

AN ABSTRACT OF THE THESIS OF

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Title: A Model for Determining the Direct Costs of Workers
Compensation in a Self-Insured Company

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The purpose of this study was to examine the total direct costs of occupational injuries as they relate to workers compensation allocations within a self-insured firm.

Through the use of a model, this study provides financial impact information for safety professionals by defining the total direct costs of occupational injuries.

The investigator constructed a model which traced actual workers compensation allocations over a five year period at a division of Hewlett-Packard in Corvallis, Oregon.

The objective of this model was to compare actual workers compensation cost history with that of adjusted workers compensation cost data to determine the total direct costs that occupational injuries have on the division's workers compensation cost allocations.

This study indicated that injuries produce cost impacts to divisions well beyond the injury compensation costs reported by insurance carrier payment summaries. The study at this specific Hewlett-Packard division in Oregon indicated total costs at 1.7 to 1.9 times the actual cost of workers compensation reimbursements.

This study supports the need to continue research efforts that will further refine the identification of total injury costs and the impact these losses have on the business performance of a company.

A Model for Determining the Direct Costs of Workers
Compensation in a Self-Insured Company

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A Model for Determining the Direct Costs of Workers Compensation in a Self-Insured Company

CHAPTER I

INTRODUCTION

Historically, safety professionals have relied on a strategy and organizational structure that arranges conditions to comply with regulatory mandates from governmental agencies and insurance carriers as a basis for justifying the budgetary existence of occupational safety and health programs. Today, safety professionals are being asked by senior level executives to extend their approach to strategy and structure to incorporate an economic justification for the function's budgetary existence. Specifically, what are the total direct costs of occupational injuries and to what degree do they impact upon the competitive performance strategy of the company?

Faced with this question, safety professionals, employed in self-insured organizations, rely on workers compensation cost data supplied by a claims management department as one basis for calculating the cost and financial impact of injuries. However, workers compensation cost data does not reveal the total direct costs of injury claims. The supplied information lacks the actual cost accumulated over the active life of the claim. This is a result of using workers compensation injury costs in a prospective formula based on retrospective claim history, thus resulting in allocation costs to entities beyond basic injury reimbursement costs. Because workers compensation costs impact each year in which they appear in the allocation formula, the safety professional relies on incomplete cost

information when attempting to communicate total workers compensation expenditures to senior level executives. Workers compensation cost information in self-insured companies is usually available through payment records recorded on a claims management summary report. However, this information is not useful for the accounting of total direct cost of an injury. The reason for this is that the total cost of insurance (i.e., insurance carrier or self-insurance costs) tend not to be considered in insurance injury summaries. In effect, the total claim costs are hidden, nevertheless these costs continue to impact on the competitive performance of the enterprise in future years. In addition, the impact of individual injuries becomes more complicated when one discovers that the injury case settlement payments may be extended beyond the year in which the injury occurred and the original claim reserve estimated costs do not match the actual injury costs.

The Hewlett-Packard Company uses a self-insured approach to satisfy the regulatory requirement of providing workers compensation coverage. This approach includes the tracking and allocating of workers compensation costs and uses retrospective planning to manage its workers compensation coverage. This approach allows for payments resulting from injuries to be distributed over a five year time period. The basis of the retrospective planning formula takes into account the loss of experience over a five year period.

Hewlett-Packard developed their workers compensation allocation formula to calculate each entity's yearly prospective allocation. The formula was developed by Hewlett-Packard's Corporate Risk Management

to ensure that profits in a single division would not be severely impacted by a single catastrophic injury or by a significant increase of injuries in a single year. To help accomplish this a monetary ceiling of \$250,000 per claim against each entity was established. Costs in excess of the ceiling would be absorbed at the corporate allocation level and shared by all domestic divisions. The formula was designed to satisfy two objectives: (1) to distribute costs in a catastrophic situation and (2) to level out the costs if an entity experienced numerous claims in a single year. Hewlett-Packard's version of the formula calculates prospective allocation costs based on twenty-five (25) percent exposure and seventy-five (75) percent losses over a five year period. For example, the 1992 Workers Compensation allocation is based on total losses from the years 1987 through 1991, plus, losses and administration costs forecasted for 1992.

The objective of this study was to examine the total direct costs of injuries as they relate to workers compensation allocations in a self-insured firm.

Limitations

This study was confined to workers compensation allocation data from an Oregon Division and Hewlett-Packard's method of allocating workers compensation costs. Workers Compensation test cases were selected based on a desired range of injury cost and management of the cases being restricted to the year in which it occurred.

This study did not include a determination of other hidden or indirect costs such as the impact on productivity, property losses, equipment replacement, additional training and hiring time, clerical time, or potential loss of customers.

Definition of Terms

Workers Compensation Insurance: Legislation designed to minimize the costs of work related injuries to employees and transfer the majority of injury costs onto employers.

Retrospective data: Data derived from the history of losses through a five year period.

Prospective allocation formula: The specific workers compensation allocation formula developed by Hewlett-Packard for allocating self insurance costs throughout the corporation.

CHAPTER II

LITERATURE REVIEW

A review of the professional literature finds that there are few attempts to examine the full impact upon enterprise profits due to work related injury claims (Matthysen, 1973; Robinson, 1979; Veltri, 1990) and no attempts to specifically address the cost of claims to a firm over time. Much of the literature involves mitigation of work related injury costs through engineering controls (Borowka, 1989; Connors, 1990) and improved procedural approaches (Zillmer, 1989; Fraser, 1990; Howard, 1990) toward workers compensation claim management. Models for establishing total direct cost of workers compensation claims within specific insurance coverage formats as a means to justify the existence of safety programs are non-existent.

There exists an overhead cost of insurance regardless of whether a firm chooses to self-insure or is covered by an insurance company. Simply defined, overhead cost of insurance is the difference between the cost of claims and the actual insurance payments; costs may include claim administrator fees, self insured bonds, or charges based on loss experience ratings.

In most cases the cost of insurance, even self-insurance, exceeds the actual submitted claim payments. However, defining this cost has not been explored thoroughly. The investigator has located only two papers (Simonds and Grimaldi, 1963; Robinson, 1979) that attempt to define the specifics of overhead costs.

Early studies recognized the need to address the cost of on-the-job injuries and illnesses. One such study (Heinrich, 1959) elaborated on direct and indirect costs with the aim of providing additional information on total costs. Objectives of the paper were to reveal that injuries not only cause medical and wage compensation payments but also have a major impact toward productivity goals. The study elaborated on several cases to describe actual workers compensation payments and productivity costs sustained from injuries, it did not however, expand its investigation into the effect of insurance premiums either directly or during future years. The model developed by the investigator provides further exploration and clarification into the effects injuries have on company costs of operation.

Another early study (Simonds and Grimaldi, 1963) focused on the identification of direct and indirect costs associated with work related injuries. A cost analysis method discussed workers compensation insurance and quoted one study where actual workers compensation premiums exceeded actual claims payments by 43 percent. The context of this message was to reveal the fact that insurance companies make a profit and in the industrial state surveyed, costs surpassed workers compensation payments by a wide margin. However, the article did not elaborate on the process for attaining this figure and a model was not constructed to guide decision making in other settings. The intention of the investigator is to raise additional questions and inspire further examination to fully understand the

overhead cost of insurance in other settings or insurance coverages that can be used to justify safety programs and expenditures.

Other safety studies have also identified the need to establish the total impact on profits (Matthysen, 1973). Matthysen elaborated on the cost of an accident and how it affects profits by focusing on the factors of production, land, labor, and capital to maximize profits. When an injury occurs Matthysen has established that each of these factors may be impacted and result in a reduction of profits. In presenting his model, Matthysen described insured costs at transportation, medical, hospitalization, rehabilitation, and compensation costs which would be covered by an accident fund. Not mentioned in this paper were the costs associated with the accident fund. The investigators paper goes beyond Matthysen's work by establishing a model that can be used to better clarify the overhead cost of insurance not mentioned by Matthysen.

Another, more recent study in the construction industry (Robinson, 1979) found a need to clarify injury costs. Robinson's study was dedicated toward establishing an accident cost schedule for use by senior level management to reduce insurance premiums. His research was conducted in an industry where workers compensation costs are covered by an insurance carrier. The study focused on better identification of injury costs as a means by which to make workers compensation costs more visible and meaningful to project management. Also covered were perceptions and knowledge of workers compensation costs by upper management and their relationships to premium costs. Senior level management, at the two construction firms surveyed,

provided positive comments on the methods devised. Within this study, a claim impact was traced over a three year period. The findings revealed that a single injury impacted the insurance "experience modification" in such a way that it resulted in total direct costs that exceeded claim cost by 75 percent. Again, this was not the prime focus of the study and a model was not published for duplication or adaptation into other industries which are covered by an insurance carrier. Upon completion of this research, conclusions and the basic model presented may inspire safety professionals to modify and adapt the procedures to include insurance carrier costs for increased clarity when identifying total direct costs of injuries. It is this clarity of management information and data that will help safety professionals justify needed programs and equipment purchases.

Other approaches have been used to establish the need for improvements in the work environment. An article dealing with automation (Lambrinos & Johnson, 1984) uses a cost benefit scheme to identify specific areas for robotic use. By placing robots in highly dangerous tasks instead of employees, significant gains can be attained in reduced workers compensation costs let alone the generally recognized cost savings of robotics use.

Although quite variable, it has been accepted that direct costs of injuries or illnesses are dwarfed by the indirect costs (Bird, 1985). Figures have been estimated at five to fifty times the actual visible costs. When relating the concept of hidden costs to the study being presented in this paper, the format for identifying total

insurance costs is more accurately identifying the visible costs as described by Bird.

Other articles have supported the need to control injury or illness losses through the justification of capital expenditures and establishment of safety and environmental programs. A cost-benefit analysis (Barake, 1986) may be established to calculate the Return-On-Investment a specific action or activity has on total cost savings. The formats in this study will establish more accurate representation of workers compensation costs and add to the impact. Another approach (Channing, 1987) detailed an essential organization format for improving profits through safety. The flavor of his research dealt with ensuring that management has the knowledge to effectively operate at profitable levels and at the same time balance decision making about the risks to personnel by adhering to financial accounting of safety. In essence, manage the cost of safety in the same manner other functions of the organization are managed. The problem addressed by Channing, however, did not elaborate on the process for identifying costs. How can the level of control requested in this article be accomplished without accounting data? This paper attempts to reveal some of the necessary accounting data that can be used to justify the operational decisions as discussed by Channing. Return-On-Investment (ROI) strategies also have been elaborated upon by Garrigan (1990) as an extremely useful tool with which to convince senior level managers to authorize improvements in working conditions that also enhance profits. Again, utilization of information in this

paper can add to the level of accuracy when completing ROI calculations.

Another published study by Veltri (1990) also has enlightened safety professionals on the financial effects of accidents as they relate to profits. His model provides a tool for identifying financial impacts at the macro level on a yearly basis. However, this study provides more in-depth information on the effects of specific previous year injuries and will reveal the impact these injuries have on the cost-volume-profit standards of the company. The format that is provided will further highlight the impact of not only one year but subsequent years and yield information at the micro level to provide more accurate day to day information to govern senior level management decision making and safety management practices. Given this data, it will be possible for models provided by Veltri to also reveal total impacts to profits over a series of years. Also more thoroughly understood by the use of this information will be total impact.

Current studies have not addressed specific claim costs and overhead percentages within the self insurance approach to workers compensation nor specific reactions within a multiple division format. To evaluate and define costs fully when multiple entities are involved, the retrospective or loss experience calculation process and its impact must be examined thoroughly through its full contribution period.

CHAPTER III

METHODS

The method used to conduct this study was to determine the conditions and practices as they relate to the aspect of workers compensation allocation. Historical data is collected, formulae re-constructed, and a model created to objectively compare total reported injury cost against the total direct cost over time.

The completion of this study was contingent on completing the following sub-problem task:

Baseline Cost History

- (1) Initial re-construction of base-line cost history over the five year period under examination. This includes (a) acquisition of the specific prospective workers compensation allocation formula as used by Hewlett-Packard. The formula calculates yearly prospective allocations by addressing direct loss and exposure potential. Loss totals for the division are established by multiplying its "percent of total losses" by the "region estimated cost" and weighting this number at 75 percent.

$$\text{Loss Total} = \text{Division \% of OR Losses} \times \text{Oregon Estimate} \times 75\%$$

The Exposure factor is identified by first multiplying the divisions "percent of Oregon population" by the years "Oregon

estimated cost" and weighting this at 25 percent. Exposure also includes the "division percent of payroll" multiplied by "Oregon estimated costs" which is weighted at 75 percent.

Population Exposure	=	Division % of OR population	x	Oregon Estimate	x	25%
Payroll Exposure	=	Division % of OR Payroll	x	Oregon Estimate	x	75%

The population and payroll exposure figures are then added together and weighted at 25 percent to complete the exposure calculation.

Total Exposure	=	Population Exposure	+	Payroll Exposure	x	25%
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The year's prospective workers compensation allocation is finalized by combined total loss and total exposure figures. Also needed is (b) yearly workers compensation loss data and potential exposure information. The collection of data was accomplished by requesting a summary of data history that was required to complete the 1988-1992 yearly allocations. A form was submitted to Hewlett-Packard which collected the required information as needed to successfully re-construct allocation history. The response to this data request is listed in Table 1.

Table 1
Essential Data Request

Cost Category	Year				
	1988	1989	1990	1991	1992
Total OR W.C. losses 5 yr period	1,131,000	1,223,200	1,054,700	1,000,000	1,370,700
Total Div. W.C. losses 5 yr period	755,200	586,000	487,300	460,00	522,00
Employment in OR	2,380	2,383	2,578	2,969	2,937
Employment in Div.	1,139	992	960	1,005	919
Payroll in OR	74,913,000	81,898,000	88,598,000	88,068,000	96,575,000
Payroll in Div.	38,357,000	41,019,000	39,652,000	34,189,000	36,492,000
Estimated W.C. losses in OR	635,000	689,000	672,000	676,000	868,000

Then (c) development of a format to re-construct the history of entity workers compensation allocation costs. A Lotus 1-2-3 spreadsheet format was selected to re-construct and verify retrospective allocations over the selected 1988 to 1992 five year period. This format now determines total costs of workers compensation allocation payments over the five year period and is used as base-line data in this study.

Injury Payment Costs

- (2) Obtaining actual workers compensation payment costs for specific injuries, as supplied by claims management expense reports.

Collection of data on workers compensation claim payments was accomplished by reviewing claim and expense reports as published by Claims Management Services of Fred. S. James & Company.

Three injury claims were selected from a population of 20 claims during the year 1987. This year is chosen because losses during 1987 will have a direct impact on the allocation formula in the years 1988-1992. A single division was selected to have their records surveyed over the five-year period.

Adjustment of Injury Cost History

- (3) Adjusting specific workers compensation injury costs over a five-year period to ultimately determine the relationship between total insurance claim costs and total workers compensation allocation costs. Direct costs of selected cases, as reported by the Claims Management Service, are adjusted out of the formula and directly compared against base-line data history to determine impact on the claim on a single division over the five year period.

Information of Hewlett-Packard's workers compensation allocation process and specific data over the five-year period being studied enabled the establishment of direct comparisons between initially reported injury costs in 1987 and total direct costs of the injury as it impacted the division over the five-year period.

CHAPTER IV

ANALYSIS OF DATA

The purpose of this chapter is to present an analysis of data between the actual five-year history of Hewlett-Packard's workers compensation allocation costs and the total impact selected injury cases have on total allocation costs over the same period. Included are tables that verify Hewlett-Packard workers compensation formula use, its accuracy, and needed adjustments to calculate the total workers compensation allocation impact beyond reported injury costs as supplied by claims management summaries.

Data Accumulation

To establish yearly division allocations the Hewlett-Packard prospective allocation formula is separated into two sections. The first section is considered direct data accumulation. Using the year 1990 as an example, the previous five year loss totals are accumulated and labeled "Total OR 5 year losses (HP)";

Period	Oregon Total Losses
1985-1989	\$1,054,700

The formula also requires the total losses incurred over the same time period for the specific division in question. This figure is labeled "Sum of 5 year losses (division)."

Period	Division Total Losses
1985-1989	\$487,300

Data in the next row is the percentage of Oregon losses that were incurred by the division over the five-year period. This is labeled "% of total losses (division)" and is simply calculated as follows:

Sum of 5 year losses (division)	/	Total OR 5 year losses (HP)	=	% of total losses (division)
\$487,300	/	\$1,054,700	=	0.462027

Additional direct data needed for completion of the prospective allocation formula includes the specified divisions percent of population and payroll within Oregon. These percentages are determined using information from Table 1 as follows:

Division Employment	/	Oregon Employment	=	% of total population in Oregon
1,139	/	2,380	=	0.3724
Division Payroll	/	Oregon Payroll	=	% of total payroll in Oregon
\$38,357,000	/	74,913,000	=	0.4475

The last direct data needed for the formula is the estimated workers compensation losses in Oregon for the year. This information is taken directly from Table 1.

Period	Oregon W.C. estimated losses
1980	\$672,000

Allocation Calculation

The second section is actual calculation of workers compensation allocations to the division. The initial step is to determine the exposure and weight the amount at 25 percent to calculate the total exposure costs for the year. The necessary data for this calculation is (1) Oregon Estimated Cost, (2) percent of population and, (3) percent of payroll. Total exposure cost is then determined as follows:

(Oregon Estimate	x	% population)	x	Weight	=	pop. cost
(672,000	x	.3742)	x	.25	=	62,563.2
(Oregon Estimate	x	% payroll)	x	Weight	=	payroll cost
(672,000	x	.4475)	x	.75	=	225,540.0
(population cost	+	payroll cost)	x	Weight	=	exposure cost
(62,523.2	+	225,540)	x	.25	=	72,025.8

Also necessary is a total loss cost. This is based on division performance, the 1990 Oregon estimate, and weighted at 75 percent.

The necessary data for this calculation is (1) the percent of division losses within Oregon and, (2) the Oregon estimated cost. Total losses are calculated as follows:

(1990 Oregon Estimate	x	% losses)	x	weight	=	loss cost
(\$672,000	x	.4602)	x	.75	=	\$232,861.6

Combining total exposure costs and total loss costs provides the prospective workers compensation allocation cost to the specified division. This figure is rounded to the nearest thousand.

(Total losses	+	Total exposure)	=	Prospective Workers Compensation cost
(\$232,868.6	+	\$72,025.8)	=	\$304,887.4

Rounded Allocation = \$305,000

Table 2 is constructed to outline the formula appearance during a single year and to verify that the re-construction of the formula matches actual allocation to the specified division.

Table 2

Allocated Workers Compensation Costs 1990

Total OR 5 YR losses (HP)	\$ 1,054,700
Sum of 5 YR losses (Div.)	\$ 487,300
% of total losses (Div.)	0.462
% of total population in OR	0.372
% of total payroll in OR	0.447
OR estimated cost	\$ 672,000
population cost at 25% weight	\$ 62,563
payroll cost at 75% weight	\$ 225,540
Total Exposure at 25% weight	\$ 72,026
Total Losses at 75% weight	\$ 232,862
w.c. premium calculated	\$ 304,887
Actual w.c. Allocation (rounded)	\$ 305,000

To analyze total workers compensation costs Table 3 is constructed. This table reflects actual allocations to a single division in a multiple division, self-insurance coverage scheme over the selected 1988 to 1992 five year period and is considered the baseline in this study. Each individual year is calculated as outlined in Table 2.

Table 3
Allocated Workers Compensation Costs 1988-1992

	1988	1989	1990	1991	1992
Total OR 5 YR losses (HP)	113,100	1,223,200	1,054,700	1,000,000	1,370,700
Sum of 5 YR losses (div)	755,200	586,500	487,300	460,000	522,000
% of total losses (div)	0.668	0.479	0.462	0.460	0.381
% of total population in OR	0.475	0.416	0.372	0.339	0.313
% of total payroll in OR	0.512	0.501	0.448	0.388	0.378
OR estimated cost	635,000	689,000	672,000	676,000	868,000
population cost at 25% weight	75,406	71,708	62,563	57,207	67,899
payroll cost at 75% weight	243,840	258,840	225,540	196,847	246,013
Total Exposure at 25% weight	79,812	82,637	72,026	63,506	78,478
Total Losses at 75% weight	318,005	247,771	232,862	233,220	247,919
W.C. premium calculated	397,817	330,408	304,887	296,726	326,397
Actual W.C. Allocation (rounded)	398,000	330,000	305,000	297,000	326,000

Data Manipulation

The crux of this study is to remove known workers compensation costs from the formula base to evaluate the five-year impact. To accomplish this, data from an injury sustained in 1987 is gathered

through insurance payment records. Table 4 illustrates an exact replication of Table 3, except costs from a selected 1987 workers compensation claim are subtracted from three rows of data. The manipulation of data occurs in several areas, as if the injury had not occurred. These areas are:

- 1) total Oregon five year losses,
- 2) sum of five year losses in the division, and
- 3) Oregon estimated cost (1988 only).

Also changed will be the "percentage of total losses" for the division as this calculation is dependent upon Oregon losses and division losses as previously described. Also included in Table 4 is a row to calculate adjustments to each years workers compensation cost base, and a row to determine the total five-year impact of the adjustments.

Five Year Cost Impact

The five-year cost impact of a sustained workers compensation claim is determined by comparing actual total entity allocations, Table 3, to the adjusted costs in Table 4.

This comparison is repeated for two additional claims that were sustained in 1987. Tables 5 and 6 are constructed to examine the consistency of overhead insurance costs between inexpensive and expensive reported claim costs.

Table 4

Adjusted Workers Compensation Costs: \$1,566 Injury

	1988	1989	1990	1991	1992
total OR 5 YR losses (HP)	1,129,434	1,221,634	1,053,134	998,434	1,369,134
Sum of 5 YR losses (div)	753,634	584,934	485,734	458,434	520,434
% of total losses (div)	0.667	0.479	0.461	0.459	0.380
% of total population in OR	0.475	0.416	0.372	0.339	0.313
% of total payroll in OR	0.512	0.501	0.448	0.388	0.378
OR estimated cost	633,434	689,000	672,000	676,000	858,000
population cost at 25% weight	75,220	71,708	62,563	57,207	67,899
payroll cost at 75% weight	243,239	258,840	225,540	196,817	246,013
Total Exposure at 25% weight	79,615	82,637	72,026	63,506	78,478
Total Losses at 75% weight	317,002	247,427	232,458	232,791	247,455
Adjusted W.C. premium	396,617	330,063	304,484	296,297	325,936
Adjusted W.C. allocation (rounded)	397,000	330,000	304,000	296,000	326,000
Adjusted Delta	-1,000	0	-1,000	-1,000	0
Total 5 year cost					-3,000

Table 5

Adjusted Workers Compensation Costs: \$4,131 Injury

	1988	1989	1990	1991	1992
total OR 5 YR losses (HP)	1,126,866	1,219,066	1,050,566	995,869	1,366,566
Sum of 5 YR losses (div)	751,066	582,366	483,166	455,866	517,866
% of total losses (div)	0.667	0.478	0.460	0.458	0.379
% of total population in OR	0.475	0.416	0.372	0.339	0.313
% of total payroll in OR	0.512	0.501	0.448	0.388	0.378
OR estimated cost	630,866	689,000	672,000	676,000	868,000
population cost at 25% weight	74,915	71,708	62,563	57,207	67,899
payroll cost at 75% weight	242,253	258,840	225,540	196,817	246,013
Total Exposure at 25% weight	79,292	82,637	72,026	63,506	78,478
Total Losses at 75% weight	315,358	246,859	231,795	232,083	246,699
Adjusted W.C. premium	394,650	329,496	303,821	295,589	325,177
Adjusted W.C. allocation (rounded)	395,000	329,000	304,000	296,000	325,000
Adjusted Delta	-3,000	-1,000	-1,000	-1,000	-1,000
Total 5 year cost					-7,000

Table 6

Adjusted Workers Compensation Costs: \$9,286 Injury

	1988	1989	1990	1991	1992
total OR 5 YR losses (HP)	1,121,714	1,213,914	1,045,414	990,714	1,361,414
Sum of 5 YR losses (div)	745,914	577,214	478,014	450,714	512,714
% of total losses (div)	0.666	0.475	0.457	0.455	0.377
% of total population in OR	0.475	0.416	0.372	0.339	0.313
% of total payroll in OR	0.512	0.501	0.448	0.388	0.378
OR estimated cost	625,714	689,000	672,000	676,000	868,000
population cost at 25% weight	74,304	71,708	62,563	57,207	67,899
payroll cost at 75% weight	240,274	258,840	225,540	196,817	246,013
Total Exposure at 25% weight	78,644	82,637	72,026	63,506	78,478
Total Losses at 75% weight	312,063	245,714	230,453	230,654	245,169
Adjusted W.C. premium	390,708	328,351	302,479	294,160	326,472
Adjusted W.C. allocation (rounded)	391,000	328,000	302,000	294,000	324,000
Adjusted Delta	-7,000	-2,000	-3,000	-3,000	-2,000
Total 5 year cost					-17,000

One last scenario is constructed to evaluate total workers compensation cost impact of a cluster of claims or an extremely costly

injury to determine if higher cost claims have approximately the same percentage of impact on workers compensation allocation costs within this format. Table 7 is designed to examine the impact a \$30,000 injury cost from 1987 would exhibit over the five-year period. Once again, this is direct comparison of costs between the original costs as described in Table 3 and the costs as manipulated in Table 7.

To further evaluate model usage within Hewlett-Packard's format, division five year loss total were artificially reduced to levels significantly below the division payroll and population ratio to examine the effect. Consistency of application is observed in all cases except the lowest cost injury scenario. Figures 1 through 3 graphically display outcomes of actual history and modifications.

Table 7

Adjusted Workers Compensation Costs: \$30,000 Injury

	1988	1989	1990	1991	1992
total OR 5 YR losses (HP)	1,101,000	1,193,200	1,024,700	970,000	1,340,700
Sum of 5 YR losses (div)	725,200	556,500	457,300	430,000	492,000
% of total losses (div)	0.659	0.466	0.446	0.443	0.367
% of total population in OR	0.475	0.416	0.372	0.339	0.313
% of total payroll in OR	0.512	0.501	0.448	0.388	0.378
OR estimated cost	605,004	689,000	672,000	676,000	868,000
population cost at 25% weight	71,844	71,708	62,563	57,207	67,899
payroll cost at 75% weight	2,323,206	258,840	225,540	196,817	246,013
Total Exposure at 25% weight	76,041	82,637	72,026	63,506	78,478
Total Losses at 75% weight	298,873	241,009	224,926	224,753	238,899
Adjusted W.C. premium	374,914	323,645	296,949	288,259	317,377
Adjusted W.C. allocation (rounded)	375,000	324,000	297,000	288,000	317,000
Adjusted Delta	-2,300	-6,000	-8,000	-9,000	-9,000
Total 5 year cost					-55,000

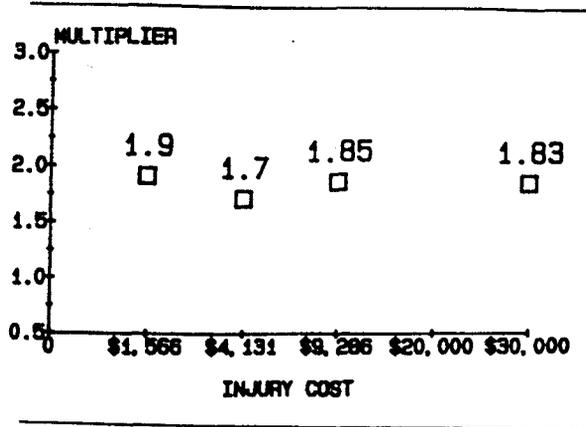


Figure 1. Actual loss history

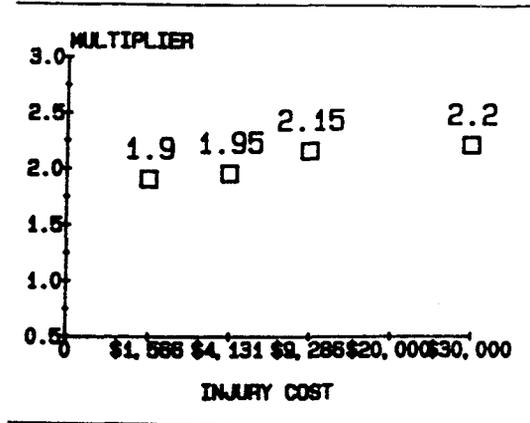


Figure 2. Modified loss history (\$200,000)

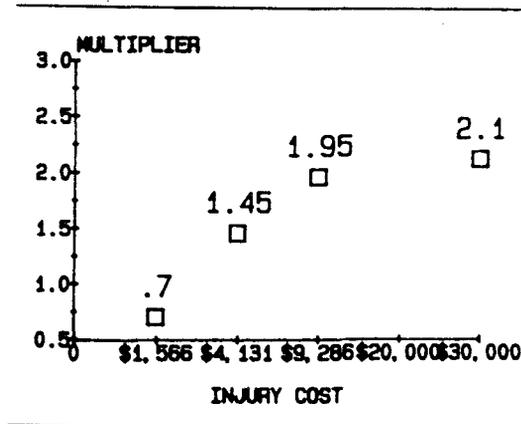


Figure 3. Modified loss history (\$250,000)

CHAPTER V

SUMMARY OF ESSENTIAL FINDINGS

The problem addressed by this research was to examine the total direct costs of occupational injuries as they relate to workers compensation allocations within a self-insured firm.

Data was gathered from Hewlett-Packard's Corporate Risk Management department in the form of (1) the specific formula utilized for the allocation of workers compensation costs, (2) the collection of workers compensation allocation information over a five-year period, and (3) actual workers compensation payment costs for three specific injuries representing different levels of severity.

Finally, comparisons were made through (1) the re-construction of the formula being placed into a five-year format and (2) adjusting injury costs within the formula to determine actual workers compensation costs over a five-year period.

Essential Findings

Analysis of the data collected and assembled in Chapter IV resulted in the following two essential findings:

(1) That there exists an additional cost impact to workers compensation allocations beyond workers compensation injury payment costs as detailed by the claims management reports.

(2) That the impact of individual claims (based on three cases) over the five year period as determined at this division ranged

between 1.7 and 1.9 times the actual injury compensation payments. A fourth case was introduced as a high cost injury scenario, the result was 1.8 times the cost of injury compensation.

Conclusions

Based upon findings of this investigation, the following conclusions seem to be indicated:

(1) That there are more costs associated with workers compensation losses than is reported by claims administration summaries.

(2) That an additional level of clarity is attained when using injury cost summaries as the basis for budgeting decisions.

Recommendations

The results of this investigation lead the investigator to make the following recommendations:

(1) A study should be conducted to test the reliability and validity of this model at other Hewlett-Packard sites within Oregon and other states.

(2) A similar study should be performed within other large industries, which are covered by conventional workers compensation insurance practices, to establish a model that determines the additional cost impact injuries have on workers compensation payments.

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APPENDICES

Appendix A

Base Allocation Format

cells	A	B	C	D	E
1					
2					
3					
4			1988		1989
5					
6					
7					
8	Total State Losses		1983-1987		
9			\$ totals		
10					D
11					
12	Total Division Losses		1983-1987		U
13			\$ totals		
14					P
15					
16	% of total losses		@sum(C12/C8)		L
17	(division)				
18					I
19					
20	Division % of total		()		C
21	population in state				
22					A
23					
24	Division % of total		()		T
25	payroll in state				
26					E
27					
28	Estimated W.C. cost		()		
29					
30					
31					
32					
33	% of headcount @ 25%		@sum(C28*C20)*(.25)		
34	% of payroll @ 75%		@sum(C28*C24)*(.75)		
35					
36	Total exposure @ 25%		@sum(C33+C34)*(.25)		
37					
38	Losses weighted @ 75%		@sum(C28*C16)*(.75)		
39					
40	W.C Premium calculated		@sum(C36+C38)		
41					
42	W.C Premium Allocation (rounded)		ROUND		
43					

Appendix B

Adjusted Allocation Format Comparison

cells	A	B	C	D	E
101					
102					
103					
104			1988		1989
105					
106					
107					
108	Total State Losses		1983-1987		
109	(adjusted)		\$ totals		
110					D
111					
112	Total Division Losses		1983-1987		U
113	(adjusted)		\$ totals		
114					P
115					
116	Div. % of total losses		@sum(C112/C108)		L
117	(adjusted)				
118					I
119					
120	Entity % of total		()		C
121	population in state				
122					A
123					
124	Entity % of total		()		T
125	payroll in state				
126					E
127					
128	Estimated W.C. cost		()		
129	(adjusted)				
130					
131					
132					
133	% of headcount @ 25%		@sum(C128*C120)*(.25)		
134	% of payroll @ 75%		@sum(C128*C124)*(.75)		
135					
136	Total exposure @ 25%		@sum(C133+C134)*(.25)		
137					
138	Losses weighted @ 75%		@sum(C128*C116)*(.75)		
139					
140	Adjusted W.C. Premium		@sum(C136+C138)		
141					
142	Adjusted Allocation (rounded)		ROUND		
143					
144	Actual / Adjusted Delta		@sum(C142-C42)		
145					
146	Five Year Cost		cell L146 = @sum(C144..M144)...		
147					