To the Graduate Council:

I am submitting herewith a thesis written by Chad D. Lawson entitled "Analysis of Claims in Highway Construction." I have examined the final copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Civil Engineering

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Associate Vice Chancellor and
Dean of The Graduate School

Analysis of Claims in Highway Construction

A Thesis
Presented for the
Master of Science
Degree
The University of Tennessee, Knoxville

Chad D Lawson

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Abstract

Today's construction industry is fast paced, complex, and expensive. Unfortunately, there exist many instances when a project falls behind schedule. Disputes often arise as a result of tight budgets. Contractors normally file claims against the owners in order to recover lost time and money Although owners and contractors try to settle disagreements as quickly as possible, there are times when a solution cannot be reached to satisfy both parties. Thus, claims management has become an important part of the construction industry. The task of analyzing a construction claim is not easily accomplished. The purpose of this study is to develop an analysis procedure for delay claims. With each claim being unique, the analysis procedure discussed in this thesis is presented in a broad sense However, there is a detailed discussion of indirect job costs, and, more specifically, home office overhead costs. The focus of the procedure is to provide owners with methods to calculate home office overhead. This topic is approached by the use of examples related to home office overhead calculations.

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Chapter 1

Introduction

1.1 BACKGROUND

The construction industry is a complex business joining diverse professions, trades, and crafts to reach a common goal. That goal is to produce a final product, the project, which is acceptable to the owner. Unfortunately, this goal is a complicated task undergoing many phases. The phases associated with a typical project are planning, design, bidding, construction, occupancy, and evaluation. Following procedure becomes crucial to the life of the project. In addition to the laws and regulations established by local, state, and federal governments, there are those guidelines written specifically for an individual contract. The presence of multiple phases, laws, and procedures increases the likelihood of mistakes. These mistakes can often lead to major disputes. The most common form of legal dispute, in the construction industry, is a claim A claim is a demand for something that is owed to the claimant. In construction, time and money are usually the two items of concern.

The University of Tennessee is presently involved in a project funded by the Tennessee Department of Transportation (TDOT) regarding effective claims resolution. One of the goals of the project is to produce a claim analysis procedure for highway construction. Historically, most of TDOT's disputes have been settled through a mutual agreement with the contractor. However, this method of settlement can be costly to the owner Indeed, the determination of additional compensation due to a contractor is a complicated task. However, the use of a claim analysis procedure would save money by using historical data, contract documentation, and numerical techniques to recognize areas of inflated demands from the contractor.

Before a project begins, the contractor typically presents a schedule to the owner. This schedule contains the tasks involved to complete the job along with the cost, quantity, and time associated. Inevitably, this schedule will change during the construction progress. For instance, the contractor will likely be faced with delays in the work. These delays can increase the cost of a project dramatically However, delays are only one cause of claims. Acceleration, acts of God, cardinal changes, and defective specifications are the other reasons for construction disputes and will be discussed further in chapter 3. Contracts attempt to minimize problems between the owner, the A/E (architect/ engineer) and the contractor by documenting procedures to follow in the event of a modification to the project. These procedures are normally found in the project specifications and are called the "conditions of the contract". Still, these conditions cannot prevent all claims. For this reason, the need for an analysis procedure exists to aid in dispute resolution.

1.2 PREVIOUS WORK

Considering the money involved in the construction industry, claims management is a very important job. Numerous publications have been devoted to construction claims. Topics have included the importance of documentation during construction, effective claims management, claims resolution, and other suggestions to avoid or reduce the occurrence of claims

In Construction Contracts and Claims[1], Simon discusses the frequency of delays and the problems associated He expresses the importance of contract clauses directed at delays and the clauses' applications in various situations. Owners often use no-damage-for-delay clauses in an attempt to exclude themselves of responsibility in the event of a delay Still, certain instances can result in full recovery by the contractor. These instances occur when a delay is deemed excusable. An example of an excusable delay would be when the owner stops the work on a job By stopping the work, the owner is causing a breach of contract and the contractor is due any losses caused by the delay. This example clarifies the importance of contract clauses in the case of disputes.

Simon also talks about acceleration claims. He uses an example in which a contractor decided to accelerate work in order to stay on schedule. It seems the work had fallen behind as a result of an excusable delay and the owner concluded that a time extension was unnecessary The contractor was denied his request for additional money and as a result he filed a claim against the owner The court's decision was for full recovery by the contractor because the acceleration of work was a direct result of the excusable delay. This case reinforces the fact that the owner must use caution when denying a contractor's request for legitimate time extensions

Simon covers many other cases in the construction industry, some of which include the importance of documentation Kangari surveyed a group of professionals, associated with the American Arbitration Association (AAA), in his paper

"Construction Documentation in Arbitration".[2] His concern was to find out what documentation presented the strongest defense in arbitration. Those surveyed agreed that the construction schedule, video and photography, firsthand witnesses, and the field diaries were the most important pieces of information. Another result of the paper was the strong recommendation for some kind of project-management information control system.

1.3 PROBLEM STATEMENT

Previous publications have expressed the need for claims management. Countless strategies dealing with claims prevention are also covered in these publications. The topics mentioned thus far are extremely important and should not be overlooked. However, past literature gives little consideration to claims analysis The goal of this study is to examine those TDOT contracts containing claims and develop a general analysis procedure to evaluate contractor's demands.

Chapter 2

Methodology

2.1 CURRENT PRACTICES AND RELATED ISSUES

The information a contractor provides with his claim must support his demands. This information typically contains a productivity report of the job under consideration along with supporting documentation. This information can be analyzed systematically with the aid of historical data and a common procedure. This common procedure should contain a checklist of steps to follow during the analysis along with numerical techniques used to examine the contractor's demands. There are three possible items a contractor can demand in a claim. These items are time extensions, direct costs, and indirect costs.

Direct costs of a job are more easily determined since the prices for labor, materials, and equipment is established by the industry. In other words, the contractor does not determine these prices. Labor rates are established by local, regional, or national standards. Material costs are set by the manufactures and equipment costs are based on current rental or operation rates. Thus, an inflated demand for direct costs can be recognized more easily than an inflated demand for indirect costs, such as home office overhead. Time of construction is determined by comparing past productivity and historical data to the job under consideration. The contractor usually updates his schedule as the job progresses. This updated schedule provides a means to compare expected productivity to actual productivity. Overall, the demands for direct costs and time extensions are not as complicated to determine as the demands for indirect costs.

When a contractor calculates indirect costs for a claim, he uses a certain procedure to estimate the final amount. Direct costs are also an estimate on any job but the means for calculating direct costs are more common and accepted by the industry. For instance, if there is an increase in the specified work, the contractor typically uses a unit price to make the necessary adjustments to the labor, time, and material costs In highway construction, contracts are likely based on a unit price for each task in order to make such changes easily adjustable. However, when adjustments are made to the indirect costs, and more specifically, home office overhead, it should be assumed that the contractor uses the most advantageous approach for his benefit. Therefore, when analyzing these costs, certain resources should be utilized. These resources include numerical techniques to estimate appropriate demands along with documents related to the contractor's financial history. A detailed discussion of home office overhead analysis will be continued in chapter 3.

TDOT currently has no standard analysis procedure to handle claims. The information provided by the contractor in his claim, along with historical data, is used to determine the amount of recovery TDOT feels is appropriate. This method of examination can be amended with the addition of a standard analysis procedure (SAP).

2.2 APPROACH OF THIS STUDY

It is the intent of this study to develop a SAP including a technique to estimate home office overhead. By taking into account those calculations typically involved in construction claims, a general analysis procedure can be developed. This procedure can be formed into a checklist to aid in the analysis of claims. Also, literature is available discussing home office overhead determination. This literature will be used as a resource when developing the SAP. Chapter 3 contains the complete SAP for construction claims.

Chapter 3

Standard Analysis Procedure (SAP)

3.1 INTRODUCTION

The SAP should be used to aid and guide in the evaluation of construction claims. It is not the intent of this study to nullify all other means of analysis nor is the SAP a substitution for experience and/or knowledge of claims adjustment.

The majority of claims stem from delays in construction. As mentioned earlier, acceleration, acts of God, cardinal changes, and defective drawings and specifications also contribute to disputes. Acceleration is used to reach the project completion date on time or to reach an early completion date. This usually happens when a delay has already occurred. An act of God is defined as an unforeseeable condition or event of nature. Although these conditions are indeed unforeseeable, some contract provisions require contractors to plan for lost days. A cardinal change is simply a change or modification made by the owner. When these types of changes occurs, the contractor should be compensated accordingly. Still, a cardinal change may cause a claim. The owner must be careful to document important information during this period to avoid disputes. Defective drawings and specifications may also lead to problems in productivity. Overall, there are a number of areas associated with construction claims. However, the cause of a claim can be narrowed down into two categories. The two categories are delays and acceleration. Although the above mentioned causes of claims (acts of God, cardinal changes, and defective drawings and specifications) are unique, the end result is typically a delay Thus, the focus of the SAP is delay claims.

3.2 DATA ACQUISITION

Perhaps the most important step in construction claims analysis is the acquisition of necessary data. This data or documentation is a direct function of the dispute at hand. Thus, the volume or detail of information needed varies from claim to claim However, it is becoming more common to list provisions, in the general conditions of the contract, covering all necessary requirements and documentation in the event of a claim This demand for information is an important standard which should be considered if not currently practiced. By issuing these provisions in the contract, the owner has all of the data needed to analyze a claim.

In his thesis, "Effective Contract Drafting for the Avoidance and Resolution of Construction Claims"[3], Russell N Rackley lists an example of a contract provision requiring delay claims to have specific contents These contents provide the claims analyst with pertinent information. Examples of those items included are listed below.

a *A description of the operations that were delayed, the reasons for the delay, how they were delayed, including the report of all scheduling experts or other consultants, if any*

b *An as-built chart, CPM scheme, or other diagram depicting in graphic form how the operations were adversely affected*

In addition to the items in Rackley's thesis concerning the content of claims, he lists some important documents that would increase the effectiveness of a claims analysis. These documents are as follows.

1 *Financial statements for all years reflecting the operations on this project*

2 *Income tax returns for all years reflecting the operations on this project*

3 *Depreciation records on all company equipment whether such records are maintained by the company involved, its accountant, or others*

4 *If a source other than depreciation records is used to develop costs for the Contractor's internal purposes in establishing the actual cost of owning and operating equipment, all such other source documents*

5 *All documents which reflect the contractor's actual profit and overhead during the years this project was being performed and for each of the five years prior to the commencement of this Project*

6 *All documents related to the preparation of the Contractor's bid including the final calculations on which the bid was based unless such documents are placed in escrow under the provisions of the contract*

7 *All documents which relate to each and every claim together with all documents which support the amount of damages as to each claim*

8 *Worksheets used to prepare the claim establishing the cost components for items of the claim including, but not limited to, labor, benefits and insurance, materials, equipment, subcontractors, and all documents which establish the time periods and individuals involved, along with the hours and rates for those individuals involved*

Once the appropriate data is collected, the SAP may proceed

3.3 PROCEDURE

It would be difficult to create an in-depth analysis procedure applicable to all claims. A better approach is to recognize those steps or calculations occurring in a typical claims analysis, and create a checklist. The following is an outlined procedure for analyzing a delay claim·

A. TIME EXTENSIONS

1 Determine expected productivity

This can be accomplished by observing the contractor's initial schedule for the job under consideration and comparing the results to historical data or the productivity of similar operations that have already been completed

By making this comparison, a judgement can be made as to a reasonable production rate for the operations under consideration

2 Determine actual productivity·

This can be determined from schedules or progress reports provided by the contractor or from the inspector's diary and field books Other resources, such as material invoices and job expense accounts, may be utilized to estimate actual productivity.

3. Determine time extension:

This step is crucial to the remainder of the claim analysis since all expenses will be based on the time of delay. Compare the expected productivity to the actual productivity Note any deviations or unreasonable results. The final step is to determine the contractor's actual time of delay By establishing a reasonable production rate in steps 1 & 2, the owner can determine if the contractor's requested time extension is legitimate.

B. DIRECT COSTS

Determine labor, material, equipment, and subcontractor costs:

Compare the claim for the costs of these items to those costs already established This can be done by observing the contractor's previous billings for these items or by observing the market value of these items and relating the results to the costs demanded in the claim. A determination can be made to assure reasonable direct costs

C INDIRECT COSTS

Determine field overhead, home office overhead, and extended equipment costs:

> This may be accomplished by using a formula to estimate costs, a percentage to estimate costs, or some other means to calculate reasonable results. Examples related to the calculation of home office overhead will be presented in the following pages

The above outline for analyzing claims is meant to cover all areas in a broad sense Certainly there are other items that may be considered. These items include tools and supplies, bonds, depreciation, extended field expenses, extended equipment costs, increased labor costs due to a period of higher labor rates, as well as those costs that fall under broader categories. For instance, those costs that fall under home office overhead include building rent, depreciation on buildings (if owned), depreciation on equipment such as computers; lights, heat, telephone, stationery, taxes, insurance, and benefits A more detailed account of these job costs as well as others may be found in <u>Construction Claims Analysis, Presentation, Defense</u>[4]

Indirect costs typically account for one half of a claim. A large percent of the indirect costs come from home office overhead. Consequently, the methods for calculating these costs are controversial Contractors normally use some form of estimate when determining overhead costs The goal of the claims analyst is to decide whether or not this estimate is feasible There are a number of techniques used in the industry to calculate job overhead costs. However, when presented in court, some techniques have been proven to hold stronger cases. The following method is used to calculate home office overhead costs and is discussed in greater detail in Builder's and Contractor's Handbook of Construction Claims [5].

Eichleay formula:

1. $\dfrac{\text{Contract Billings}}{\text{Total Billings for Contract Period}} \times \text{Total Overhead for Contract Period} =$

   Overhead Allocable to the Contract

2. $\dfrac{\text{Allocable Overhead}}{\text{Days of Performance}} = \text{Daily Contract Overhead}$

3. Daily Contract Overhead X Number Days Delay = Amount Claimed

Although the Eichleay formula has been proven to be an effective means for calculating home overhead costs, other methods display different results Depending on the application, the Eichleay formula may over-estimate a contractor's expenses. Therefore it is recommended to use a variety of calculations to determine the most reasonable results. The following examples taken from Builder's and Contractor's Handbook of Construction Claims[5] explains the variance associated with the Eichleay formula and two other methods used to determine overhead costs

Example 1 Example 1 illustrates a project which could have been performed by the contractor for a price of $400,000 over a four-month duration assuming no change orders were issued, and no suspensions of work or other delays were encountered. The contractor in this example has a fixed home office overhead rate of $40,000 and regularly does $500,000 worth of total business per month including the contract in question These data are reflected under the headıng "Potential Performance" and reflect what would have happened but for any changes or delays caused by the owner on thıs proȷect

Example 1· A $400,000, four-month contract with a one-month suspensıon and no change orders

	MO 1	MO 2	MO 3	MO 4	MO 5
POTENTIAL PERFORMANCE					
Home Office Overhead	$ 40,000	$ 40,000	$ 40,000	$ 40,000	$ 40,000
Contract Billıngs	$100,000	$100,000	$100,000	$100,000	-------
Other Contract Billıngs	$400.000	$400.000	$400.000	$400.000	$500.000
Total Billings	$500,000	$500,000	$500,000	$500,000	$500,000
ACTUAL PERFORMANCE					
Home Office Overhead	$ 40,000	$ 40,000	$ 40,000	$ 40,000	$ 40,000
Contract Billıngs	$100,000	$100,000	--------	$100,000	$100,000
Other Contract Billings	$400.000	$400.000	$400.000	$400.000	$400.000
Total Billıngs	$500,000	$500,000	$400,000	$500,000	$500,000

EICHLEAY FORMULA

$$\frac{\$400{,}000 \text{ (Contract Billings)}}{\$2{,}400{,}000 \text{ (Total Billings)}} \times \$200{,}000 \text{ (Total Overhead)}$$

$$= \$33{,}3333 \text{ (Allocable Overhead)}$$

$$\frac{\$33{,}333 \text{ (Allocable Overhead)}}{5 \text{ (Months of Performance)}} = \$6{,}667 \text{ (Monthly Contract Overhead)}$$

$$\times \ 1\text{-Month Delay} = \$6{,}667 \text{ (Claim)}$$

COMPARATIVE ABSORPTION RATES

$$\frac{\$200{,}000\ \text{(Potential Total Overhead)}}{\$2{,}500{,}000\ \text{(Potential Total Billings)}} = 08\ \text{(Reasonable Overhead Ratio)}$$

08 (Reasonable Overhead Ratio) X $2,400,000 (Actual Total Billings)

= $192,000 (Reasonable Total Overhead)

$200,000 (Actual Total Overhead) - $192,000 (Reasonable Total Overhead)

= $8,000 (Unabsorbed Overhead Claim)

BURDEN FLUCTUATION

$2,400,000 (Total Billings) - $400,000 (Contract Billings)

= $2,000,000 (Other Billings)

$$\frac{\$200{,}000}{\$2{,}400{,}000}\ \text{(Actual Overhead Rate)} - \frac{\$200{,}000}{\$2{,}500{,}000}\ \text{(Potential Overhead Rate)} =$$

8 33% - 8.00% = 33% (Burden Fluctuation)

33% X $2,000,000 = $6,600 (Unabsorbed Overhead Claim)

In the "Actual Performance" of the work, the contractor experienced no changes; however, there was a one-month suspension of work during the third month of the project This resulted in a one-month delay to the contract in question and the inability to take on $100,000 in new work after the originally planned completion date had passed Under the Eichleay theory, the contractor would have a claim for $6,667 of extended overhead based on the one-month delay.

A comparison of absorption rates reveals that the contractor, in fact, suffered $8,000 in unabsorbed overhead during the delay This figure is arrived at by calculating a reasonable overhead rate based on what the contractor's overhead absorption rate would have been but for the delay In this case, the rate equals 8 percent Applying that rate to the actual billings for the actual performance period, one arrives at a reasonable total overhead of $192,000, $8,000 less than the amount of overhead the contractor had to absorb. In other words, the contractor was unable to maintain the 8 percent absorption rate during the delay Had the contractor been able to maintain that rate, only $32,000 would have been expended on home office overhead during the delay

Under the burden fluctuation method, the contractor could claim a .33 percent increase in his overhead rate Applying that percentage increase to the work which had to bear extra overhead expense would yield a claimed amount of $6,600 Regardless of the method used, this example presents a classic case of underabsorption of home office overhead In other words, money lost due to the delay. Recovery, however, would be dependent on proof that additional work could have been obtained on other contracts but for the delay

<u>Example 2</u> Example 2 is based on the same contract and contractor described in example 1, but on a different type of delay. The actual performance included no suspension of work and resulted in the increase of the

contract price by $110,000 for change orders, including $10,000 for overhead markup. Under the Eichleay formula, the contractor would have an extended home office overhead claim of $8,127 despite the fact that change orders resulted in additional direct charges which could absorb the contractor's overhead.

Example 2. A $400,000, four-month contract with no suspension and change orders worth $110,000, including $10,000 overhead mark-up (Same "POTENTIAL PERFORMANCE" as Example 1)

	MO. 1	MO. 2	MO.3	MO 4	MO 5
POTENTIAL PERFORMANCE					
Home Office Overhead	$ 40,000	$ 40,000	$ 40,000	$ 40,000	$ 40,000
Contract Billings	$100,000	$100,000	$100,000	$100,000	-------
Other Contract Billings	$400,000	$400,000	$400,000	$400,000	$500,000
Total Billings	$500,000	$500,000	$500,000	$500,000	$500,000
ACTUAL PERFORMANCE					
Home Office Overhead	$ 40,000	$ 40,000	$ 40,000	$ 40,000	$ 40,000
Contract Billings	$ 75,000	$ 75,000	$125,000	$135,000	$100,000
Other Contract Billings	$400,000	$400,000	$400,000	$400,000	$400,000
Total Billings	$475,000	$475,000	$525,000	$535,000	$500,000

EICHLEAY FORMULA

$510,000 (Contract Billings) X $200,000 (Total Overhead)
$2,510,000 (Total Billings)

= $40,637 (Allocable Overhead)

$$\frac{\$40{,}637\ \text{(Allocable Overhead)}}{5\ \text{(Months of Performance)}} = \$8{,}127\ \text{(Monthly Contract Overhead)}$$

X 1-Month Delay = $8,127 (Claim)

COMPARATIVE ABSORPTION RATES

$$\frac{\$200{,}000\ \text{(Potential Total Overhead)}}{\$2{,}500{,}000\ \text{(Potential Total Billings)}} = 08\ \text{(Reasonable Overhead Ratio)}$$

08 (Reasonable Overhead Ratio) X $2,510,000 (Actual Total Billings)

= $200,800 (Reasonable Total Overhead)

$200,000 (Actual Total Overhead) - $200,800 (Reasonable Total Overhead)

= ($800) (Unabsorbed or $800 Overabsorbed Overhead)

BURDEN FLUCTUATION

$2,510,000 (Total Billings) - $510,000 (Contract Billings)

= $2,000,000 (Other Billings)

$$\frac{\$200{,}000}{\$2{,}510{,}000}\ \text{(Actual Overhead Rate)} - \frac{\$200{,}000}{\$2{,}500{,}000}\ \text{(Potential Overhead Rate)} =$$

7 97% - 8 00% = (.03%) (Burden Fluctuation)

(03%) X $2,000,000 = ($600) (Unabsorbed or $600 Overabsorbed Overhead)

Calculating the contractor's damages by comparing absorption rates shows that this contractor actually did not suffer from underabsorption of home office overhead. Instead of absorbing overhead at the normal rate of 8 percent, the contractor was, with the help of changes, able to absorb overhead at the rate of 7 97 percent. The burden fluctuation method would similarly reveal an overabsorption of overhead, in the amount of $600, based on the 03 percent decreases in the contractor's overhead rate

The results obtained for the two examples through the absorption rate or burden fluctuation methods vary greatly, but the results obtained by using the Eichleay formula do not This case illustrates the basis of objections to Eichleay. The contractor in Example 1 who experiences a one-month suspension without receiving any extra work seems to have suffered more damage than the contractor in Example 2 who receives extra work, extending his performance through changes, yet Eichleay would give the second contractor a larger recovery

These two examples play a key role in the explanation of the SAP When evaluating job expenses, it is important to determine the method of calculation used by the contractor. Job costs may be determined by an estimate or by actual costs. If actual costs are used to calculate an expense, there is less chance the contractor will overcharge for an item After all, when using actual cost, the proper documentation must be provided to support the results However, when an estimate is used to calculate job costs, there are a variety of methods that may be utilized. The two examples in this chapter show the range of possibilities when calculating indirect costs Overall, the standard analysis procedure, presented in the previous pages, is a guide or reference to be used when faced with a claim. The SAP is a combination of a checklist of items and examples showing some of the possibilities encountered in claims analysis. In the next chapter, a TDOT claim will be analyzed using the SAP.

Chapter 4

Case Study

4.1 INTRODUCTION

The SAP presented in chapter 3 is further illustrated by the following example This chapter will use the SAP to analyze the home office overhead costs of a past TDOT delay claim[6]. Although the documentation presented in the claim is accurate, there will be some hypothetical information used to fully represent the SAP.

4.2 BACKGROUND

In 1991, Vecellio & Grogan, Inc. was the low bidder for the completion of I-181 through Unicoi County at Sam's Gap. This portion of highway extended through the mountainous terrain of east Tennessee to meet the North Carolina state-line The contract amount was $21, 644, 984 88 and was to be completed in 425 workdays. The job included the excavation of 4,162,281 cubic yards of roadway and undercut material Also, 2,719,502 tons of select rock was to be processed through a specially designed screening plant However, during the course of construction, certain environmental permits were not obtained. V&G also experienced problems with mobilization and were forced to change their production schedules. The completion of the project, originally estimated to be near the end of 1993, was ultimately delayed until the spring of 1995. As a result of the 16-month overrun, V&G (Vecellio & Grogan, Inc.) filed a claim against TDOT for $4,908,450 to cover lost time and money

4.3 ANALYSIS

As mentioned earlier, the first step in claims analysis is the acquisition of data In this case, V&G had been working on the project for some time before actually filing a claim Thus, TDOT had knowledge of V&G's job productivity as well as their prices for operations So, part of the information needed for analysis was already available However, problems remained V&G's claim was for $4,908,450 with overhead costs accounting for $2,003,065. The information provided in the claim regarding these costs was incomplete Tables 1, 2, and 3 show the breakdown of overhead costs presented in V&G's claim Although there is sufficient data related to overhead expenses, the information needed to conduct an analysis is not available This information would include the contract billings for all contracts during the period the V&G contract was in effect or a detailed financial history to validate those values presented in the claim. Thus, the Eichleay formula and the other methods mentioned in the SAP cannot be applied with full confidence However, a hypothetical solution can be made

In table 1, V&G calculated the overhead expenses by simply taking the difference of total costs, for each item, from the time of actual completion to the time of expected completion This difference or overrun in costs represented V&G's claim for the overhead expenses Table 2 is a comparison of the budgeted or bid costs to the costs at the time of expected completion. V&G make this comparison to show the bid was reasonable. Table 3 shows the bid costs compared to the costs at actual completion. It is evident, by looking at these tables, that contractor is due some recovery for the 16-month

Table 1. Detailed Accounting of V&G's Project Overhead Accounts

	Job-To-Date Costs as of 12/31/93				Job-To-Date Costs as of 04/30/95				Additional Costs Incurred after 12/31/93	
Cost Account	Job 185	Job 285	Job 485	Total	Job 185	Job 285	Job 485	Total		
Field Overhead	$851,988 71	$272,139 41	$4,073 39	$1,128,201 51	$1,306,825 87	$280,705 08	$50,223 04	$1,637,753 99	$509,552 48	
Job Support	$1,031,915 71	$69,276 83	$4,020 56	$1 105,213 10	$1,396,626 06	$71,088 05	$12,042 17	$1,479,756 28	$374,543 18	
Construction Layout	$263,101 99	$0 00	$0 00	$263,101 99	$348,135 13	$0 00	$0 00	$348,135 13	$85,033 14	
Equipment Costs										
Depreciation	$2,900,143 94	$416,732 90	$0 00	$3,316,876 84	$3,637,658 98	$523,413 16	$0 00	$4 161 072 14	$844,195 30	
Rental	$601,628 66	$13,931.44	$0 00	$615,560 10	$780,491 87	$18,083 44	$6,726 14	$805,301 45	$189,741 35	
Total Equipment Costs	$3,501 772 60	$430,664 34	$0 00	$3,932,436 94	$4,418,150 85	$541,496 60	$6,726 14	$4,966,373 59	$1,033,936 65	
										CLAIM
TOTALS	$5,648,779 01	$772,080 58	$8,093 95	$6,428,953 54	$7,469,737 91	$893,289 73	$68,991 35	$8,432,018 99	**$2,003,065 45**	METHOD
				Difference =	$1,820,958 90	$121,209 15	$60,897 40	$2,003,065 45		

Table 2. Detailed Accounting of V&G's Project Overhead Accounts.

	Budgeted Cost				Job-To-Date Costs as of 12/31/93				12/31/93 Cost vs Budgeted Cost	
Cost Account	Job 185	Job 285	Job 485	Total	Job 185	Job 285	Job 485	Total		
Field Overhead	$792,472 00	$161,750 00	$0 00	$954,222 00	$851,988 71	$272,139 41	$4,073 39	$1,128,201 51	$173,979 51	
Job Support	$820 317 00	$122,000 00	$0 00	$942,317 00	$1,031,915 71	$69 276 83	$4,020 56	$1,105 213 10	$162,896 10	
Construction Layout	$262,180 00	$0 00	$0 00	$262,180 00	$263,101 99	$0 00	$0 00	$263,101 99	$921 99	
Equipment Costs										
Depreciation	$697 685 00	$888,193 00	$0 00	$1,585,878 00	$2 900 143 94	$416,732 90	$0 00	$3 316 876 84	$1,730 998 84	
Rental	$2,467,245 00	$22,500 00	$0 00	$2,489,745 00	$601,628 66	$13,931 44	$0 00	$615,560 10	-$1,874,184 90	
Total Equipment Costs	$3,164,930 00	$910,693 00	$0 00	$4,075,623 00	$3,501,772 60	$430,664 34	$0 00	$3,932,436 94	$143,186 06	ILLUSTRATES
										BID WAS
TOTALS	$5,039,899 00	$1,194,443 00	$0 00	$6,234,342 00	$5,648,779 01	$772,080 58	$8,093 95	$6,428,953 54	$194,611 54	RESONABLE
				Difference =	$608,880 01	-$422,362 42	$8,093 95	$194,611 54		

Table 3. Detailed Accounting of V&G's Project Overhead Accounts

	Budgeted Cost				Job-To-Date Costs as of 04/30/95				04/30/95 Cost vs Budgeted Cost	
Cost Account	Job 185	Job 285	Job 485	Total	Job 185	Job 285	Job 485	Total		
Field Overhead	$792,472 00	$161,750 00	$0 00	$954,222 00	$1,306,825 87	$280,705 08	$50,223 04	$1 637,753 99	$683,531 99	
Job Support	$820,317 00	$122,000 00	$0 00	$942,317 00	$1,396,626 06	$71,088 05	$12,042 17	$1,479,756 28	$537,439 28	
Construction Layout	$262,180 00	$0 00	$0 00	$262,180 00	$348,135 13	$0 00	$0 00	$348,135 13	$85,955 13	
Equipment Costs										
Depreciation	$697,685 00	$888,193 00	$0 00	$1,585,878 00	$3,637,658 98	$523,413 16	$0 00	$4 161,072 14	$2,575,194 14	
Rental	$2,467,245.00	$22,500 00	$0 00	$2,489,745 00	$780,491 87	$18,083 44	$6,726 14	$805,301 45	-$1,684,443.55	
Total Equipment Costs	$3,164,930 00	$910,693 00	$0 00	$4,075,623 00	$4,418,150 85	$541,496 60	$6,726 14	$4 966,373 59	$890,750 59	ALTERNATE
										CLAIM
TOTALS	$5,039,899 00	$1,194,443 00	$0 00	$6,234,342 00	$7,469,737 91	$893,289 73	$68,991 35	$8,432,018 99	$2,197,676 99	METHOD
				Difference =	$2,429,838 91	-$301,153 27	$68,991 35	$2,197,676 99		

overrun on the project However, the deciding factor in claim is the determination of the actual time of delay

TDOT concluded that V&G were only delayed seven months This reduction in delay time would decrease the overhead costs by one half if V&G's tables were used However, a comparison needs to be made to determine reasonable rates By using assumed numbers, the methods contained in the SAP can be utilized The first piece of information needed is the total contract billings for the time period in question A reasonable amount for the total contract billings for one year would be $100 million. This amount is comparable to the contract billings of other similar sized companies. Also, the contract billings, for the project under analysis will need to be used. The next piece of information needed is the total home office overhead costs for the one-year period This amount is typically ten percent of the total contract billings. The next step in the analysis is to apply the methods used in the SAP To begin the analysis, the costs will be calculated to represent a monthly expense. So, if the total contract billing for one year equals $100 million, then the monthly expense would be $8,333,333. The V&G contract amount was $21,644,984 88 and was to be completed in 28 months Thus, the monthly expense equals $773,035.17. Assuming the delay time was determined to be 7 months, the following calculations are thus:

	Non-delayed months = 28 total	Delayed months = 7 total
POTENTIAL PERFORMANCE		
Home Office Overhead	$833,333	$833,333
Contract Billings	$773,035	-------
Other Contract Billings	$7,560,298	$8,333,333
Total Billings	$8,333,333	$8,333,333

ACTUAL PERFORMANCE

Home Office Overhead	\$833,333	\$833,333
Contract Billings	\$773,035	-------
Other Contract Billings	\$7,560,298	\$7,560,298
Total Billings	\$8,333,333	\$7,560,298

EICHLEAY FORMULA

$$\frac{\$21,644,980 \text{ (Contract Billings)}}{\$286,255,410 \text{ (Total Billings)}} \quad \text{X} \quad \$29,166,655 \text{ (Total Overhead)}$$

$$= \$2,205,414 \text{ (Allocable Overhead)}$$

$$\frac{\$2,205,414 \text{ (Allocable Overhead)}}{35 \text{ (Months of Performance)}} = \$63,012 \text{ (Monthly Contract Overhead)}$$

$$\text{X} \quad \text{7-Month Delay} = \$441,083 \text{ (Claim)}$$

COMPARATIVE ABSORPTION RATES

$$\frac{\$29,166,655 \text{ (Potential Total Overhead)}}{\$291,666,655 \text{ (Potential Total Billings)}} = 10 \text{ (Reasonable Overhead Ratio)}$$

$$.10 \text{ (Reasonable Overhead Ratio)} \quad \text{X} \quad \$286,255,410 \text{ (Actual Total Billings)}$$

$$= \$28,625,541 \text{ (Reasonable Total Overhead)}$$

$$\$29,166,655 \text{ (Actual Total Overhead)} - \$28,625,541 \text{ (Reasonable Total Overhead)}$$

$$= \$541,114 \text{ (Unabsorbed Overhead Claim)}$$

BURDEN FLUCTUATION

$$\$286,255,410 \text{ (Total Billings)} - \$21,644,980 \text{ (Contract Billings)}$$

$$= \$264,610,430 \text{ (Other Billings)}$$

$$\frac{\$29,166,655}{\$286,255,410} \text{ (Actual Overhead Rate)} - \frac{\$29,166,655}{\$291,666,655} \text{ (Potential Overhead Rate)} =$$

$$10.189\% - 10.00\% = 189\% \text{ (Burden Fluctuation)}$$

$$189\% \quad \text{X} \quad \$264,610,430 = \$500,114 \text{ (Unabsorbed Overhead Claim)}$$

The results from this analysis can be compared to the "Job Support" calculation V&G made in table 1 under the heading "Additional Costs Incurred after 12/31/93" Even though the calculation V&G provided is less than the results found in the previous analysis, the outcome shows a reasonable claim Of course, part of the information used in this analysis was based on assumptions such as the "total contract billings", "home office overhead", and "other contract billings". If the actual data related to these assumptions were acquired from V&G, a more accurate analysis could have been performed. Another item to consider in this type of claim is V&G being able to prove that other work could have been obtained during the delay period. If V&G had been able to obtain other work during the delay period, the analysis would be similar to example 1 in the SAP In conclusion, the V&G home office overhead analysis shows that the SAP can be used, as a comparison, even when all of the data is not present The numbers used in this example were assumed in order to illustrate the methods used in the SAP and do not reflect actual values

Chapter 5

Conclusions

Highway construction is fast paced, complex, and expensive. The owner and contractor are legally bound by a contract that explicitly states unique requirements for the project. In addition to the contract, there are laws and regulations that must be followed throughout construction. Unfortunately, problems occur during the course of construction, which cannot be solved by the instructions provided in the contract or the governing laws and regulations These problems may stem from unusual weather, unavailability of materials, bad management, or a number of other possibilities. All to often, these problems result in construction claims. TDOT has funded a project, through the University of Tennessee, regarding effective claims resolution. The purpose of this thesis was to develop a claims analysis procedure to aid in claims evaluation.

There have been numerous publications dedicated to claims management, claims resolution, and appropriate documentation during construction. However, there exists little information on claims analysis The approach of this thesis was to study past claims and develop a general analysis procedure to deal with delay claims, and, more specifically, provide some numerical techniques used in home office overhead calculations

The three items of concern involving a claim are direct costs, time, and indirect costs. The determination of direct costs is more easily accomplished due to their direct relationship to the project under analysis. Also, considering the fact that direct costs, such as labor and materials, are established by the industry, it is more difficult for the contractor to overburded his price for these items. The determination of time is also more easily accomplished due to its direct relationship to the project under analysis. When calculating the time of construction, resources such as project scheduling, historical data, the inspector's diary and field books, prove to be important tools. However, the determination of indirect costs, such as home office overhead, is a more complicated task. Since a contractor typically has a number of projects in progress, and the home office is involved in the management of these projects, it is difficult to allocate the appropriate home office expenses to a particular project. The goal of the analyst is to determine what percentage of home office overhead is applicable to the claim.

The SAP presented in this thesis consists of a checklist of items and equations to aid in the analysis of a delay claim The importance of other claims management techniques as well as experience in claims analysis should not be overlooked. The first step in the analysis procedure is the acquisition of data. The incorporation of contract provisions, into the general conditions, is a strong recommendation. These provisions include the access to project documents, financial records, as well as other important information related to the claim. After acquiring the necessary data, the analysis can proceed Determining the appropriate time extension plays a key role in the remainder of the analysis. After all, the costs presented in the claim are based on extra time spent to complete the job. Finally, the analyst must determination the direct costs and indirect costs. The SAP contains two examples of home office overhead calculations using three different techniques. The purpose of these examples is to show the variance in the results from these different techniques

The example involving the Vecellio & Grogan, Inc. claim shows how the techniques in the SAP may be used as a reference solution when there is a lack of information available to conduct an appropriate analysis In this example, the contractors financial history would have provided a means to evaluate the demands for indirect costs However, this information was not available and thus, an estimate was used to assure reasonable demands presented in the claim.

In order to be fully effective, the claims analyst must have two items The first item is the necessary data to conduct the analysis. The second item is a procedure or checklist to reference during analysis. In conclusion, the standard analysis procedure presented in this thesis provides an important tool to evaluate a delay claim.

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Vita

Chad D Lawson was born in Kingsport, Tennessee on November 17, 1975. He graduated from Sullivan North High School in 1994, and began his undergraduate studies at The University of Tennessee at Knoxville In December of 1998, he graduated with a Bachelor of Science in Civil Engineering January 1999, he began his graduate studies, and received his Master of Science degree in Civil Engineering in August, 2000.