	Jamestown-Yorktown Foundation	1.33
100	Senate of Virginia	1.31
960	Department of Fire Programs	1.30
199	Department of Conservation and Recreation	1.30
123	Department of Military Affairs	1.29
262	Department of Aging and Rehabilitative Services	1.29
218	Virginia School for the Deaf & the Blind	1.29
140	Department of Criminal Justice Services	1.28
152	Department of the Treasury	1.28
208	Virginia Polytechnic Institute & State University	1.22

One of the primary influences on the EMR value is the number of workers' compensation claims sustained with incurred costs compared to the expectation for the industry. High injury frequency with associated costs will produce a higher EMR. The following summarizes the combined frequency rates for workers' compensation claims reported over the past two fiscal years, 2012-2014. The injury rates for all agencies are provided in Appendix Figure 7-2.

Agency Number	Agency Name	Total No. Salaried & Wage Employees	Workers' Compensation Claim Count		Total No. Of Claims 2012/ 2014	Combined 2 Year Injury Rate Per 100 EE's
			2012/ 2013	2013/ 2014		
411	Dept. of Forestry	244	106	131	237	48.63
912	Dept. of Veterans Services	369	152	173	325	44.04
156	Dept. of State Police	2,773	910	916	1,826	32.92
720	Dept. Behav Health & Develop Svcs	9,056	2,152	2,196	4,348	24.01
777	Dept. of Juvenile Justice	1,797	432	309	741	20.61
218	Va School for Deaf/Blind	164	39	23	62	18.91
263	Va Rehabilitation Center for the Blind	30	3	8	11	18.22
330	Virginia-Israel Advisory Board	2		1	1	31.06
425	Jamestown-Yorktown Foundation	220	35	40	75	17.06
111	Supreme Court	194	29	25	54	13.90
100	Senate of Virginia	42	2	9	11	13.01
239	Frontier Culture Museum of Va	53	7	6	13	12.36
209	UVA Medical Center	5,944	718	719	1,437	12.09
123	Dept. of Military Affairs	336	35	41	76	11.32
199	Dept. Conservation & Recreation	1,094	119	118	237	10.83
961	Division of Capitol Police	95	7	13	20	10.53
268	Va Institute of Marine Science	348	45	25	70	10.05
405	Virginia Racing Commission	5		1	1	10.00
403	Dept Game and Inland Fisheries	467	40	37	77	8.24
402	Marine Resources Commission	146	10	14	24	8.20
942	Va Museum of Natural History	43	3	4	7	8.20
208	VPI & State University	8,496	677	655	1,332	7.84
211	Virginia Military Institute	559	41	46	87	7.78
702	Dept. for the Blind & Vision Impair	288	23	21	44	7.64
701	Dept. of Corrections	12,520	888	907	1,795	7.17
146	The Science Museum of Virginia	88	7	5	12	6.80

For the purpose of this analysis the formula for calculating the Occupational Injury Frequency Rate is:

$$\text{Occupational Injury Frequency Rate} = \frac{\text{(No. of Claims Reported 2013+2014) x 100 Employees}}{\text{(No. of Employees 2013 + 2014)}}$$

Assessing Safety Performance

In assessing overall safety performance of an Agency or department within an Agency, consider the types of incidents that have contributed to the portfolio of injuries. For most state agencies slips, trips and falls and manual materials handling will dominate the injury experience.

Most agencies retain unique risk factors inherent in the nature of activities of the organizational functions. State colleges and universities, hospital systems and social service agencies retain unique risk profiles that vary significantly from all other agencies. Those risk factors must be addressed in the overall scheme to minimize occupational injuries and typically specialists with expertise in areas such as biological, chemical and radiological safety are required. The knowledge, experience and skills to effectively address the respective risk factors for agencies retaining unique operations often require the allocation of a staff safety and health professional.

Occupational Safety and Health Survey of Agency Initiatives

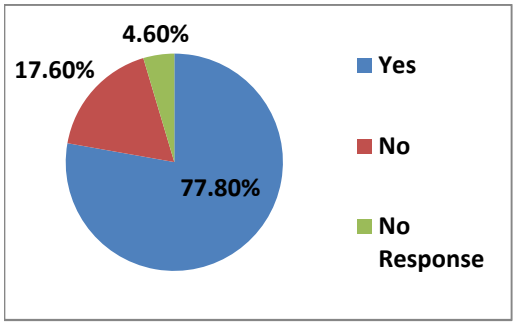
Marsh Risk Consulting conducted a survey on agency occupational safety and health initiatives. One hundred and eight agencies responded to all or most of the survey questions. The intent of the survey was to gauge the depth of effort to prevent employee injuries and illnesses and control hazards in the workplace.

Question 1: Has your agency published a statement on safety administration and expectations of employees, supervisors, managers and other administrators?

Describing how the agency leaders will manage health and safety in the Agency will let staff and others know about your commitment to health and safety. An occupational health and safety policy is the employer's written commitment to workplace health and safety. In addition to clearly stating the health and safety goals of the organization, the policy outlines roles and responsibilities as they relate to health and safety. Employers are responsible for their workers and have a legal and moral obligation to provide for their safety and well-being. Having an OH&S policy in place helps leadership meet this responsibility. It also helps them to effectively communicate their commitment to health and safety to workers and the public.

Number of responses: 103
Number of respondents: 108

Yes	84	77.8%
No	19	17.6%
Not answered	5	4.6%



- 22.2% of the responding agencies either have not published a statement on personnel safety or are unaware if one exists.

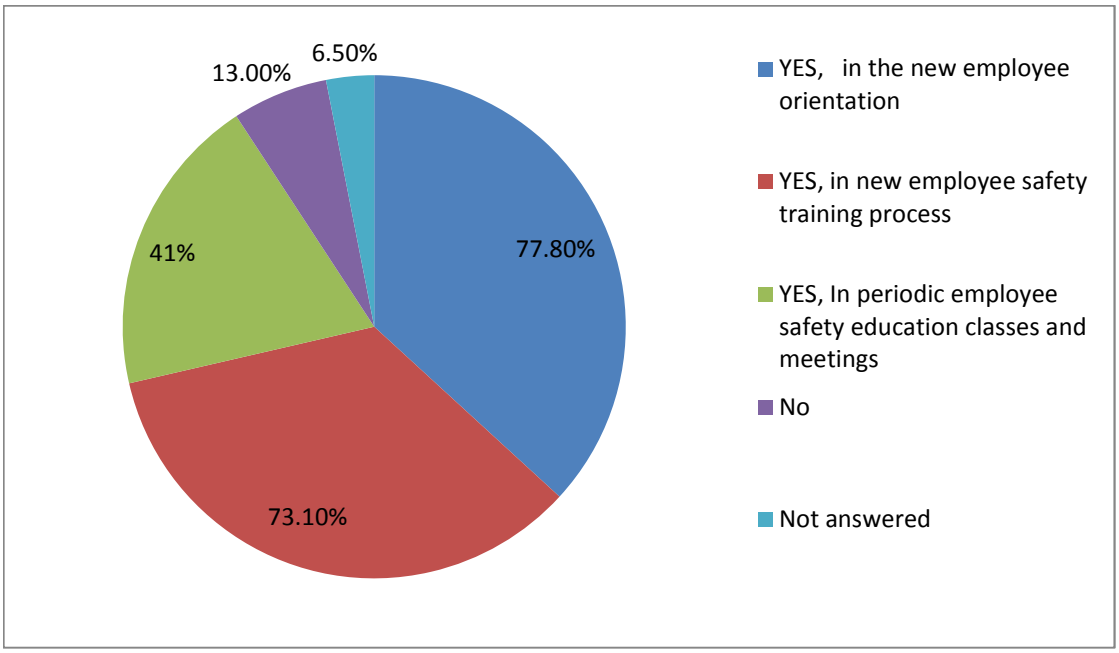
Preparing and implementing a Safety statement and keeping it up to date is the most important step in managing health and safety within an organization. This will not in itself prevent accidents and ill health at the workplace, but by making a commitment to promoting safety and health and specifying the health and safety measures and resources being provided, the Safety Statement plays a vital part in the implementation of health and safety policies.

Question 2: Does your agency communicate that message to new employees and periodically to existing employees?

Orienting employees to their workplaces and their jobs is one of the most neglected functions in many organizations. Developing an effective employee orientation experience continues to be crucial. It is critical that new hire programs are carefully planned to educate the employee about the history, values, and who is who in the organization including occupational safety values and leadership.

Number of responses: 103
Number of respondents: 108

YES, in the new employee orientation	84	77.8%
YES, in new employee safety training process	79	73.1%
YES, In periodic employee safety education classes and meetings	45	41%
No	14	13.0%
Not answered	7	6.5%



- 19.5% of agencies do not maintain a process, formal or informal, to provide occupational safety information and education to the staff.

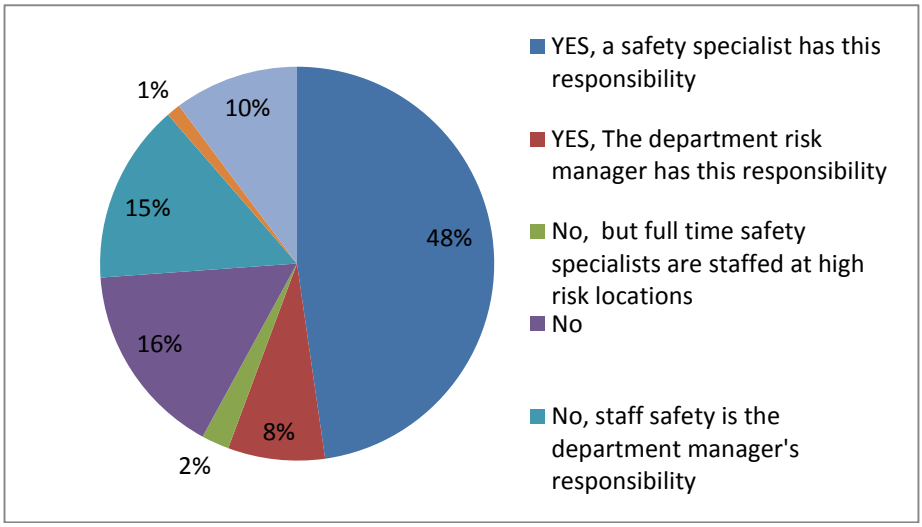
Organizations that have good safety orientation programs get new people up to speed faster, have better alignment between what the employees do and what the organization needs them to do, and have lower injury frequency rates.

Question 3: Does your agency staff a full time employee dedicated to employee injury prevention?

A safety officer works focuses on assisting leadership and supervisors to prevent employee accidents. He or she may also be called a risk manager. The workplace or job site must be assessed for health and safety risks before preventive or corrective measures can be implemented. A safety manager determines the risk that working in a specific environment poses, then implements protection policies and procedures for workers.

Number of responses: 104
Number of respondents: 108

YES, a safety specialist has this responsibility	42	38.9%
YES, The department risk manager has this responsibility	7	6.5%
No, but full time safety specialists are staffed at high risk locations	2	1.9%
No	14	13.0%
No, staff safety is the department manager's responsibility	13	12.0%
NO, but we had safety specialist on staff until _____ (year)	1	0.9%
Not answered	9	8.3%



- 47% of Commonwealth agencies do not have an individual assigned to focus on occupational safety issues.

Safety officers provide managers, supervisors and employees the information and knowledge necessary to avoid hazards and prevent injuries. The value of employing a full time safety officer is not an easy

calculation; however, a well-run/managed safety program is thought to return between 300% and 500% of the amount invested.[2] The savings result from saving:

- The value of wages and personal benefits, paid with no productivity in return;
- The need to replace the injured worker to accomplish the task to be completed, either through regular or overtime;
- The non-productivity of co-workers tending to the injured worker or otherwise distracted from their work;
- The cost of administering the injury including transporting the injured worker to medical care, investigation time, workers' compensation claim administration, and over time.

The Department of Human Resource Management employed a Loss Control Manager at one time providing support to the agencies. That position has not been refilled since the employee was promoted to another position. Re-establishing that position will enhance the ability of the department to assist agencies to identify hazards and develop solutions; however, it will not displace the value of an agency dedicated position.

Dedicating a safety position will ultimately improve the reduction in the number of employee injuries through enhanced:

- Communications to the safety committee and upper management about the effectiveness of the organization's effort;
- Hazard identification and control, and compliance with Virginia Occupational Safety and Health (VOSH) standards;
- Improved quality in safety training;
- Complete and accurate Job Hazard Analysis for each position;
- Improved targeting of factors that contribute to the injury trends; and,
- Improved accident investigations.

[2] American Society of Safety Engineers study of return on investment, 2005

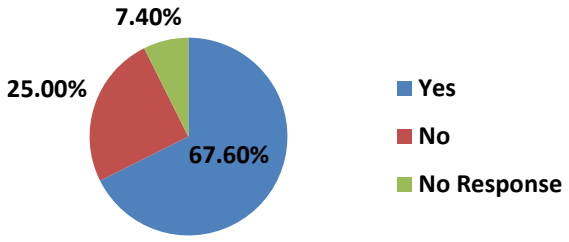
Question 4: *Do the Employee Work Profiles for your agency supervisors, managers and other administrators identify their responsibilities for agency safety performance?*

Upper level management has the overall responsibility for providing a safe work environment for employees. However, since management cannot carry out all aspects of the loss control program, partial responsibility has to be delegated to others.

All employees will have some responsibility for carrying out parts of the overall safety program. An effective safety initiative involves safety functions at all levels of management and the labor force.

Number of responses: 102
Number of respondents: 108

Yes	73	67.6%
No	27	25.0%
Not answered	8	7.4%



Executive Order No. 109 (10) requires every Executive Branch agency to:
"Ensure that job expectations are clearly defined in the employee work profile to include physical requirements."

and to,

"Include in managers' performance expectations, when appropriate, goals to encourage a safer work environment and reduction in work-related and non-work related employee lost time. "

- 35 agencies, 32.4%, have not communicated the position safety responsibilities to employees. Without definition, safety performance cannot be measured and there is no mechanism of accountability for non-performance.

Management retains the responsibility to motivate employees to get the program initiated and to oversee its operation. This can be accomplished by setting objectives and policies. The objectives will determine what action the management will take to assign responsibility. Policies establish exactly who will be assigned those responsibilities and what authority level accompanies their assignment.

Question 5: Does your agency sponsor a monthly or quarterly Safety Committee Meeting?

Whether the agency staffs a dedicated safety officer or not, it should maintain a safety committee to address the hazards confronting its employees and to adopt the necessary actions to minimize workers' compensation claims.

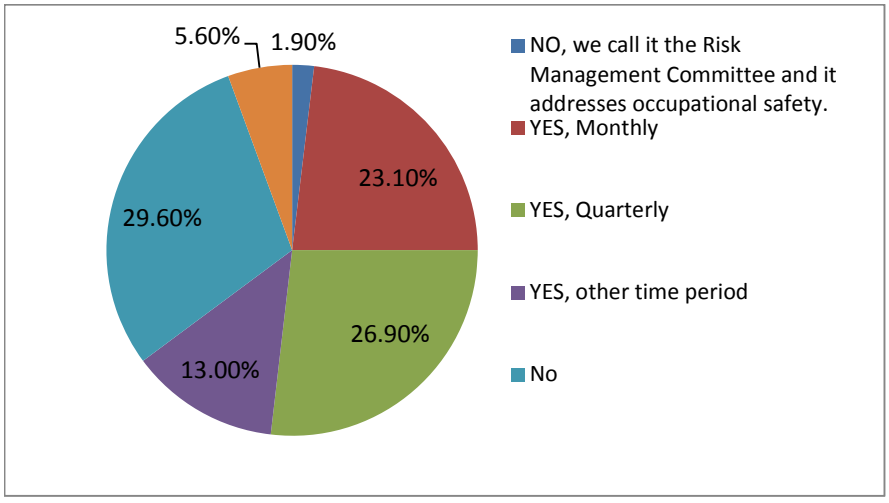
Safety Committees spirit safety communications vertically throughout the organization. They can be effective in helping prevent unsafe practices and conditions, reducing the risk of injury and illnesses, and motivating employees and supervisors to become actively involved in the company's injury and illness prevention program. Whether an organization employs a safety officer or not, it should maintain a safety committee regardless of size or nature of operations.

A safety committee is one mechanism for demonstrating management commitment to workplace safety and health. An effective committee establishes:

- Procedures for review and management's response to minutes;
- Written recommendations for safety/health improvement/changes and response;
- An evaluation of the organization's safety/health policies and procedures;
- Response in writing to safety committee recommendations; and,
- Assurance that corrective action taken by management is implemented.

Number of respondents: 108
Number of responses: 102

NO, we call it the Risk Management Committee and it addresses occupational safety.	2	1.9%
YES, Monthly	25	23.1%
YES, Quarterly	29	26.9%
YES, other time period	14	13.0%
No	32	29.6%
Not answered	6	5.6%



- 32.4% of the agencies do not maintain a safety committee.
- 35.2% of the agencies do not maintain an occupational safety committee.

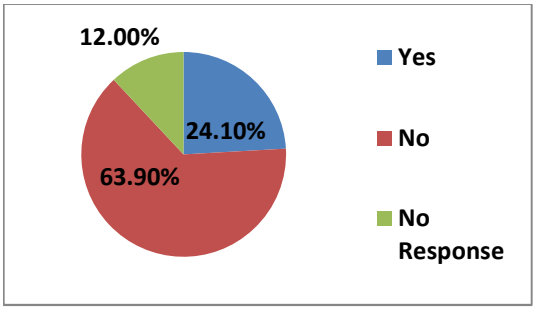
Most public sector worksites have at least one manager responsible for health and safety activities. Yet an effective health and safety program takes the commitment and energy of *many* individuals and that is why a joint committee structure facilitates the work of individuals. Those assigned to health and safety matters, part or full-time, should be members of the joint committee.

Question 6: Has your agency published a Job Safety Analysis for each position?

A job safety analysis (JSA) is a procedure which helps integrate accepted safety and health principles and practices into a particular task or job operation. In a JSA, each basic step of the job is to identify potential hazards and to recommend the safest way to do the job. Other terms used to describe this procedure are job hazard analysis (JHA) and job hazard breakdown.

Number of responses: 95
Number of respondents: 108

Yes	26	24.1%
No	69	63.9%
Not answered	13	12.0%



- 82% of Commonwealth agencies have not documented the occupational hazards of their staff positions.

JSA is a useful technique for identifying hazards so that workers can take measures to eliminate or control hazards. From that hazard inventory, the organization is well prepared to identify the safety training needs for each position, including training required by VOSH regulations. Once the analysis is completed, the results must be communicated to all workers who are, or will be, performing that job.

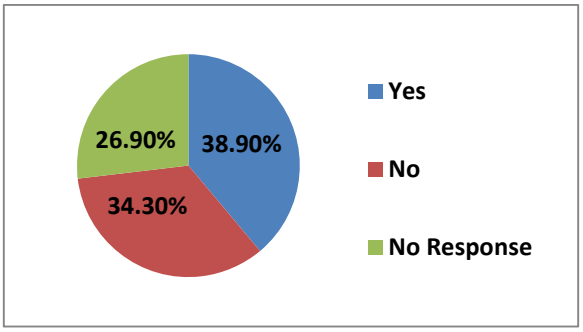
Without a planned effort of hazard identification, the organization cannot fully understand its risk of occupational injury, nor can it implement the necessary controls to minimize those risks.

Question 7: Does your agency's employee safety training plan follow the needs identified in the Job Safety Analysis?

It cannot be assumed that an employee will recognize the predominance of hazards that are inherent in the work and activities they will be asked to perform. Like all other training plans within an organization, the methods for performing the requirements of the position and the expected actions necessary to avoid injury need to be communicated.

Number of responses: 79
Number of respondents: 108

Yes	42	38.9%
No	37	34.3%
Not answered	29	26.9%



- 61.2% of agencies do not provide safety and health training reflective of the hazards of the work to be performed.

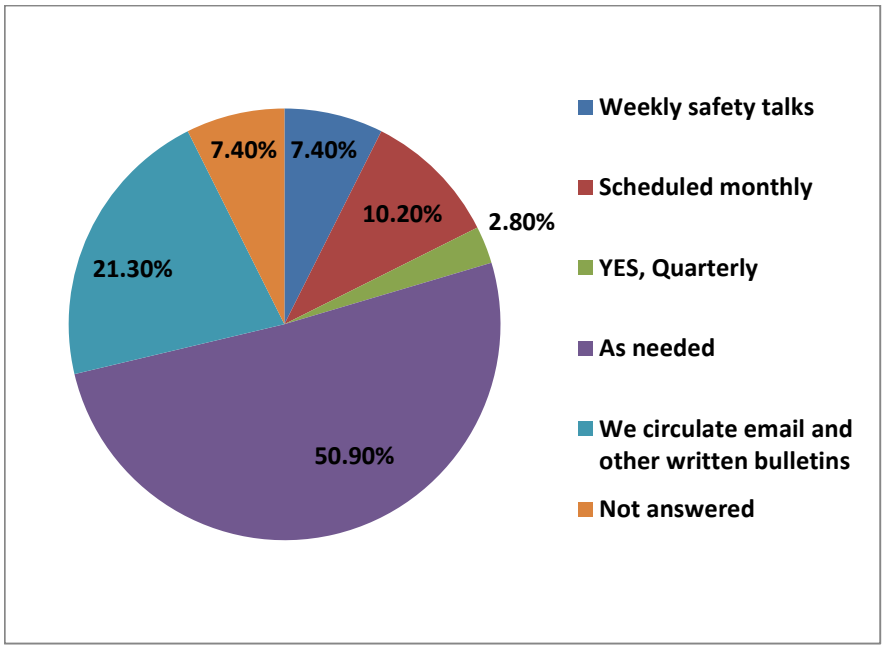
Virginia Occupational Safety and Health requires an employer to educate workers about the hazards of their specific position; job safety analysis, and to provide the necessary education about how they can protect themselves from injury. If the appropriate safety education is not communicated, a critical opportunity to prevent injury occurrences is lost.

Question 8: *How often are agency employee safety education sessions offered?*

To maintain employee awareness about job hazards and motivation to avoid those hazards, safety information must be communicated upon initial hire through a new employee orientation, and on the job through coaching by experienced supervisors and co-workers.

Number of responses: 100
Number of respondents: 108

Weekly safety talks	8	7.4%
Scheduled monthly	11	10.2%
YES, Quarterly	3	2.8%
As needed	55	50.9%
We circulate email and other written bulletins	23	21.3%
Not answered	8	7.4%



- Only 20.4% of the responding agencies maintain a formal plan of providing safety education to workers.

Safety education is one of the primary responsibilities of a staff safety officer. While managers and supervisors are ultimately responsible for delivering on the job safety education, a safety officer adds value from experience and knowledge to that process. A safety officer can assist the agency department in developing training plans for managers and supervisors, increasing the accuracy and value of the information delivered by managers and supervisors. A safety officer can also assure the appropriate safety education required by regulation is delivered when due.

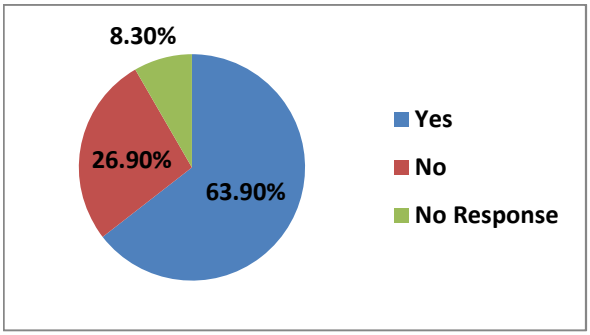
Question 9: Has your agency published a procedure for investigating accidents as a means of preventing future incidents?

Accident investigations are the key means of:

- Identifying previously unknown work hazards;
- Gauging the effectiveness of employee safety education;
- Adopting revised or new work practices required to prevent future recurrences; and,
- Taking disciplinary action for safety rule violations.

Number of responses: 98
Number of respondents: 108

Yes	69	63.9%
No	29	26.9%
Not answered	10	8.3%



Executive Order No. 109 (10) requires every Executive Branch agency to:

"Evaluate the work-related injuries and illnesses that occurred in FY 2010 and each subsequent fiscal year in order to reestablish goals and strategies to reduce them, to enhance workplace safety, and for transitional duty; "

- 36.1% of agencies do not investigate employee injuries.

A productive accident investigation approach focuses on identifying flaws in the safety process leading up to the incident and the safety procedures that were supposed to prevent it from happening. The ultimate goal is not only to ensure that the accident isn't repeated; it is to use what is learned to head off other types of accidents. Another purpose is to prepare for the possibility of litigation, especially in incidents that result in severe injuries or fatalities.

It's important to properly investigate all incidents; even those that may be appear to be inconsequential, for two reasons. First, the lessons learned in investigating even small incidents can be valuable in preventing larger incidents in the future. Second, investigating all incidents sends a message to employees and regulatory agencies such as VOSH, and the general public, that the agency takes its commitment to safety seriously and pursues it consistently.

Department of Human Resource Management Occupational Safety and Illness Prevention Services

Kristie McClaren, State Employee Workers' Compensation Services Director, Department of Human Resource Management directs the safety services offered by LC Innovations to support Commonwealth and agency injury prevention initiatives which include:

- Snapshot Surveys
- Claims Trend Analysis
- Safety / Loss Control Consulting
- Scheduled Loss Control Training
- Safety Training by Request

Snapshot Surveys include a review of workers' compensation loss control programs and activity at an agency facility that offer recommendations for improvement. The emphasis is on compliance with Virginia Occupational Safety and Health regulations as well as implementation of "best practices" including self-inspection routines, safety committees, employee safety training, return-to-work plans, injury investigations and injury trend analysis and vehicle fleet safety. These are valuable services that can effectively support agency safety and health initiatives.

The Department of Human Resource Management maintains an inventory of resources available to agencies that will complement their safety and loss control initiatives. The department once staffed a Loss Control Manager to support agency leaders and their safety and health mission. That position has been vacant for a number of years and warrants consideration for re-staffing in light of the excessive cost of workers' compensation. The primary responsibilities for the position would be to:

- Assist agencies to establish and administer the safety and loss control program, thereby fulfilling Executive Order 109 (10) obligations.
- Assist agencies to establish safety committees.
- Prepare reports that complement agency efforts to identify the trends, problem areas and compliance within high risk agencies.
- Assist agency review of accident investigations and injury trends.
- Work in cooperation with DHRM workers' compensation claims administrators and agency safety and risk management representatives in the investigation of claims, analysis of potential hazards and development of methods to reduce losses.
- Ensure agencies maintain proper job and safety training for all employees.
- Prepare safety letters and safety bulletins on safety problems.
- Direct LC Innovation services including audits of defined loss prevention programs, physical inspections of work areas, shops and buildings for any unsafe acts or hazards as a means of gauging agency performance.

3

Occupational Safety and Health Programming

Building Will and Leadership Involvement

For a safety program to be successful, senior leadership support and active participation are deemed essential. Providing a culture that safe work practices are expected and ensuring leadership involvement are increasingly recognized as essential aspects of improving service quality and occupational safety.[3] They have long been identified as key factors in establishing high reliability workplaces that strive to eliminate mistakes and prevent worker accidents.[4] [5]

Government services are considered to be high hazard risk industry due the diverse range of services provided and associated occupational hazards.

Examples of potential hazards for state government workers include exposures to:

- Automobile accidents;
- Infectious disease;
- Chemical, and physical (nuclear, electromagnetic energy, noise) agents;
- heavy lifting and repetitive tasks;
- Slips, trips, and falls;
- Stress;
- Workplace violence; and risks associated with suboptimal organization of work
    - Infections such as hepatitis, cancer and poor reproductive outcomes,
    - Hearing loss,
    - Musculoskeletal injuries,
    - cardiovascular disease,
    - Acute traumatic injury, and
    - Death.

[3] Pronovost PJ, Goeschel CA, Marsteller JA, Sexton JB, Pham JC, Berenholtz SM. Framework for patient safety research and improvement. Circulation. 2009 Jan 20;119(2):330–337. Review.PubMed PMID: 19153284.

[4] Leape L, Berwick D, Clancy C, Conway J, Gluck P, Guest J, et al; Lucian Leape Institute at the National Patient Safety Foundation. Transforming health care: a safety imperative. Qual Saf Health Care. 2009 Dec;18(6):424–428. PubMed PMID: 19955451.

[5] Hines S, Luna K, Lofthus J, et al. Becoming a High Reliability Organization: Operational Advice for Hospital Leaders. Rockville (MD): AHRQ Publication [Internet]. 2008 Apr; No. 08-0022. Contract No.: 290-04-0011. Available from: http://www.ahrq.gov /qual/hroadvice/

Accordingly, government agencies need to achieve levels of safety performance that are comparable to that found in private industry of equally high occupational injury risk.

Service Department	Hazards
Colleges and Universities	Auto accidents; consumer behavior; infectious disease, chemical, and physical (biological, radiological, electromagnetic energy, noise) agents; heavy lifting and repetitive tasks; slips, trips, and falls; stress; workplace violence; infectious disease; international research
Corrections	Auto accidents; armed and violent inmate behavior; slips trips and falls; infectious disease
Health Care	Chemical, and physical (biological, radiological, electromagnetic energy, noise) agents; heavy lifting and repetitive tasks; slips, trips, and falls; stress; workplace violence; infectious disease
Social Services	Auto accidents; consumer behavior; slips trips and falls; infectious disease
Conservation and Recreation	Auto accidents, slips, trips and falls, water activities, working alone
Museums and Public Entertainment	Slips, trips and falls, material handling, infectious disease
Public Works	Auto accidents; slips trips and falls; demanding physical tasks; hazardous chemicals, moving vehicles
State Police	Auto accidents; armed and violent individuals; slips trips and falls; physical demands making arrests; infectious, chemical, and physical (biological, radiological, electromagnetic energy, noise) agents; moving vehicles
Judicial Systems	Slips, trips and falls, consumer behavior, infectious disease
Administrative Services	Slips, trips and falls, material handling, consumer behavior, infectious disease

High-hazard, high-risk industries such as state government demand attention to safety in order to succeed efficiently and cost effectively. Greater awareness of worker safety and health issues coincided with the growth of organized labor in the early twentieth century. During the 1980s and 1990s, published studies drew attention to worker safety issues various industries; however, many occupational risks had been known for centuries. By contrast, the patient safety movement developed in the late 1990s and was exponentially accelerated by publication of the landmark Institute of Medicine (IOM) report “To Err Is Human: Building a Safer Health System” in 2000.[6]

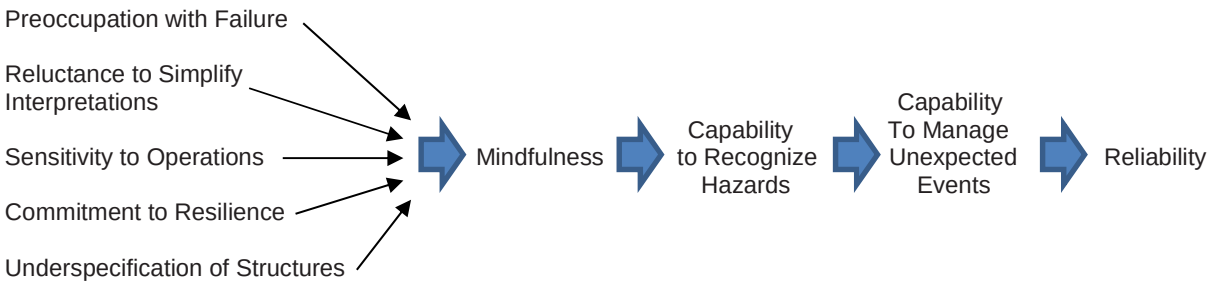
[6] Dejoy DM. Behavior change versus culture change: Divergent approaches to managing workplace safety. Safety Science. 2005;43:105-129.

High Reliability in Organizations and Benefits to Improving Worker Safety

What Is a High Reliability Organization?
High reliability organizations (HROs) have been described as "systems operating in hazardous conditions that have fewer than their fair share of adverse events." [7] Examples of industries or organizations often considered to be highly reliable are health care, nuclear power, aircraft carriers, and air traffic control.

According to reason, one of the most important distinguishing features of HROs is their intense concern (often referred to in the literature as "preoccupation") with the possibility of failure. They recognize the inherent fallibility in humans as well as the risk of system failure associated with equipment and devices used in tightly inter-related (coupled) work processes. HROs strive to create systems and processes that prevent errors or mitigate their impact, though a safety culture driven by top leadership in the organization. They value identifying and reporting potential and actual problems and treat adverse occurrences as opportunities for learning and improvement.[8] Weick and colleagues describe the following five organizational culture characteristics that contribute to a "collective mindfulness" regarding error prevention: (1) preoccupation with failure, (2) reluctance to simplify interpretations, (3) sensitivity to operations, (4) commitment to resilience, and (5) under-specification of structures (Figure 1) This mindfulness requires both constant awareness and willingness to take action on the part of all staff.[9]

Figure 1: A Mindful Infrastructure for High Reliability



Virginia Executive Order 109 (10) requires each Executive Branch agency to protect the employees within its operations, in fact, develop a culture that instills safe work practices.

> *"Keeping our government workers safe, whole, healthy and, whenever possible, employed is the duty of every state agency. This can only be accomplished with the full commitment of agency management working*

[7] Reason J. Human error: Models and management. BMJ.2000;320:768–770.
[8] Hines S, Luna K, Lofthus J, et al. Becoming a High Reliability Organization: Operational Advice for Hospital Leaders. Rockville (MD): AHRQ Publication [Internet]. 2008 Apr; No. 08-0022. Contract No.: 290-04-0011. Available from: http://www.ahrq.gov/qual/hroadvice/.
[9] Weick KE, Sutcliffe KM, Obstfeld D. Organizing for high reliability: Processes of collective mindfulness. Res Organizational Behav. 1999;21:81–123.

in partnership with all employees. All state agencies have an important role to play not only in reducing work-related injuries but also in improving return-to-work services for all injured or ill employees."

The Importance of a Safety Culture

Chassin and Loeb describe the following three interdependent, essential changes that health care organizations must undergo to become highly reliable:[10]

1. Leadership must commit to the goal of high reliability.
2. An organizational culture that supports high reliability must be fully implemented.
3. The tools of robust process improvement must be adopted.

The second point, the importance of an organizational culture that supports high reliability, deserves special attention. Briefly, in the last two decades there has been an explosion of research on the impact of an organizational culture in preventing errors in both patient safety and worker safety.[11] [12] [13] [14] [15] [16]

Studies have looked for associations between culture and a variety of staff outcomes such as turnover, satisfaction, and injury rates, as well as service outcomes such as consumer satisfaction, condition-specific functional status, infection rates, and mortality rates.

Though terminology varies across fields, Stone et al.[17] and Gershon etal.[18]provide concise descriptions of the differences between the often-used terms *organizational culture*, *climate*, and *safety culture*. *Organizational culture* refers to the deeply embedded norms, values, beliefs, and assumptions shared by members of an organization. These evolve over time and are difficult to change. *Climate*, by contrast, refers to the shared perceptions at a given point in time regarding organizational practices such as decision making, advancement opportunities, and so on. These are more amenable to change. *Safety culture/safety climate* is a subset (or microclimate) of overall organizational climate that focuses on people's perceptions about the extent to which the organization values safety (for workers, patients, and/or the environment), commits resources to safety-related initiatives and equipment, and promotes

[10] Chassin MR, Loeb JM. The ongoing quality improvement journey: Next stop, high reliability. Health Aff (Millwood). 2011 Apr;30(4):559–568.
[11] DeJoy DM, Murphy LR, Gershon RRM. Safety climate in health care settings. In: Bittner AC, Champney PC, editors: Advances in Industrial Ergonomics and Safety, VII. London, UK: Taylor & Francis, 1995.
[12] Gershon RR, et al. Hospital safety climate and its relationship with safe work practices and workplace exposure incidents. Am J Infect Control. 2000 Jun;28(3):211–221.
[13] 14 Scott JT, et al. The quantitative measurement of organizational culture in health care: A review of the available instruments. Health Serv Res. 2003 Jun; 38(3): 923–944.
[14] 15 Stone PW, et al. Nurse working conditions and patient safety outcomes. Med Care. 2007 Jun;45(6):571–578. PubMed PMID: 17515785.
[15] 16 Stone PW, Hughes R, Dailey M. Creating a Safe and High- Quality Health Care Environment. In: Hughes RG, editor. Patient Safety and Quality: An Evidence-Based Handbook for Nurses. Rockville (MD): Agency for Healthcare Research and Quality (US); 2008 Apr. Chapter 21. PubMed PMID: 21328736.
[16] Singer SJ, et al. Identifying organizational cultures that promote patient safety. Health Care Manage Rev. 2009 Oct-Dec;34(4): 300–311. PubMed PMID: 19858915.
[17] 16 Stone PW, Hughes R, Dailey M. Creating a Safe and High- Quality Health Care Environment. In: Hughes RG, editor. Patient Safety and Quality: An Evidence-Based Handbook for Nurses. Rockville (MD): Agency for Healthcare Research and Quality (US); 2008 Apr. Chapter 21. PubMed PMID: 21328736.
[18] Gershon RM, et al. Measurement of organizational culture and climate in healthcare. J Nurs Adm. 2004 Jan:34(2):33–40.

safe behaviors. Safety climate can serve as a leading indicator of safety performance, in contrast to error and injury rates, which are lagging indicators of performance.

Table 1: Common Dimensions Across Safety Culture Tools

Major Dimensions	Examples of Topic Areas: Worker Safety Culture Tools	Occupational Safety Culture Tools
Leadership and management	Leadership and management support for staff safety; degree of supervision, leadership hierarchy, policies and procedures	Perceptions of management; leadership and management support for occupational safety; non-punitive response to errors, policies, and procedures; adequacy of training
Group behaviors and relationships	Workgroup relations, conflict vs. cooperation, social relations, coworker trust, supportiveness	Teamwork within and across units; quality of handoffs and transitions
Communications	Openness of communication, formal and informal methods, conflict resolution approaches	Feedback and communication about injuries; reporting mechanisms
Quality of work life: structural attributes; working conditions	Staffing adequacy, job satisfaction, team satisfaction, security; work pressure, rewards, job security, forced overtime, benefits	Staffing adequacy, job satisfaction, team satisfaction; resource availability; stress recognition

As with all improvement activities, it is essential to measure performance before and after trying to improve it. In fact, hospitals and other organizations that are accredited by The Joint Commission are expected to regularly evaluate the culture of safety and quality using valid and reliable tools.[19]

Many valid and reliable safety and organizational culture instruments are available to measure safety culture. According to review articles by Gershon et al.,[20] Colla et al.,[21] and Sammer et al.[22] safety culture assessment tools addressing worker safety tend to focus on the dimensions shown in Table 2. Though the practice of measuring safety culture/climate is widespread, challenges remain regarding construct validation and the appropriateness of using comparative information on safety culture.

Safety culture is known to vary widely across organizations, and performance on the specific domains varies within organizations. For example, it is conceivable that hospitals may score high on dimensions

[19] The Joint Commission. 2012 Comprehensive Accreditation Manual for Hospitals: Leadership Standard LD.03.01.01. Oak Brook (IL): Joint Commission Resources; 2011 Dec:15–17.
[20] Gershon RM, et al. Measurement of organizational culture and climate in healthcare. J Nurs Adm. 2004 Jan:34(2):33–40.
[21] Colla JB, et al. Measuring patient safety climate: A review of surveys. Quality & Safety Health Care. 2005;14(5):364–366.
[22] Sammer CE, et al. What is patient safety culture? A review of the literature. Journal of Nursing Scholarship. 2010 Jun; 42(2):156–165. Review. PubMed PMID: 20618600.

related to patient safety but low on worker safety. Similarly, studies have shown that perception of culture varies between departments and units within organizations (for example, ICUs may have a stronger safety culture than medical/surgical floors) and by type of respondent (physicians may have higher perceptions of safety culture than nurses).

Table 2 highlights the common activities associated with improving safety for workers in the areas of leadership responsibility, training, hazard identification, incident analysis, and improving safety culture**:**

Table 2: Key Elements and Activities Associated with Worker Safety and Health Management Systems

Leadership of the system by management	• Establish a safety and health policy • Establish goals and objectives • Provide visible top management leadership and involvement • Ensure employee involvement • Ensure assignment of responsibility • Provide adequate authority and responsibility • Ensure accountability for management, supervisors, and rank-and-file employees • Provide a program evaluation
Creating a safety culture	• Top management buy-in • Build trust • Conduct self-assessments / benchmarking • Establish a Joint Labor Management Safety Committee comprised of management, employees, and safety staff • Develop site safety vision, key policies, goals, measures, and strategic and operational plans • Align the organization by establishing a shared vision of safety and health goals and objectives vs. department mission • Define specific roles and responsibilities for safety and health at all levels of the organization • Develop a system of accountability for all levels of the organization • Develop measures and an ongoing measurement and feedback system • Develop policies for recognition, rewards, incentives, and ceremonies. Again, reward employees for doing the right things and encourage participation in the upstream activities. • Continually measure performance, communicate results, and celebrate successes • Ongoing support—reinforcement, feedback, reassessment, midcourse corrections, and ongoing training is vital to sustaining continuous improvement
Employee involvement	• Participate on the Joint Labor-Management Safety Committee and other advisory groups • Conduct site inspections • Analyze routine hazards in each step of a job or process, and prepare safe work practices • Participate in developing and revising safety rules • Participate as trainers for current and new hires • Participate in accident/near miss incident investigations • Participate in decision making throughout the company's operations • Participate in pre-use and change analysis

	• Participate as safety observers and safety coaches • Report hazards and be involved in finding solutions to correct the problems
Analysis of worksite hazards	• Periodic, comprehensive safety, industrial hygiene, and health surveys • Analysis of accident records, near miss reporting, and employee reporting of hazards or at-risk behaviors • Routine hazard analysis, such as job hazard analysis, process hazard analysis, or phase hazard analysis • Pre-use and change analysis of the potential hazards in new or startup of facilities, equipment, materials, and processes
Prevention and control of workplace hazards	Implement the Hierarchy of Controls • Engineering controls: To the extent feasible, the work environment and the job itself should be designed to eliminate or reduce exposure to hazards based on the following principles: (1) if feasible, design the facility, equipment, or process to remove the hazard and/or substitute with something that is not hazardous or is less hazardous; (2) if removal is not feasible, enclose the hazard to prevent exposure in normal operations; and, (3) where complete enclosure is not feasible, establish barriers to reduce exposure to the hazard • Elimination of hazards through design • Administrative controls • PPE
Safety and health training	• Identify training needs • Safety training at orientation • Periodic training • Evaluate training effectiveness
Accident/ incident investigation	• Training for incident investigation • Six key questions should be answered: who, what, when, where, why, and how. Fact should be distinguished from opinion, and both should be presented carefully and clearly. The report should include thorough interviews with everyone with any knowledge of the incident. A good investigation is likely to reveal several contributing factors, and it probably will recommend several preventive actions. • Information obtained through the investigation should be used to update and revise the inventory of hazards, and/or the program for hazard prevention and control
Adapted from source: Occupational Safety and Health Administration [Internet]. [cited 2012 Jan 31]. US Department of Labor; [about 1 screen]. Safety and Health Program Management: Fact Sheets. Available from: http://www.osha.gov/SLTC/etools/safetyhealth/mod4_factsheets.html	

Creating Workplace Safety and Health Programs

Federal OSHA recommends a strong workplace safety and health program as the foundation of any OSHA compliance effort. Without an effective, organized workplace safety and health program, OSHA compliance can be very difficult to achieve. Conversely, Virginia Occupational Safety and Health (VOSH) standards and compliance materials can help state agencies to establish effective, organized safety and health programs.

The number of VOSH standards, and the detail in which they address each topic, can be intimidating. No

workplace contains all the workplace hazards that VOSH addresses. Agencies can use an outline of the topics covered by VOSH as the foundation for an initial checklist to identify their potential workplace hazards. Once potential hazards have been identified, VOSH's standards and compliance materials can help devise a plan to address them.

A good workplace safety program is not created by "filling in the blanks" on a form. It is created to meet the requirements of the individual employer. The size of an entity affects the scale of its safety program. State governments may have multiple agency safety committees to address the typical agency hazards, which reports to a central, state-wide safety committee. Small agencies may not need such a formal structure. A small agency's executive is likely to know the employees well, and be well acquainted with its operations and hazards. Small agencies are therefore ideally positioned to incorporate safety issues into overall management of their operations. Their safety committee activities will likely be agenda items for operational meetings.

Every agency will approach organization of its safety program differently, based on its own needs; however, federal OSHA materials can be of significant help: for example, this discussion draws from information included in OSHA's Small Business Handbook.

The following four elements are generally included in effective safety and health programs:

- Management Commitment and Leadership and Employee Involvement
- Hazard Identification
- Hazard Control
- Workplace Safety Training for all Employees

Beginning a workplace safety and health program can seem overwhelming. But the following general steps (most of which fit within one of the above four categories) can help develop and implement a workplace safety program. The suggestions are specifically framed for a public entity's upper level manager, but can be adapted to fit the entity's needs.

Step 1 - Decide to start the safety and health program now
Make the decision to start an agency workplace safety program now. Recognize that the program will not be built in a day, and that it will never be "finished." It will always be a work in progress, which must continually change to address changing operations.

Step 2 - Assign one person to coordinate the safety and health program
An effective safety and health program engages the employer's entire workforce. However, the program is unlikely to move forward unless one person is responsible and accountable for its coordination. If an organization does not already have an entity-wide safety coordinator, appoint someone qualified to handle the responsibilities of the position. If necessary, seek to hire a safety professional experienced in the hazards common to the agency’s operations and work activities. Communication skills, the ability to connect with the executive administration as well as the labor force is requisite.

- Choose a safety coordinator who is genuinely interested in a safe and healthy workplace, is willing to make safety coordination a job priority, is persuasive, and is able to motivate fellow employees. The responsible employee need not be a formally trained safety officer, but experience in the position is an advantage.
- Give the safety coordinator the authority required to deal with managers and supervisors who may be resistant to change. Upper management must clearly demonstrate its support of the safety coordinator and its expectations that all employees, including departmental managers and supervisors, will cooperate with the safety coordinator.
- Upper management must show its support for the workplace safety and health program on an ongoing basis.

Step 3 - Become familiar with the current safety program and any state workplace safety requirements

Before a new workplace safety and health program can be implemented or changed, the program currently in place must be known.

- If the agency already has a safety coordinator in place, meet with the coordinator to evaluate the existing safety and health program. Review all documentation of safety programs, procedures, and training.
- Review (or have the safety coordinator review and report out) the entity's history of work-related injuries and illnesses.
- Meet with department level management and supervisors to identify the department's existing safety programs, procedures and training. Obtain documentation. Ask for the department's assessment of its safety problems and the resources or support it needs to address those problems.
- Talk to the Department of Human Resource Management and ask for their assessment of any workplace safety and health issues you need to address. Ask about any programs to assist with workplace safety and health programs.
- Review any prior safety audits performed in your workplaces.

Step 4 - Establish workplace safety and health as management priorities and the responsibility of every employee

Upper management must show all employees that workplace safety and health are among its highest priorities. Launch an internal public relations campaign to keep workplace safety and health on everyone's mind.

- Adopt and post prominently a management-signed safety policy stating management's support for workplace safety and health.

- Have management meet with employees to tell them about the policy and discuss management safety and health objectives.
- Establish an agency-wide safety committee with membership derived from all operational departments. Assign the safety coordinator to chair the committee and ensure that regular meetings – with a productive agenda – occur.
- Encourage regular department level safety meetings, including management and employees, to discuss safety issues and present in-services on safety issues.
- Have management continue active and personal involvement in the details of the safety program: for example, management can review all reports of work related injury or workplace hazards; workplace safety and a report from the safety coordinator can be a regular topic on the agenda of management meetings.
- Encourage employee commitment to the safety program by including employees in activities and the decision-making process whenever possible.
- Clearly assign responsibility and accountability for all safety program activities and make safe operations a part of every employee's responsibilities and performance evaluation.
- Provide adequate resources (including financial resources) for safety program activities.
- Confirm that safety program responsibilities have been carried out, and that safety has been included as an item in each employee's performance evaluation.
- Establish and publicize a system that allows employees to report any situation they believe creates a work hazard. Encourage employees to use the system, and promptly follow up on any reports of hazards.

Encourage employees to make safety and health a lifestyle choice, not just a workplace issue. Consider establishing an employee wellness program that encourages employee efforts to adopt a healthy lifestyle away from the workplace. More information about wellness programs is available from the Department of Human Resource Management. Program elements can include information about healthy diets; the negative health effects of smoking, alcohol and drug consumption; the benefits of exercise and how to incorporate it into an active life; the use of bicycle helmets; and stress management, among others.

Step 5 - Perform a comprehensive assessment of the workplace(s) to identify hazards

A comprehensive assessment of a workplace's safety and health hazards and programs is the core of a workplace safety and health program. This assessment includes, but is not limited to, physical worksite inspections. It is equally important for each department to have current programs to address its safety and health hazards, and train its employees how to address those workplace hazards.

- The person performing the inspection needs some degree of expertise in identifying workplace safety and health hazards to be effective. A consultant from DHRM or safety personnel from VOSH can be very helpful, if available. Even if professional assistance is unavailable, however, workplace inspection is an indispensable part of any safety and health program. Before beginning a program of physical worksite inspections, review the specific topics and checklists in this resource; ask the Department of Human Resource Management or local VOSH office about the types of work hazards common to types of operations within the agency; use any other available sources of information about hazards in agency specific operations; and know what types of injuries or illnesses agency employees have experienced.
- Review the history of work-related injuries and illness for the agency to identify patterns that may reveal serious hazards, and to set priorities for physical worksite inspections. This information is readily available from the Department of Human Resource Management.
- Analyze each work environment and each job to determine whether there are any hazards in the work environment (including tools and equipment) or the work procedures.
- Conduct the inspection with a department supervisor, and with the supervisor for each area inspected. Ask questions whenever necessary, and have the supervisor explain each operation, its safety and health hazards, and the programs in place to address those hazards.
- Review any written safety programs. Find out who has access to them, how they are used, when they were last revised, and whether they are current.
- Inspect training records. The department should train employees about all safety and health hazards in the workplace, and keep written records of all employee training sessions, including date of the training, name of the trainer, outline of the content and a sign in sheet including the names of all employees who attended. Training about workplace safety and health hazards can be incorporated into larger training efforts.
- Talk to line employees during the inspection. Find out if safety is part of the worksite culture and how familiar workers are with the safety topics in which they have been trained. If there is a specific safety procedure they must follow, do they know about it?
- Does equipment used on the job have a regular maintenance schedule, is it followed, and is maintenance documented?
- Does the department have a plan for emergencies that is appropriate to its location and operations, and does it conduct regular training and drills? Does each employee know his or her responsibilities in an emergency?

Step 6 - Identify, evaluate, choose, and implement strategies for correcting any workplace hazards
Some workplace hazards can be corrected at once. For example, broken or unsafe equipment, such as ladders or tools without appropriate guards, should be immediately discarded, to be certain they are not returned to service after the inspection. Employees who are not using appropriate personal protective equipment, or following safety procedures, should be corrected on the spot.

Other workplace hazards may take longer to correct. A replacement for a missing machine guard, for example, may not be immediately available. The inspector should discuss with the manager and supervisor the various short-term options for reducing the hazard. Examples include taking the machine out of service, renting a replacement, or adopting work practice or administrative controls to protect employees from exposure to the hazard.

The inspector should also work with the manager and supervisor, and any other employees appropriate for the situation, to identify and evaluate various long-term strategies for addressing the hazard. Consider U.S. OSHA's Hierarchy of Controls. Engineering controls are the preferred solution, because they do not rely upon employees to observe certain procedures or to use personal protective equipment.

- Evaluate whether potential control strategies will create any different hazards if implemented.
- Select appropriate controls for each workplace hazard identified, and prepare an action plan with deadlines for implementation. Adopt interim protective measures. Implement the selected controls as soon as feasible. Track the action plan to be certain it is completed.
- Provide personal protective equipment when required. Discard all obsolete, broken, or otherwise unusable personal protective equipment to avoid use.

Step 7 - Establish a program for employee training and enforcement of safety rules
Training and enforcement are indispensable parts of a workplace safety program, and are required by most Virginia OSHA standards.

- Establish safe workplace procedures for each job based on the hazards identified in the job analysis, preferably with the involvement of the employees who perform the job. Train all involved employees about the procedures and enforce observance of those procedures, through discipline if necessary.
- Train all employees before they begin work about the materials and equipment with which they work, all hazards of their jobs, and how the employer is controlling the hazards. (Federal OSHA and VOSH both provide helpful model training materials and information on many safety topics.)
- Train all supervisors about the hazards of their employees' jobs; how to conduct daily worksite inspections; how to reinforce safety training with employees; and how to enforce safety rules, through discipline if necessary.
- Train all employees not to begin a job that appears to be unsafe, and to report the unsafe condition to a supervisor immediately.
- If personal protective equipment is required for the job, train employees why it is needed, how to use it, and how to inspect and maintain it. Do not make use of personal protective equipment

optional. If it is required to protect employees from a workplace hazard, its use should be enforced through discipline if necessary.

- Document all training sessions; including who conducted each session; the location and time; the topics covered; and the employees in attendance (use a sign-up sheet requiring attendees to sign in). Use these records to track attendance at training and to ensure that all employees required to attend training do so.

Step 8 - Track implementation of selected strategy and monitor results
The safety coordinator tracks the implementation of the agency action plans.

- Confirm and document that action was taken by the deadlines identified in the action plan.
- Implement a program of periodic safety inspections to confirm the plan is still in place.
- Require departments to report all suspected work related injuries or illnesses to the safety coordinator – including minor injuries that do not result in lost time from work. Tie this in with workers' compensation reporting.
- Analyze the patterns of work-related injuries and illnesses to assess the effect of the action plans, and to identify any new hazards.
- At least annually, the safety coordinator should prepare a report for upper management on the status of the entity's workplace safety and health program complying with EO 109.

Step 9 - Establish procedures to support ongoing workplace hazard analysis and control

Regularly conduct a thorough inspection of all workplaces for new or recurrent hazards, using a checklist pertinent to the agency’s operation. Confirm that previous action plans were implemented, are functioning and remain appropriate. Take corrective action as necessary.

- Annually revisit program goals and accomplishments, and adjust as necessary.
- Require notice to the safety coordinator prior to introduction of a new job, process or activity; conduct a thorough job safety analysis to identify any resulting hazards, and adopt an action plan for controlling them.
- Establish an understandable reporting procedure for work-related injuries and illnesses and train all employees and supervisors about its requirements.
- Review all reports of suspected work-related injury or illness to identifying contributing workplace hazards. Contact the department for additional information and to discuss immediate action, if necessary.

- Assign responsibility for performing a thorough post work-related injury or illness investigation, to identify the root cause of each work-related injury or illness. Train those responsible for investigation (often supervisors) how to do a thorough investigation.
- Establish an inspection and maintenance schedule for all equipment that might produce injury or illness. Correct existing hazards.
- Require supervisors to inspect their work sites daily, and to immediately correct any hazard, or isolate that hazard until it can be corrected; discard obsolete or broken equipment that may pose a safety hazard; and track identified hazards to ensure correction.
- Require good housekeeping in the workplace.
- Develop and regularly practice a plan for employee safety in emergencies, such as natural disasters, fires, incidents of workplace violence, terrorist attack, etc. Revisit the plan periodically to ensure it is current. Include plans for safety of employees with disabilities.
- Develop a plan for ensuring the ready availability of emergency medical care for injured or ill workers.

4

Occupational Safety and Health Staffing

Proper staffing of the office responsible for an Agency's occupational safety and health program is essential if the office is to perform its mission adequately. But strangely, there are few if any practical guidelines as to what constitutes proper staffing of such an office. Because of the lack of a valid and workable definition of staffing requirements, the safety and health office is often one of the first to be cut when funds become tight or reductions in the work force are necessary. On the other hand, overstaffing is also undesirable.

For the purpose of this analysis, a variety of safety and health staffing models was contemplated. Five different methods were analyzed to determine the staffing levels for the Safety and health team. All the methods used a Full Time Equivalent (FTE) available hours of 1640 hours based on 205 available days per year. This takes into account the hours used in personal professional development, away due to illnesses, holiday and vacation time. Those methods are outlined in the table below:

Analysis Methodologies	
Department of Energy Facility Representative Model DOE orders 440.1	This method examines safety and health staffing based on the total Facility Representatives assigned to facilities, age and risk of facilities activities and is based on guidance provided in DOE orders 440.1, "WORKER PROTECTION MANAGEMENT FOR DOE FEDERAL AND CONTRACTOR EMPLOYEES**",** and 450.5. "Line Environment, Safety and Health Oversight". This is designed for high risk environments with limited application to organizations with diverse operations, including low hazard activities.
Functional Area Model	The total number of functional areas was examined, binned into three areas based on risk. The three areas are low, medium and high risk. Each of the areas was resource loaded based on the actual events in occurrence data base systems. This method also examines the top risk programs and but excludes the impact of the geographic spread of operations maintained by the Commonwealth and Agency autonomy.
Regulatory Driven Model	Safety staffing is driven by VOSH regulatory compliance and the number of regulations that are applicable to each department. Notably, the vast majority of workers' compensation claims sustained by Commonwealth agency employees is not directly related to regulatory standards, but is the result of activities and decision making.
Air Force Formula (AFR 39-1)	This weighs in on the population at risk and also the need to address risk associated with visitors such as students and patients, etc. The model is more

	appropriate for colleges and universities and hospitals and to a lesser degree the core operations and services of state government. The model does not address operational risk factors and hazards.
William T. Fine Model	In 1982, William T. Fine and ten heavily experienced safety and health professionals from across a wide of industries collaborated on assessing safety and health staffing needs based on ten (10) factors that impact occupational injury and illness incident frequency and severity. This methodology remains widely used today for gaging safety and health staffing based on the risk of operations and worker activities.

The William T. Fine Model for safety and health staffing was chosen as it adopts the broadest range of factors that drive the need for professional occupational safety and support. The following detail presents a comprehensive guide for staffing an Agency occupational safety and health office and it takes into account the elements most relevant to requirements for professional personnel, including population at risk, geographic spread of operations, hazards and regulatory compliance needs. The guide places appropriate weight on each of the principal elements, and by a simple calculation, it specifies the ideal number of qualified technical safety and health personnel required to conduct a reasonably complete occupational safety and health program that minimizes worker injury rates, reduces Agency workers' compensation costs and reasonably assures compliance with Virginia Occupational Safety and Health program standards and Executive Order 109 (10).

Applicability

This guide is applicable for evaluating the staffing needs of health and safety offices of organizations of all sizes and with all types of activities, from an organization with more than 100,000 employees to a small organization that may require only a part-time safety and health officer. In the latter case, the guide will indicate the actual percentage of time that the part-time safety and health officer should devote to the safety function.

This guide is not simply a device to justify an increase in the size of a safety and health staff. It demonstrates several ways that the required number of personnel in the office can be reduced if the organization will implement some basics of good management.

Scope and Assumptions

The functions that are considered in the guide to constitute a reasonably complete program are listed in Table 2 in Section 3, Occupational Safety and Health Programming. "Adequate staffing" is the number of persons judged to be required to perform those functions.

The safety office shall be assumed to have sufficient administrative assistant support to enable safety and health professionals to devote their full time to technical safety and health activities.

No distinction is made between the various categories of safety and health personnel as to whether they are safety engineers, safety managers, safety specialists, industrial hygienists or have other titles.

Persons in any of these categories are commonly called upon to perform any or all of the standard safety functions, and they shall be assumed to be technically knowledgeable of safety programming basics and management principles.

Risk Elements to be Considered

The elements to be considered in establishing the required staffing of an Agency or individual operational facility are:

A. Number of employees in the organization or at a specified location.
B. The average degree of hazard to which employees are exposed.
C. The geographical dispersion of employees and facilities.
D. The degree of responsibility the office has for the safety and health of employees at the operating level.
E. The degree of responsibility the office has for developing and establishing policy, procedures and guidelines.
F. The degree of responsibility for safety and health that is assigned to the organization's line supervisors and managers.
G. Duplication Factor if functions are performed at level above the operating level or location.
H. Additional considerations:
    1. Additional duties assigned.
    2. Exceptional safety and health situations.
    3. Unusual circumstances.

The Formula

The effects of each of the above-named elements on the staffing requirements for the safety office of a particular organization are numerically quantified, and by use of a simple computation, the number of qualified safety and health personnel that should compose an ideally sized staff is determined. Quantification factors for elements A through G above are multiplied, and factors for H are then added to the result. The formula is as follows:

Number of qualified personnel required on the safety and health staff → A x B x C x D x E x F x G + H

Quantification Criteria

A. Number of Employees: This is the first consideration. Although identified here as "employees," the total should include the daily average of all other persons for whose safety and health the office is responsible, such as visitors, contractors, patients in hospitals, clients in offices, etc. The factors for "Numbers of Employees" are given Table 4.

Table 4: Factors for No. of Employees

Total Number of Employees	Factor	Total Number of Employees	Factor
0-25	0.1	1001-2000	2.0
26-50	0.2	2001-4000	3.0
51-100	0.4	4001-5000	4.0
101-200	0.6	8001-15,000	5.0
201-300	0.8	15,001-30,000	6.0
301-600	1.0	30,001-100,000	7.0
601-1,000	1.5	Over 100,000	8.0

B. Degree of Hazard: The second element to be considered is the degree of hazard or risk to which the employees are subjected or exposed. The factor is a measure of the average degree of risk for all employees. This can be estimated by summations of employees in various job classifications or in the departments that perform work of various hazard degrees. The factor for the average degree of hazard is determined by comparison with examples given in Table 5.

Table 5: Factors for Degree of Hazard Rating

Risk	Examples of Hazardous Activities	Factor
Minimal	Office activity; no power equipment except office machines; no moving machinery; good housekeeping and ample space with few fire or electrical hazards; excellent architecture and structures; good environment; few stairways; good ventilation. No known health hazards.	0.4
Low	Office atmosphere; light power equipment; somewhat crowded conditions; possible minor electrical or fire or structural problems. Consumer facing services. No known health hazards. Licensing and motor vehicle offices.	0.8
Medium	Standard wood and metal machine shops; paint shops; non-toxic chemical laboratories; light warehousing and storage; highway transportation; possible minor health exposures. Building maintenance and repair, custodial services. Cafeteria and dining hall services. Parks and recreation services.	1.2
High	Heavy construction work; excavation use of hazardous machinery; gases under pressure; toxic chemical laboratories; fire-fighting; some radiation hazards; known potential health hazards. Street and road renovation. Social services, high interaction with the public. Health care services.	2.5
Very high	Use of highly toxic, sensitive or dangerous chemicals, biological, radiological agents; dangerous machinery; high pressure gases; hazardous transportation activity in air, water or on land. Research laboratories. Emergency response services. Interaction with individuals with mental disabilities and behavioral problems, penal system.	3.5

Critical	Any activity where one mistake, oversight, or moment of inattention is likely to cause a very severe disability or fatality. Street and road repair; police vehicle pullovers; deep sea diving; test flying; handling sensitive explosives; potential biological agents, BLS laboratories; bomb disposal and defusing.	4.5

C. Degree of Dispersion: The next consideration is the geographical location of employees whose safety and health are to be protected. The principal distinction is if the working locations are close enough for daily personal contacts and if the office can physically monitor them during a working day, i.e., overnight travel is not required. Factors are given in Table 6.

Table 6:
Factors for Dispersion of Employees

Number of Employees Where More than One Day is Required for Visit and Return	Factor
Less Than 10%	1.0
10% to 20%	1.2
21% to 40%	1.4
41% to 60%	1.6
61% to 80%	1.8

D. Degree of Responsibility at the Operating Level: While there will usually be a staff or an office at each principal echelon of the organization, the proper size of the staff is directly related to the degree of responsibility the office has for the effectiveness of the safety program at the operating level. Factors are given in Table 7.

Table 7: Factors for Degree of Responsibility for Safety and Health at the Operating Level

Category	Description of Responsibilities	Factor
Total Direct	The office has direct contact with the first line supervisors, is fully responsible to monitor and supervise implementation of the program at the operating level.	1.5
Indirect	The office monitors but does not supervise implementation of the program at the operating level. Recommendations are reasonably mandatory. There is one intervening safety staff echelon which is responsible for the program at the operating level.	1.0
Partial	The office makes contact at the operating level only in an advisory capacity and recommendations are advisory only. There is one or more intervening staff echelon.	0.6
Minimal	The office has no assigned responsibility for conduct or safety and health activities at the operating level.	0.1

It can be noted from the descriptions and factors in Table 7 how an organizational change would cause the category for this element to be changed from "total direct" to "indirect" with an accompanying

reduction in the factor, and therefore, a reduction in the number of persons needed on the staff. This could be done by instituting a functional assignment change in the organization, e.g., appointing and training a part-time or collateral duty safety and health officer in each integral group of employees who would be responsible for monitoring safety at the operating level. This would change the category to "indirect" by adding an intervening staff echelon, thus causing the factor to drop from 1.5 to 1.0 and resulting in a lower staffing requirement.

E. Degree of Responsibility for Developing and Establishing Policy and Procedures: There is considerable variance in the degree of responsibility that safety and health offices have for this element. Some offices have total responsibility while others may act only as in intermediate relay point for transferring information. The proper factor can be selected from Table 8, interpolating as appropriate.

Table 8: Factors for Degree of Responsibility for Safety and Health Policy and Procedures

Category	Description of Responsibilities	Factor
Complete	The office is fully responsible for developing and establishing safety policy and procedures.	1.5
Shared	The office shares actively with a higher echelon office.	1.0
Partial	The office receives guidelines and, policies and procedures from a higher echelon, adapts or adds detailed implementation instructions and guidance, promulgates same	0.5
Minimal	The office has no part in developing and establishing policy and procedures.	0.1

F. Degree of Assignment to the Line Organization: The required staffing of an office or staff depends to a substantial extent on this element. Factors are given in Table 9. (Interpolate as appropriate.)

It can be noted here how the factor, and therefore the required staffing of an office, can be reduced by the functional change in the organization of assigning safety and health responsibilities to supervisors and managers. Obviously, such a change will also create a great improvement in the safety and health program.

Table 9: Factors for Degree of Established Assignment of Responsibility for Safety and Health to the Line Organization

Category	Description of Responsibilities	Factor
Full Assignment	Managers at all levels are assigned responsibilities for safety activities, and as an inherent part of their supervisory or management function, are responsible for the occupational safety and health of their subordinates. They are responsible to continuously inspect their areas or	1.5

	jurisdiction and take corrective action as needed; insure that employees have and properly use all necessary personal protective clothing and equipment; insure that equipment and machinery are properly guarded at all times; enforce all appropriate rules and established safe procedures.	
Partial Assignment	The responsibilities described above are shared on an equal basis by the line supervisors and safety and health staff.	1.0
Minimal Assignment	The office responsible for all safety and health activities including those described under "Full Assignment" above	0.1

G. Duplication Factor: In a complex organization of several echelons, it is only necessary that each safety function be performed fully and adequately by the safety office at one of the echelons. For example, if the safety office at the operating level is responsible to perform inspections, investigations, training, etc., the office at higher echelons does not require personnel to duplicate this performance. It may require only sufficient staff to monitor and spot-check performance. Interpolate from Table 10 in accordance with the degree of assigned responsibilities to eliminate the personnel requirement that would duplicate performance.

Table 10: Factors to Avoid Staffing That Duplicates Performance of Functions
If the functions from Table 2 are assigned to be performed by the occupational safety and health officer at another echelon.

Category	Description of Responsibilities	Factor
1	Fully, and affecting all personnel	0.1
2	Fully, for 50% of personnel, or only 50% of assigned functions for all personnel	0.5
3	Not at all	1.0

1. *Adjustment for Additional Duties.* This adjustment is for time required of safety and health professionals to perform duties that may or may not be safety-related, but ideally, should be performed by other organizations. Examples include processing employee workers' compensation claims, administration of the employee disability compensation program, disaster planning, environmental and pollution control, medical functions such as first-aid training and non-occupational disease control, supply functions such as operating issue centers for safety shoes, hardhats and other safety materials, fire marshal duties, driver training and testing, security duties, etc. In each case, the estimated number of managers required annually for such duties should be added to the required staff total.

2. *Exceptional Safety and Health Situations.* Many organizations have unusually hazardous operations that require additional staff personnel with special qualifications. Examples include extensive university and hospital chemical or biological laboratories, extensive use or processing of radioactive isotopes and use of lasers and x-rays, state police explosives handling or processing, etc. Special staffing needed for such operations will depend on the nature and magnitude of the operations, and it must be calculated on an individual-case basis. Add the number of persons required for such duties to the staff.

3. *Unusual Circumstances.* In any organization, there may be diverse unusual situations that can contribute to the required workload of the staff, such as an exceptionally rapid turnover of employees, a rapidly growing organization or unusually poor employee morale. Such situations could justify recommending additional staffing to assure appropriate safety and health training is maintained.

Sample Models

Table 11 is an example of model application for the Virginia State Police. Notable is the high demand for occupational safety and health staffing. The model alone is not suggesting an addition to staff. In fact, occupational safety is a 24/7 goal for the department. Many if not most of the "safety" positions are currently filled by trainers and others though they do not carry "safety" in their title. In fact, they are in positions dedicated to protecting the safety and welfare of the staff. The model does suggest the Virginia State Police review the hazards confronting the organization staff and question if it has addressed all of the risk factors for occupational injury and illness and where weakness is observed in administrative control make appropriate assignments of responsibility to address those weaknesses, and whether adequate resources are directed toward addressing all occupational hazards, not just tactical, life threatening risks.

For example, slip, trip and fall is a significant contributing factor to staff injuries. Enhancing injury prevention through the assessment of risk factors including footwear and education can offer significant improvement in the department injury rate. While the focus is and should be on preservation of life under the most demanding of situations, recognition of the day to day risk factors that cause troopers to lose time away from their stations impacts staffing and the overall cost of operations.

Table 11: Applying the Fine Model Virginia State Police
(Hazard Ratings were estimated without discussion with the State Police administration)

					Risk Factors
Table 4. (A)	Total Number of Employees	2,773			3.0
Table 5. (B)	Degree of Hazard	(A) No. of Employees	(B) Risk Rating	=(A) x (B)	
	Minimal (Clerical/Administrative)	278	0.4	111	
	Low				
	Medium (Field Supervision)	650	1.2	780	
	High	1,845	2.5	4,612	
	Very High (Troopers)				
	Critical (Special Forces)				
	Total	2,773	Average Factor = Sum (A)x(B) / No. of EE's	1,545	2.0
Table 6. (C)	Dispersions	60% - 80%			1.8
Table 7. (D)	Degree of Operational Responsibility	Total Direct			1.5
Table 8. (E)	Degree of Policy and Procedure Responsibility	Complete			1.5
Table 9. (F)	Degree of Assigned Responsibility	Minimal			1.8
Table 10. (G)	Avoiding Duplicate Responsibilities	Not at All			1.0
Other Factors (H)	Additional Duties	None			0.0
	Exceptional Safety Situations Dedicated Staff	Special Forces Emergency Management	2.0		2.0
	Unusual Circumstances				2.0
				Safety Staffing Demand = A x B x C x D x E x F x G + H =	45.75

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Conclusions

Using the NCCI experience modification factor methodology and Commonwealth loss data valued as of April 30, 2013, Oliver Wyman calculated an overall experience modification factor of 1.28 for the Commonwealth. This EMR value suggests occupational injury rates and the resulting loss cost of medical and disability benefits afforded under the coverage is 28% higher than the average for commercially insured Virginia employers with a job hazard profile similar to the Commonwealth's state agencies.

Experience Modification Rates, a leader indicator of occupational injury prevention and injury management effectiveness, were calculated for all Commonwealth Agencies. The top ten state agencies driving the overall excess cost workers' compensation benefits include:

Agency Code	Agency Name	Experience Modification Factor
156	Department of State Police	2.34
777	Department of Juvenile Justice	2.17
702	Department for the Blind and Vision Impaired	1.97
912	Department of Veterans' Services	1.80
182	Virginia Employment Commission	1.78
720	Dept. of Behavioral Health and Developmental Services	1.69
209	University of Virginia Medical Center	1.52
402	Marine Resources Commission	1.45
301	Dept. of Agriculture & Consumer Services	1.44
213	Norfolk State University	1.44

Occupational injuries rates were also calculated for each agency. The ten agencies having the highest injury rates include:

Agency Number	Agency Name	Total No. Salaried & Wage Employees	Workers' Compensation Claim Count		Total No. Of Claims 2012/ 2014	Combined 2 Year Injury Rate Per 100 EE's
			2012/ 2013	2013/ 2014		
411	Dept. of Forestry	244	106	131	237	48.63
912	Dept. of Veterans Services	369	152	173	325	44.04
156	Dept. of State Police	2,773	910	916	1,826	32.92
720	Dept. Behav Health & Develop Services	9,056	2,152	2,196	4,348	24.01
777	Dept. of Juvenile Justice	1,797	432	309	741	20.61
218	Va School for Deaf/Blind	164	39	23	62	18.91
263	Va Rehab Center for the Blind	30	3	8	11	18.22
330	Virginia-Israel Advisory Board	2		1	1	31.06
425	Jamestown-Yorktown Foundation	220	35	40	75	17.06
111	Supreme Court	194	29	25	54	13.90

A simple survey of agency occupational safety and health injury prevention practices was conducted. The survey reflected the basic elements of an occupational safety health initiative. The survey suggests that improvement in agency efforts to prevent injury and illnesses will result in a reduction in the number of workers' compensation claims filed annually by Commonwealth employees.

- *22.2% of the responding agencies either have not published a statement on personnel safety or are unaware if one exists.*

Executive Order 109 (10) requires agency leadership to protect the health and safety of its staff. Improved direction from agency leaders will foster improved action to prevent employee injuries.

- 32.4% of agencies have not communicated the safety responsibilities to employees.
- 82% of Commonwealth agencies have not documented the occupational hazards of their staff positions.
- 61.2% of agencies do not provide safety and health training reflective of the hazards of the work to be performed.
- Only 20.4% of the responding agencies maintain a formal plan of providing safety education to workers.

Overall, many of the Commonwealth agencies do not perform well implementing the most essential elements to the prevention of occupational injuries – information and training on safe work practices.

- 47% of Commonwealth agencies do not have an individual assigned to focus on occupational safety issues.
- Only 12 of the 37 agencies (32%) with the highest occupational injury and experience modification rates staff a full time safety officer.

Dedicated staff safety officers will enable improved identification of hazards, elimination of those hazards where practical, and improved employee safety communications and motivation. Above all, fewer staff will be out of work, productivity will be more stable, less overtime will be paid and department managers will not be required to shuffle staffing as often to accommodate the service that needs to be maintained.

Based on the size of the employee population of the agency, nature of activities and hazards, and historical injury rates and loss costs, the following agencies do not appear to staff a central safety officer and should consider dedicating a position to oversee department occupational safety and health administration:

- Department for the Blind and Vision Impaired
- Virginia Employment Commission
- Department of Agriculture and Consumer Services
- Department of Game and Inland Fisheries
- Department of Conservation and Recreation
- Department of Forestry
- Jamestown-Yorktown Foundation*
- Department of Behavioral Health and Developmental Services**

*The Jamestown-Yorktown Foundation has significant injury experience, recording almost one injury for every five workers over the two year period or review. The organization offers unique demonstrations of colonial life which at times, are hazardous. The addition of a safety officer to staff should offer an immediate reduction in workers' compensation claims. An additional consideration is value the officer will bring to protecting the public from injury.

**Based on the survey responses from the Department of Behavioral Health and Developmental Services it appears full time safety officers are dedicated at the operating level, but there is no central leadership overseeing overall agency safety performance. Injury statistics suggest improvement is not imminent. The recommendation is to add an agency safety director to oversee and direct facility level safety performance and creation and implementation of improved programs and procedures across the organization that focus on the factors driving injury experience.

Any agency with an Experience Modification Rating in excess of 1.20 should assess whether or not it is adequately staffed to prevent occupational injuries. Affording dedicated focus to controlling the impact of the workers' compensation expense will ultimately reduce the allocated cost to the agency, freeing Treasury funds for more valuable initiatives.

- 35.2% of the agencies do not maintain an occupational safety committee.
- Only 16 (43%) of those agencies identified having the highest injury rates maintain either a central or site safety committees.

Maintenance of Joint Labor Management Safety Committee will expedite recognition, development and implementation of essential programs and procedures to prevent occupational injuries and illnesses. An agency looking for a direction for establishing a renewed effort to reduce occupational injuries should seek to create a safety committee.

The Department of Human Resource Management once staffed the position Loss Control Manager that offered assistance to the individual agencies on matters of injury and illness prevention. That position has been vacant for quite some time. The existing staff of the department is consumed with overall workers' compensation program administration and post injury management supporting the agencies. Refilling the position would benefit the overall safety mission of the Commonwealth and will support agency compliance with Executive Order 109 (10). Additionally, the position could support the efforts of smaller agencies that cannot justify staffing a safety officer.

The Department of Human Resource Management contracts for supplementary safety inspection and advisory services from LC Innovations. This is a limited resource and cannot be expected to fulfill the assistance needed by the individual agencies. The LCI service provides comprehensive safety assessments including evaluations of compliance with VOSH and EO109 (10), but essentially only identifies weaknesses in current agency efforts. It then becomes agency responsibility to implement the recommended improvements.

Commonwealth agencies must be self-sufficient in their injury prevention efforts. A methodology for calculating dedicated safety and health management support has been offered toward determining the need for a dedicated agency safety officer to guide the organization. Whether an agency chooses to staff the position as a central agency function or allocate the resource to assigned higher risk locations will depend on the size, risk rating and geographic spread of the organization.

6

Opportunities for Risk Improvement

September 2014 -01- Dedicated Agency Safety Officer
Based on the size of the employee population of the agency, nature of activities and hazards, and historical injury rates, it appears the following agencies do not staff an agency safety officer and should consider dedicating a position to oversee occupational safety and health administration:

- Department for the Blind and Vision Impaired
- Virginia Employment Commission
- Department of Agriculture and Consumer Services
- Department of Game and Inland Fisheries
- Department of Conservation and Recreation
- Department of Forestry
- Jamestown-Yorktown Foundation
- Department of Behavioral Health and Developmental Services

September 2014 – 02 – Department of Human Resource Management – Loss Control Manager
Replace the vacant position of Loss Control manager in the Department of Human Resource Management to increase agency workers' compensation injury and illness prevention oversight,

September 2014 – 03 – Agency Safety Responsibilities and Training
All agencies should review their commitment to meeting the requirements of Executive order No. 109 (10) Workplace Safety and Employee Health.

- Review the existing agency statement on department safety policy, revise or develop, publish and communicate the agency position to all employees.
- Review the agency Employee Work Profiles for each position including administrators, managers and supervisors and employees to assure occupational safety responsibilities are communicated and measurable.

September 2014 -04 – Safety Committees

If the agency has not created a safety committee as yet, consider doing so as a means of increasing injury prevention activity and reducing workers' compensation claims.

- Initially, the Committee should meet monthly, scheduled for no more than one hour.
- Charge the Committee with reviewing the agency initiative on occupational safety and creating new or revised procedures for increasing occupational safety and health amongst the staff.
- Review occupational injury trends (available from DHRM) and initiate activities to address the most frequent causes of injuries: slips, trips, and falls; manual material handling; auto accidents; inmate patient, perpetrator behavior.
- Consider Joint Labor Management Site Safety Committees at key location.

7

Appendix

Figure 7-1 Commonwealth of Virginia Agency Experience Modification Ratings

Agency Code	Agency Name	Experience Modification Factor
156	Department of State Police	2.34
777	Department of Juvenile Justice	2.17
702	Department for the Blind and Vision Impaired	1.97
912	Department of Veterans' Services	1.80
182	Virginia Employment Commission	1.78
121	Office of the Governor	1.76
720	Dept. of Behavioral Health and Developmental Services	1.69
209	University of Virginia Medical Center	1.52
402	Marine Resources Commission	1.45
301	Dept. of Agriculture & Consumer Services	1.44
213	Norfolk State University	1.44
942	Virginia Museum of Natural History	1.43
158	Virginia Retirement System	1.42
403	Department of Game and Inland Fisheries	1.38
103	Magistrate System	1.37
191	Virginia Workers' Compensation Commission	1.35
750	Department of Correctional Education	1.35
799	Department of Corrections	1.35
146	Science Museum of Virginia	1.34
425	Jamestown-Yorktown Foundation	1.33
960	Department of Fire Programs	1.30
100	Senate of Virginia	1.31
199	Department of Conservation and Recreation	1.30
123	Department of Military Affairs	1.29
262	Department of Aging and Rehabilitative Services	1.29
218	Virginia School for the Deaf & the Blind	1.29
140	Department of Criminal Justice Services	1.28

Agency Code	Agency Name	Experience Modification Factor
152	Department of the Treasury	1.28
208	Virginia Polytechnic Institute & State University	1.22
	EMR + 1.20 is Considered Excessive	
111	Supreme Court of Virginia	1.16
141	Office of the Attorney General	1.16
411	Department of Forestry	1.12
999	Department of Alcoholic Beverage Control	1.10
172	Virginia State Lottery Department	1.09
212	Virginia State University	1.09
154	Department of Motor Vehicles	1.08
765	Department of Social Services	1.08
174	Virginia College Savings Plan	1.05
201	Department of Education	1.04
841	Department of Aviation	1.04
207	University of Virginia	1.03
211	Virginia Military Institute	1.02
839	Virginia Commission of Youth	1.01
239	Virginia Frontier Culture Museum	1.01
	EMR +1.00 Exceeds Industry Average	
108	VA Code Commission	1.00
147	State Inspector General	1.00
148	Virginia Commission for the Arts	1.00
307	Virginia Agricultural Council	1.00
330	Virginia Israel Advisory Board	1.00
119	Office of Lieutenant Governor	1.00
162	DOA Transfer Payments	1.00
193	Secretary of Agriculture and Forestry	1.00
840	Virginia Housing Study Commission	1.00
842	Chesapeake Bay Commission	1.00
847	Comm. on Tech. & Sciences	1.00
859	Virginia Sesquicentennial of the American Civil War Commission	1.00
820	Capitol Square Preservation Council	1.00
834	Virginia Freedom of Information Advisory Council	1.00
751	Virginia Dept. for Deaf & Hard of Hearing	0.99

Agency Code	Agency Name	Experience Modification Factor
606	Virginia Board for People w/Disabilities	0.99
454	Office of Commonwealth Preparedness	0.99
766	Virginia Parole Board	0.99
844	Joint Commission on Health	0.99
938	New College Institute	0.99
957	Commonwealth's Attorney's Service Council	0.99
112	Judicial Inquiry and Review Commission	0.99
160	Virginia Criminal Sentencing Commission	0.99
180	Secretary of Administration	0.99
183	Secretary of Natural Resources	0.99
184	Secretary of Technology	0.99
185	Secretary of Education	0.99
186	Secretary of Transportation	0.99
187	Secretary of Public Safety	0.99
188	Secretary of Health and Human Resources	0.99
190	Secretary of Finance	0.99
192	Secretary of Economic Development	0.99
202	The Library of Virginia	0.99
226	Board of Accountancy	0.99
232	Dept. of Minority Business Enterprise	0.99
233	Virginia Board of Bar Examiners	0.99
413	Virginia Alcohol Safety Action Program	0.99
417	Gunston Hall	0.98
405	Virginia Racing Commission	0.98
109	Division of Legislative Automated Systems	0.98
157	Compensation Board	0.98
166	Secretary of the Commonwealth	0.98
246	University of Virginia at Wise	0.98
260	Virginia Community College System	0.97
132	State Board of Elections	0.97
937	Southern Virginia Higher Education Center	0.97
161	Virginia Department of Taxation	0.96
325	Department of Business Assistance	0.96
110	Joint Legislative Audit Review Commission	0.96

Agency Code	Agency Name	Experience Modification Factor
245	State Council for Higher Education	0.95
194	Department of General Services	0.95
107	Division of Legislative Services	0.94
133	Auditor of Public Accounts	0.94
122	Department of Planning & Budget	0.94
151	Department of Accounts	0.93
165	Dept. of Housing & Community Development	0.93
217	Radford University	0.92
222	Dept. of Professional & Occupational Reg	0.92
117	Virginia State Bar	0.91
129	Department of Human Resources Management	0.91
948	Southwest VA High Ed Center	0.91
423	Department of Historic Resources	0.90
848	Public Defender Commission	0.90
101	House of Delegates	0.89
127	Department of Emergency Management	0.89
409	Department of Mines, Minerals and Energy	0.88
215	University of Mary Washington	0.87
216	James Madison University	0.87
501	Department of Transportation	0.86
602	Department of Medical Assistance Services	0.85
268	Virginia Institute of Marine Science	0.85
238	Virginia Museum of Fine Arts	0.83
961	Division of Capitol Police	0.83
223	Department of Health Professions	0.82
236	Virginia Commonwealth University	0.81
181	Virginia Department of Labor and Industry	0.81
242	Christopher Newport College	0.81
136	Virginia Information Technologies	0.80
601	Virginia Department of Health	0.77
214	Longwood University	0.76
221	Old Dominion University	0.74
171	State Corporation Commission	0.74
778	Department of Forensic Science	0.74

Agency Code	Agency Name	Experience Modification Factor
247	George Mason University	0.72
204	The College of William & Mary	0.69
440	Department of Environmental Quality	0.68

Figure 7-2 Agency Occupational Injury and Illness Frequency Rates

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Agency Number	Agency Name	Total No. Salaried & Wage Employees	Workers' Compensation Claim Count		Total No. Of Claims 2012/ 2014	Combined 2 Year Injury Rate Per 100 EE's
			2012/ 2013	2013/ 2014		
411	Dept of Forestry	244	106	131	237	48.63
912	Dept of Veterans Services	369	152	173	325	44.04
156	Dept of State Police	2,773	910	916	1,826	32.92
720	Dept Behav Hlth & Develop Svcs	9,056	2,152	2,196	4,348	24.01
777	Dept of Juvenile Justice	1,797	432	309	741	20.61
218	Va Sch for Deaf/Blind	164	39	23	62	18.91
263	Va Rehab Center for the Blind	30	3	8	11	18.22
330	Virginia-Israel Advisory Board	2		1	1	31.06
425	Jamestown-Yorktown Foundation	220	35	40	75	17.06
111	Supreme Court	194	29	25	54	13.90
100	Senate of Virginia	42	2	9	11	13.01
239	Frontier Culture Museum of Va	53	7	6	13	12.36
209	UVA Medical Center	5,944	718	719	1,437	12.09
123	Dept of Military Affairs	336	35	41	76	11.32
199	Dept Conservation & Recreation	1,094	119	118	237	10.83
961	Div of Capitol Police	95	7	13	20	10.53
268	Va Institute of Marine Science	348	45	25	70	10.05
405	Virginia Racing Commission	5		1	1	10.00
403	Dept Game and Inland Fisheries	467	40	37	77	8.24
402	Marine Resources Commission	146	10	14	24	8.20
942	Va Museum of Natural History	43	3	4	7	8.20
208	VPI & State University	8,496	677	655	1,332	7.84
211	Virginia Military Institute	559	41	46	87	7.78
702	Dept. f/t Blind & Vision Impair	288	23	21	44	7.64
701	Dept. of Corrections	12,520	888	907	1,795	7.17
146	The Science Museum of Virginia	88	7	5	12	6.80
417	Gunston Hall	8	1	0	1	6.56
960	Dept. of Fire Programs	87	4	7	11	6.35
601	Dept. of Health	3,587	245	201	446	6.22

Agency Code	Agency	Employees	2013 Claims	2014 Claims	Total Claims	Injury Rate
501	Dept. of Transportation	7,359	450	401	851	5.78
778	Dept. of Forensic Science	277	16	16	32	5.77
154	Dept. of Motor Vehicles	2,038	117	101	218	5.35
751	Va Department f/t Deaf & Hard of Hear	10	1	0	1	5.22
147	Office State Inspector General	30	2	1	3	5.00
262	Dept. f/Aging & Rehab Services	979	48	48	96	4.90
217	Radford University	1,381	65	68	133	4.81
999	Dept. Alcoholic Beverage Control	2,295	112	106	218	4.75
213	Norfolk State University	941	3	42	85	4.52
215	University of Mary Washington	865	31	46	77	4.45
238	Virginia Museum of Fine Arts	315	13	15	28	4.44
216	James Madison University	3,260	154	128	282	4.33
301	Dept. of Agriculture & Cons. Services	508	25	16	41	4.03
242	Christopher Newport University	1,098	42	33	75	3.41
129	Dept. of Human Resource Mgmt.	96	3	3	6	3.13
172	Virginia Lottery	278	9	12	21	3.78
194	Dept. of General Services	617	28	15	43	3.48
214	Longwood University	808	26	29	55	3.40
212	Virginia State University	850	36	20	56	3.29
221	Old Dominion University	2,961	99	88	187	3.16
204	College of William and Mary	2,141	60	74	134	3.13
207	University of Virginia	7,112	226	212	438	3.08
127	Dept. of Emergency Management	134	3	5	8	2.99
241	Richard Bland College	126	5	1	6	2.38
182	Virginia Employment Commission	946	25	22	47	2.48
166	Secretary of the Commonwealth	22	1	0	1	2.28
101	House of Delegates	136	2	4	6	2.20
202	The Library of Virginia	140	4	2	6	2.14
111	Supreme Court	1,294	29	25	54	2.09
201	Dept. of Education	266	5	6	11	2.07
236	Virginia Commonwealth University	8,230	159	171	330	2.00
261	Virginia Community College Sys	10,753	192	231	423	1.97
246	UVA College at Wise	365	8	6	14	1.92
152	Dept. of the Treasury	109	0	4	4	1.84
140	Dept. of Criminal Justice Services	110	2	2	4	1.82

Agency Code	Agency	Employees	2013 Claims	2014 Claims	Total Claims	Injury Rate
223	Dept. of Health Professions	224	5	3	8	1.78
765	Dept. of Social Services	1,686	34	23	57	1.69
181	Dept. of Labor and Industry	149	3	2	5	1.68
161	Dept. of Taxation	870	12	17	29	1.67
841	Dept. of Aviation	35	1	0	1	1.44
937	Southern Va Higher Education	38	1	0	1	1.32
247	George Mason University	7,348	76	108	184	1.25
409	Dept. Mines Minerals & Energy	201	1	4	5	1.24
141	Attorney General & Dept. of Law	364	0	8	8	1.10
165	Dept. of Housing and Comm. Dev.	94	2	0	2	1.07
122	Dept. of Planning and Budget	48	0	1	1	1.04
171	State Corporation Commission	634	7	6	13	1.03
440	Dept. of Environmental Quality	828	6	8	14	0.85
103	Magistrate System	427	2	5	7	0.82
136	Va. Information Technologies	264	2	2	4	0.76
117	Virginia State Bar	100	1	0	1	0.50
133	Auditor of Public Accounts	118	1	0	1	0.42
151	Dept. of Accounts	136	0	1	1	0.37
158	Virginia Retirement System	353	2	1	3	0.42
191	Va. Workers Compensation Comm.	279	0	3	3	0.54
848	Indigent Defense Commission	529	4	0	4	0.38
222	Dept. of Professional & Occ. Reg.	177	0	1	1	0.28
602	Dept. of Medical Asst. Services	412	2	0	2	0.24
107	Division of Legislative Services	69	0	0	0	0.00
109	Div of Legislative Auto Sys.	18	0	0	0	0.00
110	Joint Leg Audit & Review Comm.	31	0	0	0	0.00
112	Judicial Inquiry and Rev Comm.	3	0	0	0	0.00
113	Circuit Courts	168	0	0	0	0.00
114	General District Courts	1,024	0	0	0	0.00
115	Juvenile and Domestic Relations Dct. Crt	662	0	0	0	0.00
116	Combined District Courts	198	0	0	0	0.00
119	Lieutenant Governor	3	0	0	0	0.00
121	Office of the Governor	34	0	0	0	0.00
125	Court of Appeals of Virginia	69	0	0	0	0.00
128	Virginia Veterans Care Center	271	0	0	0	0.00

Agency Code	Agency	Employees	2013 Claims	2014 Claims	Total Claims	Injury Rate
132	Dept. of Elections	29	0	0	0	0.00
143	Division of Debt Collection	22	0	0	0	0.00
148	Virginia Comm. for the Arts	5	0	0	0	0.00
157	Compensation Board	14	0	0	0	0.00
160	Va Criminal Sentencing Comm.	9	0	0	0	0.00
162	Dept. Accounts Transfer Payments	1	0	0	0	0.00
174	Virginia College Savings Plan	92	0	0	0	0.00
180	Secretary of Administration	9	0	0	0	0.00
183	Secretary of Natural Resources	4	0	0	0	0.00
184	Secretary of Technology	3	0	0	0	0.00
185	Secretary of Education	4	0	0	0	0.00
186	Secretary of Transportation	6	0	0	0	0.00
187	Sec of Pub Safety Homeland Security	8	0	0	0	0.00
188	Sec of Health & Human Resource	4	0	0	0	0.00
190	Secretary of Finance	4	0	0	0	0.00
192	Secretary of Commerce & Trade	5	0	0	0	0.00
193	Secretary of Agr and Forestry	3	0	0	0	0.00
200	Comp Services At-Risk Youth & Family	11	0	0	0	0.00
203	Woodrow Wilson Rehab Center	306	0	0	0	0.00
226	Board of Accountancy	10	0	0	0	0.00
233	Board of Bar Examiners	3	0	0	0	0.00
234	Cooper Ext & Agriculture Res Service	90	0	0	0	0.00
245	St Council of Higher Education	40	0	0	0	0.00
310	Va Economic Dev Partnership	103	0	0	0	0.00
320	Virginia Tourism Authority	90	0	0	0	0.00
350	Dept of Small Bus/Supplier Division	40	0	0	0	0.00
407	Virginia Port Authority	93	0	0	0	0.00
413	Comm. on Va Alcohol Saf Act Pro.	9	0	0	0	0.00
423	Dept. of Historic Resources	38	0	0	0	0.00
454	Sec Veterans & Defense Affairs	6	0	0	0	0.00
505	Dept. of Rail & Public Trans	45	0	0	0	0.00
506	Motor Vehicle Dealer Board	24	0	0	0	0.00
606	Va Board for People With Disabilities	9	0	0	0	0.00
851	Tobacco Indem. & Comm. Rev Comm.	12	0	0	0	0.00
852	Va Foundation Healthy Youth	14	0	0	0	0.00

Agency Code	Agency	Employees	2013 Claims	2014 Claims	Total Claims	Injury Rate
938	New College Institute	14	0	0	0	0.00
948	Southwest Va Higher Ed Center	37	0	0	0	0.00
957	Commonwealth Att. Serv Council	7	0	0	0	0.00

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MARSH

SOLUTIONS...DEFINED, DESIGNED, AND DELIVERED.

CLAIM INVENTORY WORKOUT:

AN ACCELERATED CLAIM CLOSURE INITIATIVE

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF HUMAN RESOURCE MANAGEMENT

SEPTEMBER 30, 2014

MARSH & McLENNAN COMPANIES

CONTENTS

1

Introduction

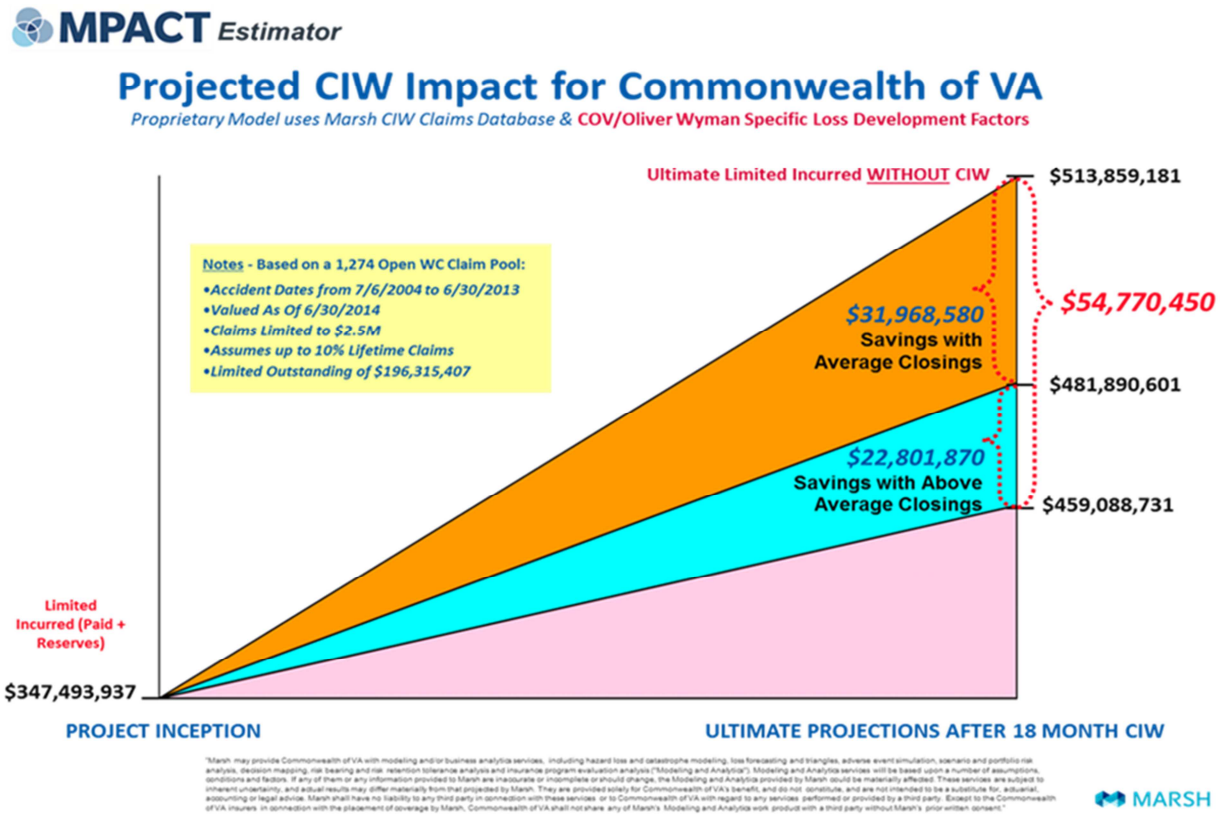
Marsh Risk Consulting conducted an analysis to examine the impact of settling appropriate claims, including an estimate of the potential cost avoidance opportunity associated with an accelerated claim closure initiative. The study was promulgated by language included in Item 81, F.2 of Chapter 2, 2014 Special Session 1, which requires the Department of Human Resource Management to conduct a study with results due no later than October 1.

> *"The Department of Human Resource Management shall conduct a study, with the cooperation of all executive, legislative, judicial, and independent agencies, to include, but not be limited to, the impact of settling appropriate claims, the potential need for a risk management position in the Department of Human Resource Management to further assist state agencies not staffed with a risk management position, and the need for a risk management position for state agencies with a high incidence of claims who are not staffed with a risk management position. The department shall report its findings and cost savings recommendations for the state employee's workers' compensation program to the Governor and Chairmen of the House Appropriations and Senate Finance Committees no later than October 1, 2014."*

Bringing a focus to older, legacy claims with a specific emphasis on effecting expedited closures is the hallmark of a Claim Inventory Workout (CIW) project.

It is important to note that every employer faces unique challenges with their respective workers' compensation claims and the challenge is magnified for the Commonwealth of Virginia given the broad diversity of jobs across the spectrum of Agencies. Having been said, our experience has shown that a notable cost avoidance associated with the acceleration of claim closures can be reaped by mitigating the future development of individual claim costs and reducing the impact of future cost of living adjustment (COLA) increases. Further, our book of business results for Public Entities is a 25% closure rate with a correlating reduction of 15% in total incurred values for those closed claims.

Based upon our MPACT analysis for the Commonwealth of Virginia, the projected estimated potential cost avoidance from an accelerated claim closure engagement would range from $31,968,580 to $54,770,450 as illustrated in the "wedge" graphic on the following page.


MPACT Estimator
Projected CIW Impact for Commonwealth of VA
Proprietary Model uses Marsh CIW Claims Database & COV/Oliver Wyman Specific Loss Development Factors
Ultimate Limited Incurred WITHOUT CIW
$513,859,181
Notes - Based on a 1,274 Open WC Claim Pool:
•Accident Dates from 7/6/2004 to 6/30/2013
•Valued As Of 6/30/2014
•Claims Limited to $2.5M
•Assumes up to 10% Lifetime Claims
•Limited Outstanding of $196,315,407
$31,968,580
Savings with
Average Closings
$54,770,450
$481,890,601
$22,801,870
Savings with Above
Average Closings
$459,088,731
Limited
Incurred (Paid +
Reserves)
$347,493,937
PROJECT INCEPTION
ULTIMATE PROJECTIONS AFTER 18 MONTH CIW
"Marsh may provide Commonwealth of VA with modeling and/or business analytics services, including hazard loss and catastrophe modeling, loss forecasting and triangles, adverse event simulation, scenario and portfolio risk analysis, decision mapping, risk bearing and risk retention tolerance analysis and insurance program evaluation analysis ("Modeling and Analytics"). Modeling and Analytics services will be based upon a number of assumptions, conditions and factors. If any of them or any information provided to Marsh are inaccurate or incomplete or should change, the Modeling and Analytics provided by Marsh could be materially affected. These services are subject to inherent uncertainty, and actual results may differ materially from that projected by Marsh. They are provided solely for Commonwealth of VA's benefit, and do not constitute, and are not intended to be a substitute for, actuarial, accounting or legal advice. Marsh shall have no liability to any third party in connection with these services or to Commonwealth of VA with regard to any services performed or provided by a third party. Except to the Commonwealth of VA insurers in connection with the placement of coverage by Marsh, Commonwealth of VA shall not share any of Marsh's Modeling and Analytics work product with a third party without Marsh's prior written consent."
MARSH

2

Methodology

The Claim Inventory Workout (CIW) program utilizes our proprietary MPACT approach to project potential ultimate cost avoidance:

1. Data Modeling began with an analysis of all open and closed claims with dates of loss between July 6, 2004 and June 30, 2013 for the Commonwealth of Virginia valued as of June 30, 2014.

2. The identified pool of 1,274 open claims is inclusive of claims open for more than one year but less than ten years. Based upon our extensive experience with accelerated claim closure projects, we have found this timeframe encompasses the prime aging of claims for settlement and closure.

CIW Pool	Closure Rate	Incurred Impact on Closed Claims
0 - 2 years	53%	-6%
2 - 4 years	50%	-14%
4 - 6 years	40%	-22%
6 - 8 years	34%	-23%
8 - 10 years	28%	-18%
>10 years	22%	-22%

3. It is recognized that the Commonwealth of Virginia is financially responsible for the full statutory benefits on workers' compensation claims; however for the purposes of this modeling, incurred and outstanding values were limited at $2.5 million on a per claim basis unless otherwise noted.

4. The limited incurred value was calculated by adding the dollar amount that has been paid on the open 1,274 claims in the pool plus the total remaining reserves ("limited outstanding") associated with those claims.

5. The ultimate limited incurred values were calculated using the specific loss development factors (LDF's) of the Commonwealth of Virginia as calcuated by Oliver Wyman. As a point of comparison, the modeling was also generated against the open claim pool using NCCI(*1) loss development factors specific to Virginia. Because the expected amount of money that will be paid on existing claims changes or "develops" over time as individual claims mature and new information becomes available, LDF's are used to project the amount that will ultimately be paid on the set of claims.

   The scope and outcomes of both these exercises can be seen in the table below:

Commonwealth of Virginia		
	Oliver Wyman LDF	**Virginia NCCI LDF**
Accident Date Range	7/6/04 - 6/30/13	7/6/04 - 6/30/13
Valuation Date	6/30/2014	6/30/2014
Number of Open Claims	1,274	1,274
Limited Incurred Value	$347,493,937	$347,493,937
Paid	$151,178,530	$151,178,530
Limited Outstanding	$196,315,407	$196,315,407
IBNR	$166,365,244	$69,776,139
Ultimate Limited Incurred Value	$513,859,181	$417,270,076
Potential Estimated Cost Avoidance at the 50th Percentile	$31,968,580	$16,863,070
Percentage of Cost Avoidance	8.81%	6.34%
Potential Estimated Cost Avoidance at the 70th Percentile	$54,770,450	$38,561,540
Percentage of Cost Avoidance	15.10%	14.49%

*(*1) The NCCI is the National Council on Compsation Insurance, a United States insurance rating and data collection bureau. As an independent and objective not for profit organization, the NCCI gathers, analyzes and reports on industry trends in addition to providing statistical data to carriers, employers and regulatory authorities.*

6. The estimated cost avoidance associated with an accelerated claim closure project was calculated by applying a Monte Carlo statistical modeling technique within a proprietary Marsh @Risk software application. MPACT compares a client's open workers' compensation legacy claim portfolio to "peer" company portfolios that have previously been involved in a CIW ("peers" based on similar accident year and jurisdictional attributes). For this modeling exercise, peer claims were from multiple industry sectors in

both the public and private sectors within the Virginia jurisdiction. Up to 50,000 peer company simulations are generated, and the results are ranked to identify the ultimate CIW impact the client could achieve if their claims were to produce correlative outcomes at "average closures" up to "above average closures".

Also contemplated within the MPACT modeling is the presumption that up to 10% of the claims may be "lifetime" claims. These are claims for which the injured employee is due indemnity and/or medical benefits for the remainder of his or her lifetime. As the modeling process does not include an actual file review, it is not possible to provide the actual number of lifetime claims within the subject pool of claims.

7. The lower amount of the estimated range of cost avoidance for the Oliver Wyman LDF's modeling ($31,968,580) is based upon achieving results consistent with the 50th percentile of Marsh Risk Consulting's success on previous Claim Inventory Workout projects. The top of the estimated cost avoidance ($54,770,450) was calculated at the 70th percentile.

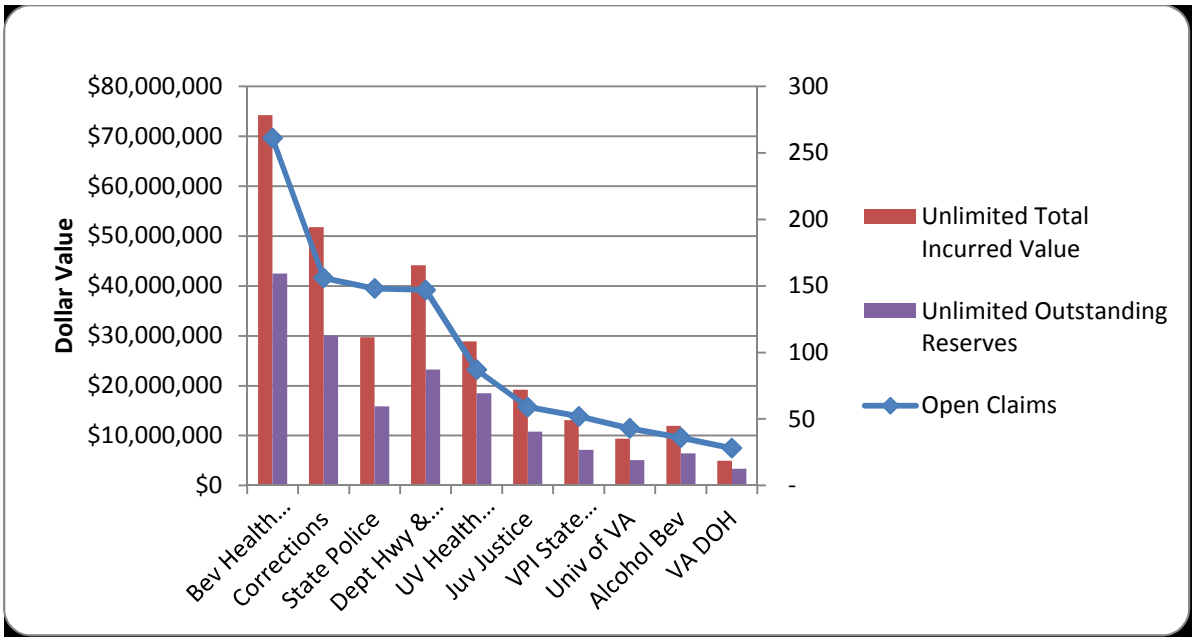
   The cost avoidance projections are based upon an eighteen (18) month Claim Inventory Workout project period.

8. The estimated cost avoidance is inclusive of 1,274 open claims from 52 of the Agencies with the top ten Agencies as measured by the number of open claims:

Agency	Open	Unlimited Total Incurred	Unlimited Total Paid	Unlimited Outstanding
Behavioral Health & Developmental Svcs	261	$74,224,816	$31,752,213	$42,472,604
Department of Corrections	156	$51,752,492	$21,666,084	$30,086,409
State Police	148	$29,716,479	$13,839,378	$15,877,100
Department of Highways and Transportation	147	$44,119,793	$20,912,386	$23,207,407
University of Virginia Health System	87	$28,867,122	$10,378,207	$18,488,915
Department of Juvenile Justice	59	$19,230,727	$8,457,626	$10,773,101
VPI State University	52	$13,121,459	$6,001,921	$7,119,538
University of Virginia	43	$9,421,301	$4,318,813	$5,102,487
Department of Alcoholic Beverage Control	36	$11,963,994	$5,531,225	$6,432,769
VA Department of Health	28	$4,942,032	$1,580,001	$3,362,030
Sub-Total	**1,017**	**$287,360,213**	**$124,437,854**	**$162,922,360**
All other open claims	257	$61,736,940	$26,740,676	$34,996,264
Total	**1,274**	**$349,097,154**	**$151,178,530**	**$197,918,624**

These ten Agencies account for 79.8% of the open claim volume and 82.3% of the unlimited outstanding reserves.

The following graph illustrates the comparison of the unlimited total incurred value (the amount expected to be paid when all of the claims have closed) with the outstanding reserves (the amount of the reserves posted to claims beyond what has already been paid) for the ten agencies having the greatest number of open claims in the CIW pool:



9. Oliver Wyman expects that an accelerated claim closure initiative would not have a significant impact on the total annual workers' compensation pay as you go premiums in the near term, unless premiums are increased to fund claim settlements. Further, Oliver Wyman expects that the individual agency experience modification factors used in the agency premium allocations are not likely to be impacted. This is because the experience period used in the EMF calculation is only three accident years excluding the latest accident year and the claim closure initiative would likely have a more significant impact on older accident years. The most significant and immediate impact of a claim closure initiative is a reduction in the Commonwealth's estimated reserves (total estimated future claim payments on incurred claims). However, over the long term, a reduction in total reserves should also lead to a reduction in the total premium requirements.

10. Due to the accelerated pace of claim closures, a CIW engagement would require an estimated additional $46.5M to $56.5M in funds during the 18 month project period. This amount is over the usual payout trending experience of the Commonwealth of Virginia. If an accelerated claim closure project is not undertaken, these funds will be paid on the claims over time. The CIW is expected to produce a higher number of claim closures with lower outstanding reserves and associated development and is projected to produce a potential ultimate cost avoidance of $32M to $54M for the Commonwealth of Virginia and its constituents.

3

Claim Resolution Best Practices

Triage:

Triaging the open inventory of claims is the first critical step in prioritizing claims with the greatest potential for appropriate closure. During the triage phase each open file in the pool is reviewed by a jurisdictional expert for:

- Reserve adequacy
- Strength and appropriateness of the documented Action Plan
- Applicability of Medicare Set-Asides (MSA)
- Probability of recoveries through subrogation and/or offsets
- Probability for settlement within the 18 month project period

Reserve Adequacy:

Across our book of business, our CIW results demonstrate a national average closure rate of 39% with a corresponding 18% reduction of ultimate incurred values on those closed claims across all industry sectors. In Virginia, the correlating historical closure rate is 49% with a corresponding reduction of 10% in ultimate incurred values.

It is noted the Commonwealth of Virginia has undertaken considerable effort to ensure claims are properly reserved; however in our experience we anticipate there will likely be some claims that will require reserve increases in order to have the actual exposure appropriately identified to settle outstanding liabilities. Reserve increases may be needed due to situational changes such as unanticipated surgical procedures, relapses in recovery or extended periods of disability. Given that LDF's specific to the Commonwealth of Virginia were used, increasing the reserves should have little, if any, impact on actuarial reports.

Developing an Aggressive Action Plan:

Positioning a claim for final resolution requires careful planning and attention to detail. Consideration must be given to mitigating the exposure value through thoughtful and targeted practices designed to help an injured employee attain Maximum Medical Improvement (MMI) and return to the greatest degree of productivity possible.

Alternative Return to Work:

Even with a strong Return to Work program, there will be injured employees who have significant medical limitations which cannot be reasonably accommodated by the respective Agency. In these instances, Alternative Return to Work options may provide a viable solution.

Such return to work programs can significantly reduce workers' compensation costs by returning the injured employee to the workforce through defined and monitored opportunities at a nonprofit while receiving compensation from their employer. Specialty vendors have proven success in placing injured employees with either large nonprofits or local organizations, such as a local library, or food pantry. These vendors can tailor a program to fit the needs of the Commonwealth of Virginia while ensuring the injured employee is working in a position consistent with his or her medical restrictions. The duration of the return to work program should be defined and consistently applied to all injured employees in similar pre-injury environments.

Medicare Set-Asides:

The NCCI has reported that MSA's make up approximately 40% of all proposed settlements and prescription drugs account for half of the MSA allocation.

The workers' compensation Medicare Set-Aside is a fund established to pay medical costs to treat occupational injuries that might otherwise have been paid by Medicare. "CMS" is the common name used for the Federal Agency responsible for administering Medicare and Medicaid programs. The full name of this Agency is the Centers for Medicare and Medicaid Services.

CMS has two thresholds for reviewing MSA's (*2):

1. The claimant is a Medicare beneficiary and the total settlement amount is $25,000 or greater; or
2. The claimant has a reasonable expectation of Medicare enrollment within 30 months of the settlement date and the anticipated total settlement amount for future medical expenses and disability/lost wages over the life or the duration of the settlement agreement is expected to be greater than $250,000.

    - A claimant has a reasonable expectation of Medicare enrollment within 30 months if any of the following apply:
    - The claimant has applied for Social Security Disability Benefits
    - The claimant has been denied Social Security Disability Benefits but anticipates appealing that decision
    - The claimant is in the process of appealing and/or re-filing for Social Security Disability Benefits

- The claimant is at least 62 year and 6 months old
- The claimant has an End Stage Renal Disease (ESRD) condition but does not yet qualify for Medicare based upon ESRD

In this context the settlement includes, but is not limited to: wages; attorney fees; all future medical expenses, repayment of any conditional payments and any previously settled portion of the workers' compensation claim. As part of the MSA submission review by CMS, it is possible for additional funds to be added to the calculations to cover other costs, such as specialist care, not included in the submission. Between 2010 and 2013 the gap between the amount submitted and the higher amount approved by CMS was approximately 10%.

CMS typically assumes the current regimen of pharmaceuticals will continue or increase over the life expectancy of the injured employee. Because CMS tends to rely upon average wholesale prices rather than discounted prices often available to the payor, the calculation for future prescription drugs can be very costly. This includes brand versus generic prescriptions. Given the potential financial impact to the MSA, it is prudent to complete a pharmaceutical review of claimants meeting the above MSA criteria.

(*2) Workers' Compensation Medicare Set-Aside Arrangement (WCMSA) Reference Guide, May 29, 2014 COBR-M5-2014—v.2.2

Retrospective Drug Utilization Review:

This type of review, typically completed by a pharmacist and or a physician, leverages evidence based medicine protocols to identify 1) potentially inappropriate medical prescriptions and 2) medically appropriate lower cost alternatives.

As it may take some time to reach agreement with the authorized treating physician, it is wise to begin this process timely in anticipation of bringing the claim to resolution.

Index Bureau Reporting:

It is a best practice to report new bodily injury claims to the Central Index Bureau at the time the claim is reported and periodically thereafter. With legacy claims, all too often years may have passed since the last update from the Bureau. By requesting an update it is possible to learn if the injured employee has sustained a subsequent, unrelated injury that may be impacting his or her recovery from the compensable occupational injury. It is not uncommon to find instances in which medical treatment for an unrelated injury is concurrent with that of the occupational injury.

Surveillance and Social Media Checks:

The use of a professional investigator should be considered when preparing a claim for settlement to help understand the actual extent of the injured employee's activities. With legacy claims the issue of compensability has been resolved, however there can be situations of exaggeration or protraction. This can be particularly prevalent with injuries based primarily upon subjective diagnosis.

Workers' compensation fraud occurs when someone knowingly, with intent to defraud, makes a false, material statement related to a workers' compensation claim or workers' compensation insurance.

In today's environment, social media checks can frequently unveil objective facts that may help to make the special investigator more efficient and/or reduce the overall value of the claim.

Independent Medical Exams and/or Physician Reviews:

As is common with many jurisdictions, Virginia recognizes and respects the role of the authorized treating physician. It remains important to ensure the provider is utilizing evidence based medicine in the treatment of the injured employee. A peer to peer review can often be a valuable cost effective resource in helping to move the injured employee to maximum medical improvement. When considering utilizing this technique it is usually best to match "specialty to specialty" and use a Board certified physician.

The peer to peer conversation can at times be more effective than an Independent Medical Examination (IME) because it is founded in a spirit of collaboration rather than as a challenge to the treating physician.

Subrogation:

Although workers' compensation is considered a "sole remedy," there are instances in which the Commonwealth may have a lien against a third party action. To protect all available rights, it is critical that parties are properly placed on notice and that appropriate diaries are set to ensure proper recoveries.

Negotiating Claim Settlements:

Taking appropriate steps including those described above will help to position an individual claim for a fair and reasonable settlement. Seeking a full and final settlement is advisable and the test of "fair and reasonable" is fundamental to workers' compensation. Settlements in the

Commonwealth of Virginia must be approved by the Commission to ensure the best interests of the injured employee are protected whether he or she is represented by an attorney or not. The expected timeframe for the approval process is generally 4 to 6 six weeks.

Through the course of an accelerated claim closure project the analysis of the settlement value will include consideration of:

- Medical reports
- Future medical treatment
- Compensation rate prior to injury
- Indemnity rate
- Impairment rating
- Future indemnity costs
- Disputed issues
- Life Expectancies
- Co-morbidities
- Considerations for SSDI and/or MSA's

Structured Settlements as an Alternative:

While settlements of workers' compensation claims have typically been accomplished through lump sum payments, structured settlements have become a mainstream alternative. Structured settlements are an agreement to resolve the settlement of a claim through payments made over a period of time rather than on a lump sum basis with advantages afforded to both the employee and the employer. The employee benefits by receiving guaranteed payments with preferential tax treatment in accordance with a customized schedule thus improving the likelihood funds will be available as personal and or medical needs arise in the future. Payment patterns can accommodate specific upcoming needs of the individual such as college tuition for dependents, home mortgage retirement or senior living arrangements. The possibilities are vast. It even is possible to structure a settlement to protect the financial interests of family members in the event of the untimely death of the injured employee.

Reducing the initial cash outlay needed to settle a claim along with the reduced administrative burden of managing an open claim, reduced legal expenses, reduced Medicare Set-Aside costs and the release of future claim obligations are key advantages for the Commonwealth of Virginia.

Legislation has been enacted by Virginia and at the Federal level to protect the rights of the employee and ensure payment obligations are met. Structured settlements are most commonly funded through annuities purchased from top-rated life insurance companies. The purchase price of the annuity is based upon the present day value of the settlement thus affording the employer an opportunity to fund the settlement for an amount less than the lump sum value. The

present discounted value of the annuity purchase is dependent upon multiple factors with the duration and pattern of the payment period being primary.

The NCCI reports that 44% of MSA settlements have an annuity component.

Voluntary Terminations:

Voluntary terminations associated with settlements must rightfully be kept separate and apart from the workers' compensation settlement evaluation. Working with human resources professionals and defense counsel is imperative in seeking voluntary terminations, particularly in the public sector due to a combination of unionization and the high bar related to "just cause." This can at times be achieved due to permanent restrictions that cannot be accommodated.

4

Summary

Managing specific files for accelerated closure requires aggressively planning, documenting and managing each individual claim within a very tight diary period. It may be advisable to tap into external resources to help ensure the exposure of the individual claim has been mitigated to the greatest extent possible prior to entering into settlement negotiations. This may include exploring alternative return to work options; retrospective pharmaceutical reviews; peer to peer consultations and/or renewed investigative activities.

Once the individual claim file is properly postured for settlement, then structured alternatives to lump sum settlements can be explored taking into consideration the unique circumstances of the individual injured employee and his or her personal situation.

Whether a claim is settled via lump sum or through a structure, the future compensable medical needs of the injured employee are taken into consideration in calculating the value of the settlement thus mitigating potential cost shifting to other benefit plans.

Overall, the Commonwealth of Virginia has a significant financial opportunity to impact the ultimate incurred value of its legacy open claim portfolio.

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