

University of Southern Queensland
Faculty of Engineering and Surveying

**Quality Assurance System in a Small Surveying
Firm**

A project submitted by

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Abstract

This dissertation examines the application of the ISO9000:2000 series to a quality assurance system in a small workplace environment. The environment of choice is a small surveying and engineering partnership based in Port Macquarie N.S.W.

The partnership has six full time and three part-time employees. The goal of this application was to improve the overall efficiency and productivity of the workplace while also maintaining or raising the level of quality assurance for the customers.

The methodology that was used was the process of gap analysis, which involves looking at current processes and filling the “gap” to reach the required level for the ISO9000: 2000 series. The objective is to allowing a greater access to other customer areas and governmental sectors that will only deal with an ISO9000: 2000 approved business.

After a series of proposed changes to the workplace, a set of new systems have been introduced which have met the ISO 9000 standard and achieved a level of efficiency required by a small business to remain profitable while still assuring quality. Many of the changes considered were found to be unsatisfactory and were unsuitable for the workplace, but using the dynamic approach to finding alternatives, solutions eventually presented themselves and were an improvement on the former systems.

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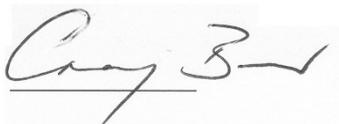
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Table of contents

Chapter 1

Introduction

1.1	Introduction.....	10
1.2	Background.....	10
1.3	The Problem.....	11
1.4	Project Aim.....	11
1.5	Project Objectives.....	12
1.6	Structure of the Dissertation.....	12
1.7	Scope of Project.....	13
1.8	Justification of Project.....	13
1.9	Organisation Overview.....	13
1.10	Conclusions.....	14

Chapter 2

Literature review

2.1	Introduction.....	16
2.2	Quality Assurance.....	16
2.3	Total Quality Management. (TQM).....	18
2.4	ISO 9000 standards and implementation.....	20
2.5	Gap Analysis for Quality Assurance.....	24
2.6	Conclusions.....	25

Chapter 3

Research Methodology

3.1	Introduction.....	26
3.2	Gap Analysis.....	27
3.21	The existing situation in the company.....	27
3.22	Identification of gaps.....	27
3.23	Identification of priority areas.....	28
3.3	Prototyping and testing of QA procedures and processes.....	29
3.31	Development of procedures.....	29

3.32 Testing	30
3.33 Evaluation	30
3.4 Conclusions.....	30
Chapter 4	
Results	
4.1 Introduction.....	31
4.2 Records	31
4.21 Job instructions.....	32
4.22 Correspondence with client.....	35
4.23 Digital data storage.....	38
4.24 Correspondence with Statutory authority	40
4.25 Job completion and Accounts	43
4.26 Data collection and field notes.....	44
4.27 Plan production	48
4.28 Job files, identification and traceability.....	51
4.29 Time sheets	53
4.3 Conclusion	54
Chapter 5	
Analysis and Discussion	
5.1 Introduction.....	55
5.2 Cost and benefit analysis	55
5.3 Discussion.....	63
5.4 Conclusions.....	64
Chapter 6	
Conclusions and Further Research	
6.1 Introduction.....	66
6.2 Discussion.....	66
6.3 Further research and recommendations.....	68
Appendix A	
Project Specification	72
Appendix B	
General instruction checklist	74
Activity log	75

Detail plan checklist.....	76
Detail checklist (field work).....	77
Identification survey checklist.....	78
Subdivision application checklist	79
DA checklist	80
Construction certificate checklist.....	81
References	82

Table of figures

Figure 4.21.1 Job instructions	32
Figure 4.22.1 Correspondence received.....	36
Figure 4.22.2 Correspondence sent.....	36
Figure 4.23.1 Digital data storage.....	38
Figure 4.24.1 Correspondence received.....	41
Figure 4.24.2 Correspondence sent.....	41
Figure 4.25.1 Accounts	43
Figure 4.26.1 Raw data	45
Figure 4.26.2 Field notes.....	45
Figure 4.27.1 Plan production	49
Figure 4.28.1 Job files.....	51

Chapter 1

Introduction

1.1 Introduction

This dissertation applies the ISO9000:2000 standards to a small business workplace environment. Specifically, a small surveying and engineering partnership based in Port Macquarie, New South Wales. This chapter provides an introduction to the problem being examined to understand the aims, objectives and problems faced with the introduction of the ISO system into a workplace with fewer than ten employees.

1.2 Background

Prior to this project there was no established quality assurance system in place in the organisation, and while the partnership has always maintained high levels of quality control, there has also always been the problems that are associated with a small business, especially with poor internal communications and organization. However, with the introduction of the ISO9000: 2000 standards into the workplace it is projected that these problem areas will be significantly reduced or eliminated. This will have the effect of increasing quality assurance while streamlining workplace efficiency for a greater workload capacity.

One of the overall benefits of a quality assurance system is the concept of customer satisfaction, which leads to repeat business from your customers. This is of paramount importance to a small business due to its very size, the number of competing businesses in the marketplace and “word of mouth” to other potential customers. The first principle in the ISO quality management principles is customer focus, with the added statement that a business “should meet customer requirements and strive to exceed customer expectations”. This leads to an

increased market share due to a rapid and flexible response to market developments. This is the very goal that this dissertation hopes to achieve.

1.3 The Problem

The company under study is a small surveying and engineering business in a small regional city. The major problems encountered within the firm are due to the poor record keeping. This includes is not only such things as small files or bits of data, but accounts and whole plans. This has a major impact due to the time taken to actually find or replace the data, redraw plans or recreate the files. Accounting problems sometimes lead to double charging of the client or delayed charging with the flow on affects to cash flow and customer satisfaction.

Another problem is the delegation of two or more workers to the same job. This is due to poor internal communications but has a major effect to time allocation and productivity. Due to poor communications, customer information is regularly lost or incorrect. These could be such things as phone numbers, addresses or even the type of job involved.

Another major problem is that there is no standard policy in place for customer complaints. This generally becomes just a matter of sending a message to one of the owners regarding poor performance.

Finally, the poor communications problem can also be responsible for internal memos which can be just bits of paper that are placed on the relevant desk.

1.4 Project Aim

The aim of this project is to develop a quality assurance system for a small business. Through the analysis of current office systems, it is my intention to compare these systems against AS/NZ ISO 9000:2000 and change and/or implement new procedures to satisfy international standards while maintaining current standards and not increasing operational costs substantially.

1.5 Project Objectives

The objectives of the project are to: -

1. Analyse the current administration and office procedures in a small survey practice and compare them against the AS/NZ ISO 9000:2000 standards.
2. Identify potential areas of improvement to the current system.
3. Define potential costs and benefits associated with implementing improvements to the system.
4. Present a formal report of findings and recommendations to the company.

1.6 Structure of the Dissertation

The dissertation on quality assurance consists of an introduction and six chapters.

These chapters are as follows: -

Chapter 1 – Introduction: introduces the reader to the dissertation, including basic overviews.

Chapter 2 – Literature Review: provides a detailed review of literature to support this dissertation.

Chapter 3 – Research Methodology: discusses the methodology and rationale employed to create and complete this project

Chapter 4 – Presentation of Findings: outlines the results using methods described in previous chapter.

Chapter 5 – Analysis and Discussion: provides an analysis of the results and discusses implications therein.

Chapter 6 – Conclusions and further Research: concludes the dissertation and offers further suggestion for future research.

1.7 Scope of Project

A small surveying office generates enormous amount paper work and data. There are few systems in place to deal with controlling all this information, and as a result, paper work and correspondence is regularly lost. There are insufficient control mechanisms to track progress of current projects. This leads to missing deadlines and doubling-up on work. The objective of this project is to implement better office procedures to maximise office efficiency, expediency and accuracy by implementing the ISO 9001:2000 quality assurance standards.

1.8 Justification of Project

The project is to introduce an effective quality assurance system into a small workplace environment. The company this project refers to has progressed from a two-man operation then to the current form now, being two directors and four full-time employees. There has been a gradual increase in the workload over this period while retaining the old systems and processes. There is an obvious need to implement new set procedures to better cater for the expanding company.

The office currently has no formal written procedures with regards to record keeping and administration. This leads to frustration from clients and co-workers when important documents are lost and deadlines are missed. It is intended to analyse the existing systems against the ISO 9000 standards with the expressed purpose of eliminating these problem areas.

The objective is to improve office efficiency and profitability through documented procedures. These procedures will help to minimise time wasting and doubling-up on work and improving error detection. This will ensure the service provided to the client is prompt, cost effective and accurate. In the end, the achievement of client satisfaction is the main objective.

1.9 Organisation Overview

This dissertation is centred around a small surveying and engineering firm in Port Macquarie on the Mid North Coast of New South Wales. This is a rapidly

growing area attracting large investments from the major cities. The firm has been operating in its current form for 10 years. It consists of two directors, a registered surveyor and a civil engineer, and employs four full-time staff.

The majority of work that is handled by this organisation is small. It ranges from detail surveys, house setouts, subdivisions and both civil and structural engineering projects. The company operates successfully because of its ability to produce good results quickly and therefore ensuring client satisfaction. This is important in a small regional city as word-of-mouth ensures a continuous stream of new clients. The current system of quality assurance that is in place at my workplace is not satisfactory. There has been many times where the system has failed due to lost paperwork or poor communication between employees. Therefore a new system is required to ensure that the office input is more streamlined and efficient.

1.10 Conclusions

This dissertation aims to analyse and review the current procedures in a small surveying and engineering company and match them with the requirements for the ISO 9000 series of quality assurance. Using the gap analysis procedure, I intend to identify deficiencies in our current procedures and institute a policy designed to rectify any major problem areas.

The research is expected to result in the detection of poor procedures in our current system, especially in the data collection and recording areas. This area is of the utmost importance for the smooth running of our company and solutions are required to make the efficiency level of the company rise to the expected level.

A review of literature for this research will identify problem areas in our company and provide an established system of management procedures designed to resolve these issues. The outcomes of this study will be used for the design and development of new procedures. The establishment of these procedures will help to resolve those problems that now occur.

The following chapter contains the literature review that was conducted to provide me with established procedures and guidelines to proceed with the planned work.

Chapter 2

Literature review

2.1 Introduction

As seen in the preceding chapter this project is concerned with quality assurance and its introduction into the work environment of a small business. Before any change can be initiated it is firstly important to gain an understanding of quality assurance, and how others have introduced it into respective workplaces, followed by what impact this has. The amount of literature existing that is related to the topic of quality assurance is daunting. The number of different systems and approaches that can be used to achieve quality assurance is also huge, however for the purposes of this project it has been decided to examine the ISO9000:2000 standard and see if the concepts and structures within can be applied to the small business. Following this introduction, there is a brief list of literature that is associated with this project.

2.2 Quality Assurance.

There are a number of ways to define quality assurance. These are due to the fact that each industry will have its definition tapered towards its own particular style of manufacturer or industry. However, one definition that can be used is that quality assurance is: the implementation of processes that aim to ensure that concern for quality is designed and built into product/services (Collins 1994). It implies commitment by the organisation to a systematic approach in the pursuit of quality, demonstrated by an explicit statement of policy, setting out expectations and standards. Systematic and comprehensive arrangements to ensure that the required standards are achieved will be evident throughout organizational procedures and will include processes for verification and feedback. While Moreno-Lonzo and Peris, (1998) state that “the purpose of QA is

the conformance of products, services and processes with given requirements and standards”. According to Garvin, (1988), “QA is concerned with quality planning and defect prevention through systems and documented processes throughout the supply chain”. QA focus gives its definition as “the focus that demonstrates your product is able to satisfy your users”.

Most workers in all industries have probably been involved in some form of quality assurance schemes without even knowing it. Even if there is no established quality assurance system in place, the constant drive for the highest levels of quality is a natural state. A quality assurance scheme puts procedures in place to formally structure that state.

The QA Focus Project (2001) has put forward the argument that “for quality assurance to be meaningful, appropriate standards must be applied to each stage of the process”. These stages have been proposed by the Focus project as being: Strategic QA, Process QA, Sign-Off QA and On-going QA. After identifying these principles the focus project identified the following key principles: -

1. Use should be made of open standards in preference to proprietary standards wherever possible. This will help to maximise the interoperability and platform-independence of resources, facilitate long term access, and ensure that resources are accessible to users with disabilities.
2. Decisions made and procedures employed at each stage in the process should be fully documented to safeguard against the loss of knowledge, particularly as a consequence of staff turnover. Ensuring the long-term preservation of this knowledge into the long-term future provides a degree of control over the future of those resources in question.

Over the last forty years, there has been an increasing trend towards quality assurance. This first became an issue during the 1960's with the introduction of quality circles in Japan (McGraw & Dunford 1987). The only problem with the trend flowing towards the West was that it was not as effective. This could be attributed to such things as inadequate resources, lack of management support or a lack of training (Field & Swift 1996).

2.3 Total Quality Management. (TQM)

It should be remembered that quality assurance is only a part of total quality management and that this is the system that is currently being introduced into as many different industries and services as possible. Phillipa Collins (1994) in *Approaches to Quality* opens with a quote from one of her undergraduate students that states: “Quality is one of the most important aspects of life today, affecting everything around us and all that we do, yet it is difficult to define, and means different things to different people”.

Some management styles see total quality management as the “be all and end all” of management systems, however there are a number of alternate views as to whether TQM is relevant to their industries or that it is only a trend and like all trends will eventually disappear. The areas between total quality management and quality assurance sometimes become clouded and make it hard to distinguish between the two. This can in one case be attributed to past history, engineers and manufacturing managers have been brought up on quality assurance and quality control and find it difficult to appreciate the “soft” issues in quality management, such as the need to discuss attitudes (Collins 1994). Collins also has the view that “if the spirit of TQM were implemented it would be an important step in this direction, but to date TQM has been just another means of manipulating the workforce”. It should also be noted that the definition given by Collins states that “total quality management describes an approach to quality assurance which stresses the importance of creating a culture in which concern for quality is an integral part of product/service delivery. This means there is ownership of responsibility for quality at all levels of the organization and involvement of all staff in the pursuit of clear and explicit quality objectives”. While the Australian Journal of Management & Organisational Behaviour gives the definition of total quality management as “an approach to doing business that attempts to maximise the competitiveness of an organisation through the continual improvement of the quality of its products, services, people, processes and environment” (Goetsch & Davis 1995). At the end of the day however there is still little agreement on what constitutes TQM (Jabnoun, 2002).

It should also be noted that there are a number of different groups that believe that TQM is not destined to last and will be replaced with the next type of management style to come along. The main problem possibly arising here is that while total quality management can be seen as a business philosophy, it does not take into account initially the inherent human nature of the employees. It must be remembered that this management style started in the east and that when total quality management is placed along side such concepts as the “four precepts of Japanese wisdom” i.e.: co-operation, patience, self-discipline and obligation, it can achieve the goals for which it was implemented. Jongi Noguchi of JUSE has been quoted as saying that TQM is based on 100 men making one step, rather than one making 100 steps (Collins 1994). When the TQM system has been implemented into large organizations there have been instances of a lack of unified direction within the company, for example where separate departments are trying to achieve their goals but at the same time competing against each other, therefore heading in separate directions. This is where it is important to implement a change in workplace culture so that everyone does not lose sight of the “big picture” and work in unison to achieve set goals. In this way there is no waste of resources and maximum efficiency is achieved. The sole responsibility for this change in work culture lies with management, which must also work with a unified goal in mind. Resistance to change is also a problem and must be eliminated so that all levels of management can have “open minds”. Information received by management from workers “on the floor” must be analysed and worked on and not cast aside due to feelings of shame, inadequacy, embarrassment, or ignorance. McKinsey and Company (1989) stated that of the top 500 European corporations some 95 per cent of the C.E.O.s considered the key requirement for success in total quality management was top management attention. Jabnoun (2002) writes in order to be able to deliver the desired quality, top management should provide the necessary input to the people that are directly involved in producing products and providing services. In a survey of ISO 9000 implementation in companies in Singapore, it was found that devoting time to quality initiatives, lack of management support, and employee resistance to change were the main obstacles in establishing an ISO 9000 quality assurance model (Calingo et al., 1995; Quazi and Padibjo, 1998)

2.4 ISO 9000 standards and implementation

In regards to the implementation of quality assurance

The ISO 9000 family of standards ... have been developed to assist organisations, of all types and sizes, to implement and operate effective quality management systems.

There has been much literature written about the ISO9001:2000 standards and their introduction into the small business environment. The debate has been mainly split both for and against this introduction. Below I have cited some of these arguments.

Seddon (1997) “reported it as being an expensive and in many cases an inappropriate system for many businesses”, and in this particular case the financial burden involved will be the only prohibitive factor involved until avenues are found to minimise costs. Burrows (1992) gives figures regarding the preparation costs for the certification process. He quotes “these costs are some \$4,000 for a small business and up to some \$30,000 for a large firm, these costs can be extremely prohibitive unless previously planned, these costs don’t cover the audit for approval either and that can be around \$500,000 for a 250 person plant. Vanguard Research 1993 conducted a survey where some 15% of companies reported an increase in costs (Gibbon 1997). This is hopefully to be avoided and it should be noted that according to Douglas et. al. (2003) “much of the empirical data cited was collected before the ISO9000:2000 version was published” so that it is now outdated and is irrelevant in some cases. The proposed introduction of the system into my work environment will not be argued against on any other grounds but this so it is an important factor to bear in mind.

Another problem is the issue of re-certification, (Motwani et. al. 1996) give figures to the extent that some 60-80 per cent of businesses applying for re-certification fail due to some oversight. As a result, a full audit must then be completed before registration is re-established.

Due to the actual purpose of the ISO9000 standards there has been a trend towards litigation if the product or service causes injury or death. Some analysts feel that responsibility lies totally with the company and as it has the ISO 9000 certification and has breached its duty of care some how then litigation is nearly mandatory, as a personal view this argument can be seen every day with the ever-increasing number of product recalls. Perhaps this may be an effort to minimise public liability by quick response to a perceived problem, and it seems to be increasing rapidly.

Douglas et. al. (2003) quotes a number of perceived problems with the ISO 9000, these include such things as the concept that quality by inspection is not quality and that when “people are subjected to external controls, they will be inclined to pay attention only to those things which are affected by those controls”.

Stevenson and Barnes (2001) also points out that while the ISO 9000 is based on good intentions, the four main areas of cost (time, training, consultants and registration) may never actually be recouped, and that the standard may interfere with new and better ways of operating.

A survey completed in 1999 in the USA (Curkovic and Pagell 1999) discovered that the main criticism of the ISO 9000 was that it did not encompass the TQM principle of continuous improvement. However, it should be noted, “continuous improvement could be inferred from areas such as statistical process control”.

The most frequent criticism has been the inherent bureaucracy created by this particular system and the inflexibility generated (Karapetrovic and Willborn 1998b). This argument should not actually be present in my workplace as the number of employees is not large enough to create a “bureaucracy” in the office. Furthermore there is no reason for inflexibility as communication channels within the office are immediate and open.

There is also the argument that the ISO 9001 series is, on its own, not relevant in the drive for efficiency as that can only be achieved when the business has reached such a level of maturity that it starts to monitor itself (Pivka and Mulej, 2004). However it should be noted that there is an argument that the ISO 9001

series is easily integrated into existing systems of quality control in the workplace and would therefore be an excellent choice of system, (Seghezzi 2001) and (Renfrew and Muir 1998). Also it should be noted that the ISO 9000 series is designed to be a platform on which other management tools can be built on or incorporated into, so as to allow flexibility within the system and tailor it to meet the specific needs of that particular organisation.

The merger of existing systems with the ISO 9001 “is very important to organisations, because it gives them a number of competitive advantages as well as providing a management system approach” (Fassoula 1999).

According to the ISO standards, a ‘management system’ refers to an organisations means of managing its processes that transform inputs of resources into a product or service that meet the organisations objectives, such as the customers quality requirements.

It should also be noted that there is a difference between quality management and quality assurance. According to van Houten (2000), quality management measures the overall management function in determining the organisations quality policy, its objective, and its responsibility, as well as the quality policy implementation through means such as quality assurance and quality control. Quality assurance measures all activities implemented within the quality system. Quality control is the operational techniques used to fulfil quality requirements.

The installation of an ISO 9000 system is not to be taken lightly. Van Der Wiele and Brown (1995) have exemplified some of the prohibitive issues involved in establishing the ISO 9000 quality control system in a small business. These include “gaining management and employee commitment; interpretation of standards; problems with assessors and consultants; and problems with documentation.”

Many companies are reluctant to change due to the major procedural documentation that is required. According to Rayner and Porter (1991), many firms, particularly the smaller ones, have set out to install ISO 9000 without any clear idea of the benefits likely to be achieved or the costs and effort involved.

There has been the argument however that by implementing the ISO9001 standards, employees have gained more knowledge about how their actual company runs from start to finish and that this has helped them recognize in the areas financial resources have been wasted. This in turn will lower the implementation costs involved (Pawlak 2003).

John Sprouster, the chief executive of The Australian Quality Council, is quoted as saying, "ISO 9000 is inappropriate for small business". The main reasons given for his statement was the cost of establishing and maintaining the document and the investment of time required being prohibitive. The argument continues that the ISO 9001 series is so inappropriate that small businesses only attempted certification "because they had to" (Gome, 1995b). An even more disturbing argument for prohibitive costs was raised by Bell (1994) with the statement that the impost for a small business with ten employees to introduce and certify the ISO 9000 quality system was almost five times more costly per employee than a business with one hundred or more employees.

Bell (1994) continues by stating that this was due to the fact that the ISO 9000 series was NEVER designed for use by small business and was only intended for the major businesses involved in high-risk endeavours such as aerospace, defence and nuclear power.

In fact some of the surveys done by businesses that have implemented the ISO 9000 series of quality control have yielded responses ranging from "ISO 9000 is basically a pyramid scam" to "ISO 9000 is the best of its kind" (Naveh, Marcus, Allen et. al. 1999). It must be stated also that there is little supporting evidence regarding the impact of the ISO 9000 series on the customer satisfaction (Naveh et. al. 1999; Rao et. al. 1997; Terzioski, Samson & Dow 1995)

In years gone by, it was possible to make and sell rubbish and remain registered to the ISO 9000. Critics have long complained that a company could make 'concrete life preservers'. The new ISO 9000 standards have helped to stop these critics because "the assessing body will review this (the organisations operations) to ensure it reasonably represents the range of services offered to the market

place.” Note: this was taken from www.2-small-business.com/quality_assurance.shtml

The fact that an organisation has a quality assurance system is not a guarantee of quality. There are several pitfalls as stated by (Survey Practice Handbook, 2000), these include-

1. Over-documentation
2. Over-prescription
3. Lack of compliance
4. Lack of leadership
5. Lack of responsiveness

It is important to be aware that these problems are due to poor implementation of the quality system and not a problem within the Standard itself.

2.5 Gap Analysis for Quality Assurance

The basic definition of a gap analysis is any process that allows you to identify areas that need to be changed to allow movement from one state to another.

Danaher (1997) states that the two most popular methods currently being used to measure customer satisfaction are gap analysis of expectations minus performance and linear regression of the overall satisfaction rating on the ratings for the attributes. In regards to this project, customer satisfaction is of the utmost importance due to the fact that it is a small business and the major area of improvement is in the records area, that having a direct impact on customer satisfaction.

The use of gap analysis is popular because it is a cost effective procedure that can also be carried out by consultants that specialize in gap analysis, and this has been mentioned in the INTERNATIONAL TRADE CENTRE BULLETIN No 70 Nov 2001 pg 11.

It is important to note that the success of gap analysis depends on the input from the various levels of workers and management. Gap analysis requires active

employee involvement in the formation, execution and auditing of the company's policies, strategies and objectives, Tennant and Roberts (2001).

Lalla et. al. (2003) states that gap analysis is part of the process approach used to determine how to get to where you want go from where you are.

Liebesman (2002) states that in comparing the structure and function of an organisation's quality management systems to those of the ISO 9001:2000, conformity gaps were revealed. This is exactly what I am trying to reveal in this project.

2.6 Conclusions

As has been revealed, there is a vast amount of literature available to be utilised. The literature examples provided in this project are by no means complete and barely scratches the surface of the resource available. Gap analysis is one of the most useful tools available today for management to assess the strengths and weaknesses of their business. By discovering these strengths and weaknesses it is possible to utilize the strengths and begin to try and rectify the weaknesses. This tool will be used in this project for the identification of areas in the business that is requiring modification or improvement. The main goal of this project is to raise the quality assurance level of the small business involved by using the gap analysis to identify problem areas and then use the ISO9000:2000 standard as a guideline to solving these problem areas. The following chapter discusses research methodology and how it has been applied to this project.

Chapter 3

Research Methodology

3.1 Introduction

This chapter outlines the hypothesis and research methodology underlying this study. It discusses the procedures and the rationale behind the study, leading to an improved quality assurance system.

The method employed in this dissertation is to analyse all facets of the current office procedures and compare these procedures to the ISO 9001:2000. By using the 'Gap Analysis', it is intended to ascertain the differences between the current office quality management system and those required by the ISO 9001:2000.

The objective is to ascertain any deficiencies that may exist in the current system, and using ISO 9001, determine a way to correct and/or improve the procedure.

This will require testing of the new procedures in everyday work and obtain feedback from the directors and/or clients.

The ultimate success of this task will be determined by the willingness of all staff to participate and use any of the new ideas and procedures implemented. A failure would be a complete rejection of the proposed changes or through lack of participation, commitment, and failure to achieve the increase in office performance. It will be important to include all staff members in all areas of the proposed changes as knowledge and understanding of changes will be required with feedback and suggestions being an important contribution to the success of the exercise.

Due to the dynamic nature of quality assurance, it will be a continuing process of trial and error to determine adequate controls of all systems. Quality management systems are notorious for creating extensive paper work and procedure. In a firm,

considered small, and dealing principally with jobs of \$700 or less, it is essential to maintain a good quality of work whilst also minimising the administration costs and still remaining profitable, so any changes must take this overall requirement into consideration. Any improvements and/or changes in procedures will be tested in the work place until such time as it is deemed successful or otherwise. In the end, it is the goal of this project to implement a system into the company that will be cost effective while achieving new streamlined office procedures and an increase in quality control.

3.2 Gap Analysis

3.21 The existing situation in the company

As the company stands at this moment in time, the end product and service that is delivered by this company is well received by the client and meets all the established criteria for quality assurance. However the processes that lead to this result are in serious need of overhauling. The main area of focus has been identified as the record and data keeping system. Because the files are not kept in an orderly system, finding them quickly is a problem. This causes an enormous amount of time wasting in the chasing up and finding of the relevant records and correspondence required to provide the expected prompt service. This results in a highly frustrating and wasteful environment and needs serious improvement.

3.22 Identification of gaps

Upon receiving this project, I spent the first three months carefully analysing the procedures that were already in place, I was able to ascertain that there was no form of orderly system at all in place. It was discovered that there had been a series of checklists that were used many years ago but they had fallen into disuse as they were considered to be too long winded and time consuming to use. After a declining period of use, the system has been reduced to a “word of mouth” system where each worker asks the next person whether something has been done or not. This has created obvious confusion and poor results.

I enquired as to what checklists were in place and found that there were a series of general checklists, but with no individual identification. I proceeded to review files of work completed to identify the system operating, I discovered that there were large gaps between work to be done and work completed, and there was no notation as to who had done the work, when it was done and by what method, and that in some instances there had been notes placed in the files but they had been lost. The older the file, the more notes were missing and the poorer the file appeared. It was readily apparent that the system was reaching a critical point of failure

3.23 Identification of priority areas.

After looking through the current records available it was quickly established that there were a number of salient areas that needed immediate review:

General Instruction orders:

Upon receipt of general instructions from the client, the front office clerk records the instructions onto a plain piece of paper then proceeds to prepare a file containing the instructions and presents it to the relevant processor. This file contains general instructions without clarification of specific instructions given by the client. Occasionally this file will not contain a contact phone number and regularly it will not contain the specific instructions aforementioned. This results in chasing down the person who actually took the message from the client and asking if there was anything specific to be done on this job.

General field work:

It is a regular occurrence that the surveyor in the field will return to the office and present the completed work on several pieces of paper that occasionally will not note a reference number, client number, date or processor reference. Important information relevant to the survey is regularly missing and the result of this can be a return visit to the work site to recover this information. This has the obvious impact on worker efficiency and often leads to tension in the workplace.

Correspondence with statutory authorities:

This is a very important area of surveying work and documenting information regarding this correspondence is a necessity. In our workplace the proceeding of correspondence was to staple the receipts to the front of the relevant file. These receipts have no recorded information about what job they are related to, or a DA number which is the council's reference number. Upon review it was discovered that 20% of files lacked evidence of a receipt or the receipt had been torn off the front of the file. The result of this is a time consuming process of contacting the council or relevant authority to try and establish if the certificate has been issued or not and, even more harmful, an extremely annoying situation for the client involved.

This is by no means an exhaustive list of the problems facing my company but these are the most pressing ones that need immediate action.

3.3 Prototyping and testing of QA procedures and processes

3.31 Development of procedures

I decided to hold a meeting with the two owners of the company and discuss what information should be recorded at each stage of the process so as to meet the requirements of the ISO 9000 series of Quality Assurance. Obviously some aspects were not relevant to our company as they would be too cumbersome and time intensive to implement and at the same time would create an unnecessary amount of paperwork that would be redundant in a small business. After discussing the problem, the introduction of a series of tailored checklists was decided upon. It was decided that the amount of information to be recorded be divided up into a series of checklists that would be easily accessible and quickly completed. These checklists would be short and only hold the relevant information needed to maintain a quick and efficient system. Completion would be mandatory and the checklists would be inserted into the relevant files immediately.

3.32 Testing

A trial period of one month was instigated so a review could be completed at the end of the month. At the beginning of the month the relevant checklists were printed out, photocopied and handed out to each employee with an explanation of the procedure. Completion of each checklist was mandatory and, with a few exceptions at the start of the trial period, was successful. At the end of each week a small review was held to receive feedback from the employees as to improvements or deletions from the checklists.

3.33 Evaluation

A comparison was made to the previous system regarding ease of use and accuracy of information recorded and how the information was stored. Also an evaluation was made by the owners of the company regarding utilisation of time by employees A.K.A was their return visits to the field to gather missed information, double checking with clients about specific instructions given for work orders and contacting council's for certificates.

3.4 Conclusions

This chapter discusses the methodology that I have followed for implementing QA in my workplace. A review of the problems facing my company in regards to the record keeping system that was in place and the system that has now been introduced. The next chapter contains the results that have been achieved, the concurrent analysis and any review of the processes to consider further streamlining of the system.

Chapter 4

Results

4.1 Introduction.

Due to the fact that my business is a small, local firm, it is going to be impossible to utilize every step in the ISO 9000 standard, however the beauty of the standard is that as long as there is supporting evidence as to why a step has been passed over, the authorized auditor will make a note of it and it will not count against being certified. The main area of interest for this project is the area of record keeping.

Bearing this in mind the principle area of information collected was in the records department. In the following chapter the information collected is presented in tabular form with my conclusions as to how the information has been interpreted and also the future actions to be taken in relation to the presented information.

At the end of the chapter there is an overall review of the information that has been collected and the future actions to be taken.

4.2 Records

According to the standard itself, section 4.2.3 Control of Documents:

Documents required by the quality management system shall be controlled. Records are a special type of document and shall be controlled according to the requirements given in 4.2.4 i.e. records shall remain legible, readily identifiable and retrievable, also controls needed for the identification, storage, protection, retrieval, retention time and disposition of records.

It is also the primary objective of the ISO standards to ensure customer satisfaction. It is essential that there is no confusion as to the extent and nature of the service required.

4.21 Job instructions

There have been a number of incidents in the office that would warrant the processes for job initialisation to be reviewed. It is not unusual to spend large amount of time looking for information about the client, quotes and specific instructions. With the aid of a checklist, this would increase efficiency greatly and decrease irrelevant and unnecessary frustration.

The current procedures employed in the office at the time of initial contact with the client are almost non-existent. The usual method is to write on a handy piece of paper (back or front of job file), not necessarily blank, whilst on the phone to the client.

One of the biggest problems with this is the person taking the instructions are they are frequently illegible or abbreviated and incomplete. The information displayed in figure 4.21.1 show the past one hundred jobs in relation to the five objectives outlined in the ISO 9000 standards.

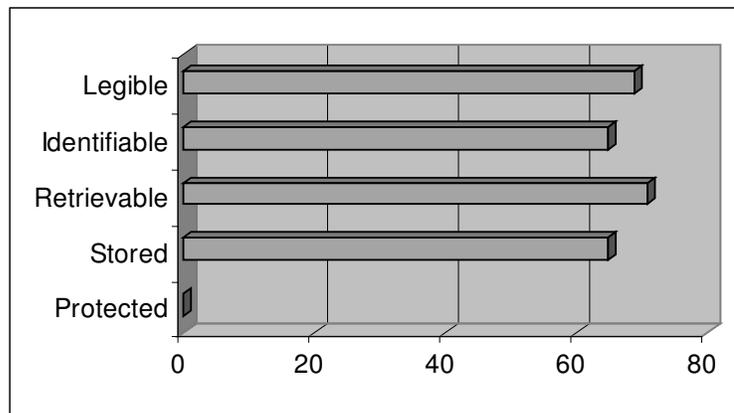


Figure 4.21.1 Job instructions

With regards to a small business, the person at the front desk collates all work orders. Due to this persons work load and environment, the work orders are often

scribbled down on blank a4 pieces of paper. Depending on the time available these work orders are often untidy, as the person will be writing them while talking to the customer on the phone.

Due to the fact that the work orders are generally written on normal a4 paper, with no actual title or heading at the top, work orders can be very confusing and can easily be misplaced.

It was apparent due to the fact that there are no job numbers allocated to the work orders that they would be easily lost and it would be extremely time consuming to match them up with the corresponding file.

The work orders are placed loosely in the corresponding file with no internal order system at all. Multiple jobs processed at the same site and have had numerous work orders allocated to them are scattered throughout the file.

These files are also open to any worker in the office or outsider as well as there being no security procedure in place other than the office building security system and locks to external doors.

New Process

The main issues encountered in this section of the ISO 9000 standards are centred on record keeping and the ability to read, identify and find information. It should be noted that customer satisfaction is always a primary objective of the ISO standards, and ensuring that all requirements of the client are satisfied and there is no confusion with the extent and nature of the service required.

The objective is to implement a process that will ensure that all records are not only complete but that the requirements for the ISO standards are met.

The office procedures that require the most attention are in the areas of general record keeping. The directors of the company have had many years of experience, and as a result, the more technical aspects and legal requirements of office procedure are sound.

There are several areas of interest when looking to improve the process at the job initiation stage. These areas may include: -

Unique job identifier (Number)

Full Client information

Quote

Full property details

Clear written instructions- eg. Extent, nature and all specifics

Person taken instruction

Deadline stated

Additional Information.

Documentation and acceptance of the client's instruction are to be recorded on a checklist as shown in Appendix B. This new checklist will be printed on green paper so as to be easily identifiable and all information contained written in a legible manner with correct corresponding information.

With the support of management and staff, this new system will be implemented across the board so that every job instruction given shall be now clearly identified in this manner.

Evaluation process

It was decided at a meeting with management that the best way to evaluate any changes in this particular area would be a one-week trial run. The short duration was decided upon due to the possibility of a complete breakdown in the system and any corresponding impact that this would have on the business in general. However a one-week trial will provide the necessary information as to the system being workable or needing to be redefined for better results.

One factor that came to light in the testing of all the new systems put in place was that there were a number of times the employees forgot to use the new system and resorted to the old. This is a human error that was slowly reduced over time and has been almost eliminated.

On review of the results from the second lot of tests that were conducted it was discovered that the new system was more successful in eliminating such

problems as identification and retrievability. The job instructions were now more legible as the information was collated in a simple and logical way. Management was far happier with the new system and has completely approved the continuation and full implementation of the new system. Due to the results and responses that were received it was decided that no new redesign was required.

4.22 Correspondence with client

This is a major area of concern as any correspondence with a client has enormous impacts on our business not only in the immediate financial sense but in the long term as well. Our office receives a large number of phone calls and faxes every day and this can lead to problems if there is not an accurate system in place to keep track of them. At the same time a large number of e-mails and letters are received daily. The main concern with received phone calls is that the messages are written down by hand and can sometimes be illegible. This can mean that the assigned worker must return to the front office to receive clarification of the message. If our office manager has a problem with remembering the instructions given by the client then a return phone call must be made to the client, this sometimes leads to a frustrated and angered client. It can happen that the time of the call is not recorded and occasionally the contact phone number is not recorded either. The current system of relaying messages is to have a hand written piece of paper placed on the keyboard in the office of the relevant worker involved. This system has led to innumerable problems and has created vast inefficiencies because of messages being lost or damaged.

The relaying of e-mails is not of any concern as they are printed out and handed immediately to the worker involved, however, the storage of these e-mails is a concern as any e-mail received four weeks earlier gets saved into a standard back up file stored on the front computer. These files are created on a week-to-week basis and there is no record of which files have what e-mails. This has led to a large amount of time wasted in trying to find the right back up file that has the relevant e-mail stored in it.

The loss or misplacing of mail or correspondence again results in a great deal of time wasting and client frustration due to the resultant processing delays.

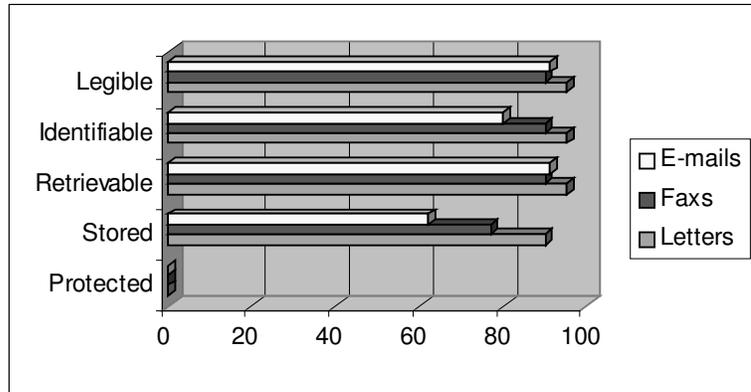


Figure 4.22.1 Correspondence received

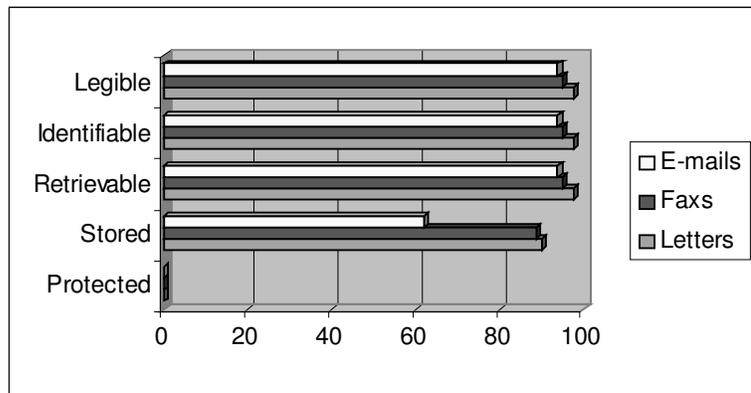


Figure 4.22.2 Correspondence sent

As pre-mentioned, all messages are hand written and when the office is busy and our office manager is pressed for time the handwriting becomes messier and messier. In regards to e-mails and letters received from clients there is no problem due to their individual format. Faxes, however, are another matter as they are sometimes hard to read due to the way they have been written. Any files that are kept on a computer are clear and therefore are not relevant here.

While there are issues regarding the many sorts of correspondence, there is no problem telling the difference between a fax received from a client and a letter received. The figures here represent this and it should be noted.

As mentioned earlier there are issues relating to finding this correspondence and it is a major concern, the figures here show just how much of a concern this problem is for all the workers and management in the office.

Again the storage of this correspondence is another major concern. The figures show just how serious this problem is and how immediate corrective action is required in this area.

In regards to e-mails received these are stored in the front office computer so there is a certain level of protection. However, referring to the way that messages are passed around the office and the handling procedures for faxes and letters, serious security concerns are evident.

New Process

The first step is to combine all relevant computer files into individual folders containing all correspondence and work related information. These sub-folders will be located in an overall folder so that just by accessing the individual folder all client correspondence and completed work can be seen. In regards to letters, a folder has been created that will contain all received correspondence and at the end of the days business will be emptied by filing the letters into their appropriate file. Faxes will also be placed into this file.

Phone messages will still be hand written but now must contain a date and time as well as a contact phone number and the client's name. These messages will be handed to each worker as they return to the office instead of placing them on their keyboard.

Evaluation Process

The one week trial period will again be initiated and the main areas of focus will be how easily the system works, how effective it is in regards to time management and how much (if any) information is misplaced.

The new system received extraordinary results. Every member of the staff was happier and more productive and this led to less stress in the office. Messages

were received in a timelier fashion and action could be taken immediately. The new system with the computer files worked out far beyond expectations and was well worth the initial effort in creating the new process. The ease in which all information could be accessed was truly astounding and it was remarked upon that it should have been in place years ago.

The only negative feedback was in regards to the emptying of the correspondence file at the end of the day. The office manager stated that it was a far more time consuming process to complete at the end of the day as against doing it throughout the day. The net effect however was however successful as the correspondence was placed in the appropriate files without loss.

4.23 Digital data storage

This is of great interest within the firm. The office has three main programs in which the majority of data for all jobs is contained. These programs are specific to the surveying and engineering industry.

This is an area of great concern within the company. It is not uncommon to have trouble finding computer files as they tend to be saved in strange places. They are usually found on the computer of the last employee to work on the job. This is normally not a huge problem as there are only a small number of computers in which it could be stored.

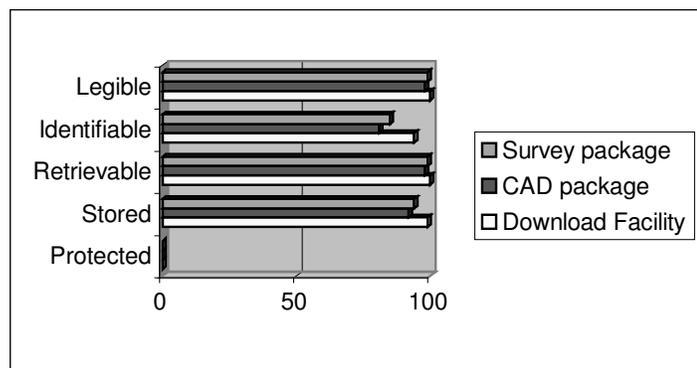


Figure 4.23.1 Digital data storage

The fact that these are all computer CAD programs means that there is no issue with legibility provided the text is at a suitable scale. This is probably one of the few areas examined in this project that actually met the requirements of the standards. In figure 4.23.1, it is important to recognise that everything is dependant on the ability to retrieve a computer file. It is impossible to ascertain if the file meets any other requirement if the file is missing.

Identifying files is not a huge concern as computer files need to be given a number or code to save them. Jobs are saved with a unique number, and the only issue is identifying one drawing when there are several plans.

Computer files need to be assigned a job number or code to allow the computer to save the information. A problem arises when two or more drawings have been produced for the one job, particularly when there is a large amount of data stored. It may be a matter of searching through several files to find the appropriate information and these may be on one of five computers. Needless to say, this is inefficient and extremely frustrating.

The storage of computer files within the office is below par. The office computer system consists of six computers connected to a network server, where all information is backed-up onto the server. The major issue with the back-up system is that it replaces the already backed-up files with any changes that have been made to that file. The problem at present is when any file is accidentally altered the server will save the file, even if the file is deleted.

It would be disastrous to the company if there were a fire as all computers, including the server, are within the same office. These files are open to any worker in the office and there is no security procedure in place other than the office building security system and locks.

Evaluation Process

The main objective is to make all computer files easy to locate. There is a need to create a system that will reduce the possible locations in which a file could be stored. This can be achieved by saving all computer files, from all programs into

a single location on the user's computer. This in turn, is then automatically saved onto the server at the end of every day.

To eliminate the problem of identification of any particular file, a description of the job type and address is to be added to the end of the job number i.e. a suffix, such as, 5555 setout Gordon or 5555 detail Lord. This will help to ensure that even if the job number has been typed incorrectly, the address offers an alternative to find the file through a simple search.

There is a need to store a copy of all computer files off the work premises. With the improvements in technology, a 'portable hard drive' has adequate storage space in which to save all files. This should be a regular occurrence, being once a week, to avoid any loss of information.

This has to be designed and implemented correctly first time around. Changing the location of computer files for a period of time will create havoc. If the new process is inadequate, all files will need to be found and saved into any new system or even the old way. Several meetings with the directors and all employees were arranged to ensure that all staff understood the process and there was no confusion.

The new system for storing and handling digital data files has been by far and away the most successful system introduced during this project. The ability to find, identify and store computer files has been dramatically increased. No longer are there four locations on each computer in which to find a file. The fact that the new system reduces the possible locations from twenty four to six, and a description of the job after the job number help to eliminate any human error and most importantly, the time savings are immense. Any system that eliminates the need to re-enter and calculate any misplaced file is invaluable.

4.24 Correspondence with Statutory authority

Obviously any correspondence with a government authority is extremely important and must be handled and responded to in the appropriate manner. There have been many cases in my office where letters and/or forms have been

misplaced or placed into the wrong file. Also there have been occurrences where the actual correspondence has been lost completely with the result that the relevant government authority has had to be contacted again.

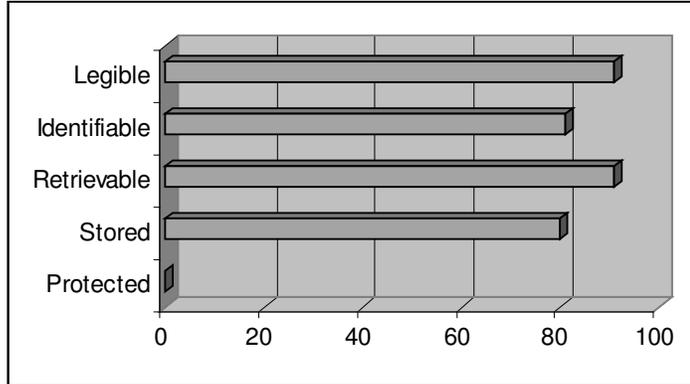


Figure 4.24.1 Correspondence received

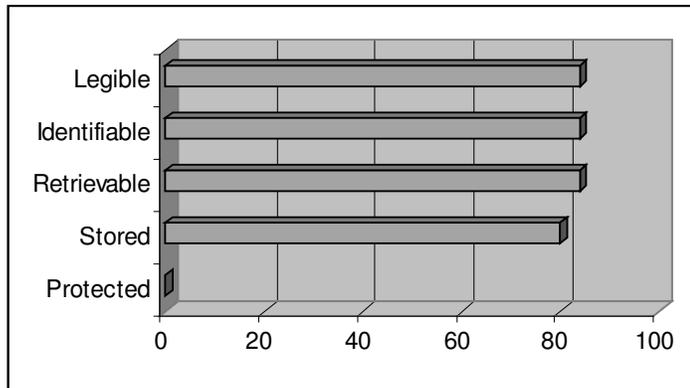


Figure 4.24.2 Correspondence sent

Due to the fact that any governmental correspondence is compiled and written according to the relevant statutes of that particular department, this section is not an issue. Any governmental forms that are to be completed are also formatted in this manner as well.

One major problem that arose when this area was tested was the fact that any correspondence from a council body or regulatory authority only contains their particular reference number for their documents system. No information is contained on the forms or receipts regarding our reference number or address. The information contained is usually only a Development Application Number.

Due to this problem the results were vastly skewed and have to be examined with an eye to this fact.

The major problem occurs when these records are required. The files did not contain information about whether any application or clearance had been applied for. This becomes a problem when clients enquire as to why their job has not come out of council. This has a major impact on deadlines, as most authorities are notoriously slow in the approval process.

Again the only problem encountered is due to the council receipts received on loose pieces of paper. These are stapled to the inside cover of the file, and tend to be lost more often than not. These receipts, once lost, are very hard to replace due to the inconvenience of having to go to the council, explain the problem and receive a replacement.

These files are open to any worker in the office and there is no security procedure in place other than the office building security system and locks.

Evaluation process

I have implemented a new checklist that contains all the different types of council authorization we have to obtain, with regards to construction certificates and development applications. This checklist is a printed form on orange a4 paper so as it can be instantly recognized. With regards to correspondence received from any governmental authority, the new system places all correspondence in a clearly marked a4 envelop inside the related file. This ensures that any received correspondence will be located in the same place and be readily accessible.

This particular section has seen the need for three checklists: - development application, construction certificate and subdivision application checklists. These are shown in Appendix B.

Again a one-week trial was agreed upon with management and during this period the new system was to be introduced across the board and also retroactively introduced to any work project that was currently being worked on. The areas that were to be looked at were the ease of retrieving any governmental

correspondence misplaced during the trial period. Also confirmation that work had been completed and the relevant information sent to the corresponding government authority, promptly.

Again the human element was present in the implementation of this system, but once again when these small problems had been ironed out the system was highly effective. The relevant government authorities had their information returned on time and it was found to be a lot easier in retrieving information from government authorities as the a4 envelops fit nicely into the work packets that we use. Management was very happy with the new system and readily agreed to the introduction of this process into our workplace.

4.25 Job completion and Accounts

The main area of concern here is that since each individual worker prints out and sends the relevant account to the client, there is some confusion as to whether the account has been sent in the first place because it is not recorded anywhere but the accounts sent file.

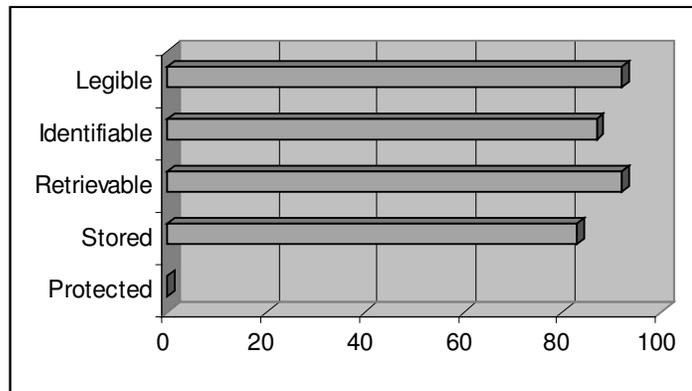


Figure 4.25.1 Accounts

In regards to the problem of legibility, there is no issue. All the accounts were printed out in WordPerfect. Again, there is no issue here due to the way that the accounts are drawn up. The accounts are easily identifiable.

The system for retrievability that was in place was an “invoice sent” folder that held all invoices. The figures show, however, that there is an issue as to discovering which worker had sent which account.

The figures show just how low a level of protection there is in the accounting section. Financial information should have some level of protection and safeguards in place but in our workplace any worker can access this information.

Evaluation Process

A new computer program called “latitude” has been installed to keep more accurate account records. Security is an issue that will have to be looked at later. There is a feeling that there are not enough employees to make security an issue. As well, a section has been added to the “Job Completion checklist” requiring information about the account, has it been sent and by whom.

The one-week trial period was again implemented to discover how well the system would work.

The new system was well received, even after the expected problems of learning the new computer program had been resolved. The new system allowed any worker to check if the account had been sent. The checklist was also of benefit as it allowed a reminder to the worker and a double check to make sure the account had been rendered and sent.

4.26 Data collection and field notes

This is an important area of any surveying business. If the data collection and the field notes are inaccurate, lost or illegible there can be a catastrophic increase in the workload required to complete any given job. This has flow on affects such as productivity and lost “work hours”. With regards to the actual physical data collected it is critical that the actual data is stored in the correct way or it will become compromised or lost. Data that is collected by the instrument is not backed up in any way, and could results in a loss of the all work that has been

carried out to date. There is only one person in the office with the responsibility of downloading the data from the instrument to the survey programs in the office.

Field notes are also a major concern due to a number of factors. Things that can and will go wrong with the field notes can be a severe problem in the office. There must be a new system introduced in this area because of the critical state of operations at the moment.

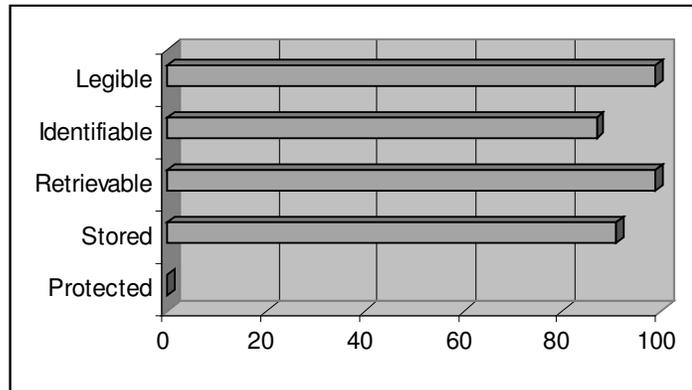


Figure 4.26.1 Raw data

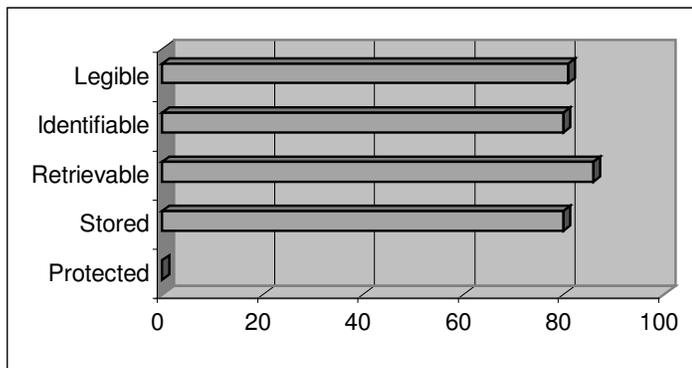


Figure 4.26.2 Field notes

This, as the figures above show, is a huge problem that cannot be overstated. It should be noted that this problem pertains only to the collection of field notes, NOT data collection as that is stored electronically and has no legibility problems inherent to it. The collection of field notes however has been a major hindrance for a very long time. The problem arises because most field notes are written by hand and the handwriting and identification marks are individual and not only

different to each person but also dependent on the quality of their handwriting. This, however, is not the only concern as environmental factors have also been identified as being a problem as rain damaged field notes are sometimes very hard to read.

It is a frequent occurrence that there will be missing information on the field notes. This can come in the form of missing adjoining information, lack of date and time of completion, field staff that completed the work ETC.

Due to there being, sometimes, a lack of information on the field notes the identifiability of these notes can be an irksome problem. The figures show that there are some ten percent of field notes that are hard to identify due to some form of missing information.

It should be stated here that the issues of retrievability was considered to be a little bit ambiguous because the retrievability of field notes and data runs at some ninety-nine percent, the *ease* of retrieving any given field notes is another matter. The odds of finding any given file *within five minutes* are only some eighty-five percent. The search for the remaining fifteen percent can (from personal experience) be anywhere around some twenty minutes, if they are found at all. There has been the odd occasion where the field notes have been lost. This occurs when there are too many files open at the same time and information is misplaced or put in the wrong file.

The retrievability of data stored on the instruments is another matter as it is one hundred percent retrievable and easy to accomplish. With the noted exception of the motherboard on the instrument itself crashing.

Data taken from the instrument is not stored adequately and is not backed up in any way shape or form. Loss of this data would represent a major inconvenience to the company. Field notes are stored in the corresponding work files. The problem with this is that the field notes are sometimes replaced into the wrong file or are left lying around the individual offices with no notification of who last handled the file.

Once again there is no security procedure in place here other than the locking of the offices at night.

Evaluation Process

A checklist has been created which is to be completed by any worker in the field collecting data for the company. This checklist contains a comprehensive list of all data that is to be included in any field notes that have been drawn up. The list includes such information as: Date and time of work completed, name of the surveyor who that collected said information, address and number of the client involved, any specialized marks that have been added by the worker, etc. There are several checklists that have been created. These include checklists for detail and identification surveys, and are shown in appendix B.

These checklists are to be completed *before* the worker leaves the job location to help reduce the chance of any missed information. The worker will also sign off the checklist so that if any questions arise the correct person can be found.

These field notes will also be permanently stored in the appropriate file and will no longer be removed for any purpose other than to photocopy. If for any reason a person in the office requires the field notes so as to work on them they are to be photocopied and returned, then the photocopy can be used. Hopefully this will reduce the number of misplaced, lost or misfiled field notes and therefore increase productivity across the board.

As to the downloading of data from the instrument, this is to be immediately backed up so that there can be no possibility of the data being lost. This is to be done continually and without error, as the damage that can result is immense.

Allowing for a short training period on the process for downloading and backing up of the data from the instrument, a one-week trial period was again implemented.

After the initial period of instruction to the staff regarding the downloading and backing up of data from the instrument, there was only two occasions where this procedure failed to be carried out. Fortunately this error in procedure was picked

up within the day and rectified. There was a small amount of negative feedback in regards to this procedure due to the time required to process it. However it has been accepted that if and when everybody adapts to the change it will no longer be a significant problem.

Again there were human errors in the trial period for the field notes collection checklist, but once again these were not a major concern as they represented only an ongoing learning curve within the staff. Overall the checklist was received well as it did accomplish its mission in reducing the amount of time lost in searching for excluded information, it was discovered that the list was not totally comprehensive and that there was a requirement to add some additions to it. After this had been done the process was found to be easy to use and a valuable tool.

The procedure for photocopying field notes and returning immediately to their respective file resulted in an interesting situation. It was discovered that it was the management team that was responsible more often than not for the breaches of this new procedure. All the staff were quick to show their support for the new processes being introduced into the office by bringing these breaches to the attention of the management team as quickly as the breach was discovered. Again, on the whole, this procedure was well received.

4.27 Plan production

For obvious reasons, this is a large concern. Any set of plans that is drawn up in our office has to be perfect. All pertinent information must be placed correctly on the plans or major problems arise. Obviously plans are worked on and revised many times before the finished project is completed and submitted to the various regulatory bodies and, just as importantly, the client.

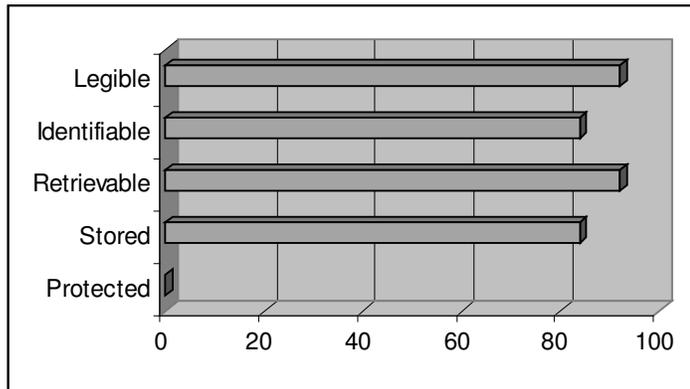


Figure 4.27.1 Plan production

All plans are drawn up using various different computer programs, and there is no problem in this area concerning legibility. However, what is not obviously stated in the figures above and is a concern is the problem of missing information. Due to the human element concerned with the production of any plans, there is occasionally a problem with important information being left off the plans. This information can range from a seemingly minor piece to a vital element of the plans themselves. After taking an internal poll at the office it was discovered that the types of information missing range from the type of plan, disclaimers, the street name or location of the project, and north points.

As mentioned before, due to the various computer systems that are used in the office the issue of identifiability is not a concern.

Again, because of the current process in place, the strict subject of retrievability is not an issue. The plans are either stored digitally on various computers or physically in the corresponding work file. However, there was an issue related to as sometimes numerous copies of individual plans are stored and this leads to the problem of not knowing *which* plan has been sent out to the various regulatory authorities or even the client themselves. This is not a continual problem, but there have been incidents where there has been no notation of the plan being issued out and therefore it is difficult to retrieve the correct plan for review or correction. This is generally due to human error.

As mentioned before the plans are stored either in a digital format on various workstations or are placed in their corresponding work file.

The only level of security in this area is the internal security system of the building itself. This is a concern due to the fact that if any damage is sustained on the building (especially fire damage) then all copies of the plans would be destroyed and therefore, in a practical sense, the business would grind to an immediate halt due to catastrophic loss.

Evaluation Process

This has been an area of concern for a long time by the management team and ideas have floated around back and forth between the partners prior to the initialisation of this project. With the commencement of the project the concern was put to the fore and a decision was made. It should be noted that it is only in this particular area that there has been a major capital outlay for the procurement of a company asset.

The purchase of a new scanner, an IR 2020, has resolved many of the issues. The new system that has been decided upon allows the plan to be altered, scanned, initialised and sent to the individual workstation as a PDF file.

Considering this to be a major purchase there is obviously not going to be a trial period. This new piece of hardware is to be incorporated into the systems that are already in place and competency on the hardware is to be achieved by all workers in the office. The results from the use of this system have been excellent. The ease of use and resulting increase in time efficiency has totally justified the initial outlay of \$4,500. Due to the method of installation the issues regarding loss of files and what version of the file is current have been resolved. The only problems arising during the time the operation was observed were again attributed to human error. The two errors detected to be repeated more often were the incorrect naming of files and the sending of a file to a wrong computer. These are minor issues and were quickly identified and remedied. The incorrect naming of the files is a very problem easy to fix, as is misdirection of the files. After a

review of operational procedures following an error it has been a relatively simple matter to retrain the individual on the correct procedures.

4.28 Job files, identification and traceability

The problematic filing system previously in place consisted of placing the files in a series of pigeon holes contained in a structure that was 2.7 metres high and 5 meters wide. The system was not accurately numbered and when a file was removed it was replaced into a “to be filed” pile and then tended to become rather large and unwieldily. Due to the old system of stapling notes and information to the file itself these important bits of information tended to be ripped of the file when they were removed/replaced into the filing “cabinet”. Another problem was that there was a tendency to have two separate, unrelated files with the same file number. This led to a time consuming process to trying to find the file, which directly impacted on time efficiency and productivity.

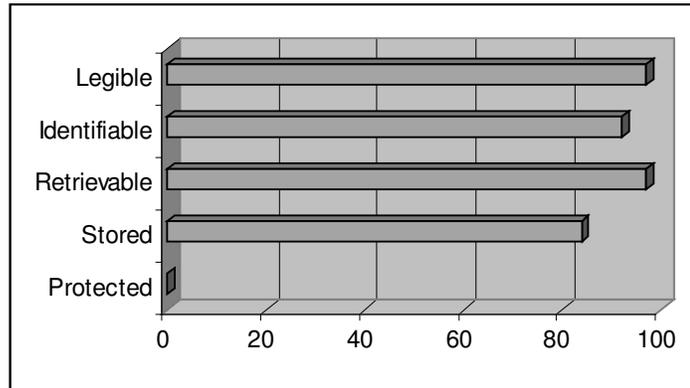


Figure 4.28.1 Job files

As represented by the above figures a problem that faces the workers in the office is the location and identification of the files. Personal conversations with the workers showed a tendency for frustration when searching for a requested file. A commonly heard phrase in the office was “where the hell is the file!” This issue had to be attended to, owing to the seriousness of the problem and needed to be rectified immediately. Another identifiable problem was the issue of information being lost from the file. The proper identification of files, two files having the

same allocated number and illegible file numbers were all problems that had to be recognised and rectified.

As listed, legibility of the file numbers was a concern because of the numbers being hand written and problems arising because of the possible confusion and, frequently, duplication of numbers.

The security issue has also been raised, as there is no provision for fire prevention, theft, etc. The only security is the ability to lock the office at night.

Evaluation process

The first issue to be dealt with was the problem of storing and retrieving of files. The decision was made to create a central pigeonhole that will hold all the files currently being processed. No files are to be placed in offices unless they are being currently worked on. This should solve that problem. The filing number system will be revamped by pre-numbering empty work files in a sequential way. After discussion, fifty was the file number decided upon, of files to be pre-numbered. Files being processed were issued a clearly numbered white sticker and placed over the hand written existing number. This will be the ongoing system and eventually all files will be clearly labelled. The problem of information being torn off the cover of the files had been addressed earlier and, information is no longer to be stapled to the files but placed inside.

A two-week trial period was decided upon. The new labelling system which as mentioned which was mentioned previously is to be ongoing.

The results achieved by the new systems were again a triumph. The placement of all working files in a central location allowed all workers to find the files that were required with a minimum of fuss. The time taken to locate a file was dramatically reduced and this had the direct flow on affect of creating increased productivity in the workplace. The other benefit obtained by the change in procedure was the reduction in stress levels of the staff themselves. This cannot be emphasized enough as the workplace is a far happier place than previously. The new labelling system was more tedious according to the staff. The belief was

that retroactively renumbering the files as they were being processed was not as easy as just replacing the file with one of the pre-numbered files that were now available. However this was eventually overcome by pointing out that files already in existence were also in the computer system and these would also have to be altered as well.

4.29 Time sheets

This was a concern experienced by everybody in the workplace, because prior to this project being initiated there were no time sheets in existence. The management team divided their work around because there was normally always one of them in the office at all times. This allowed them to be aware of who was working where and for how long. However there had been issues with the management team occasionally leaving will leave the office for the day and some of the workers remaining behind to do overtime. The converse was also a problem, as the workers would occasionally come in early before the managers arrive. With no time sheets the hours worked by the employees and their pay for the week was hard to determine. How many hours had been charged to the client for work performed was also hard to determine. This had led to clients being overcharged or frequently being undercharged for their work.

With no timesheets in existence there was no information that could be accessed and reviewed prior to this project. This also extended to any concern regarding retrievability and legibility, security and identifiability.

The new system includes a time diary in each office that allows the workers to record the times they start and finish. These figures will then be put into the computer that calculates how much time each worker has spent on what project and provides an indication as to how much the client will be charged. This can only be used as a guide with the final decision resting with the management team.

The two-week trial system was used to establish the viability of this system while also receiving feedback weekly from the management team.

The results from this part of the project were a mixed bag. On the benefit side the identification of time spent on each project was more easily achieved and it has assured the billing of customers for services provided is more accurate. This has assured the financial viability of the company and accurately reflected the individual contributions of the workers themselves.

On the negative side there have been issues raised about the efficiency of the diary system being that it is a time consuming process to record that you have spent ten minutes working on twenty five separate jobs each day. Another problem arising because of human error is that there are times when the staff have not remembered to record in their diary at all. A final solution to this problem has not entirely presented itself yet. At the completion of this project the current system will have the office manager check the diaries at the end of the day. This is not a totally accurate system either as occasionally it is too late or the worker has already left for the day. But at the moment it is the best option available.

4.3 Conclusion

There were a number of separate zones that have required attention in this particular area but they are sections that desperately need modification within the workplace due to the large amount of time and effort that is lost. The possible benefits that could be achieved if any restructuring of these areas is successful would surely outweigh any initial costs that were incurred in the restructuring.

It should be noted that it could be perceived that the office exists in some form of organised chaos and that there is hardly any effective organisation at all, this is not the case. While the office may not be organised and controlled to the level of the ISO9000 standards, it still is a productive and successful business. The main concern is just how successful the business could become if the controls were in place.

Chapter 5 provides a detailed cost analysis and projections for the possible bonuses that can be realized.

Chapter 5

Analysis and Discussion

5.1 Introduction

Chapter 4 has shown that human error is a large concern. Within the business it is apparent that the standing systems, while not perfect, were working near their required levels. However the one letdown in all those systems was the amount of human error. The new processes are designed to introduce a system that creates its own reliability on the concept of repeatability. By ensuring that the processes are easily utilised by all staff and repeated at all times in their appropriate areas the number of human errors can be easily identified and reduced. It may be impossible to completely eliminate all human error, but with continual training and positive reinforcement, human error should be reduced to a more manageable level.

This chapter has broken down the analysis into a number of areas such as cost analysis, benefit analysis and overall analysis.

5.2 Cost and benefit analysis

After appraisal the results received from the implemented processes and the resulting successes and/or failures the following conclusions have been drawn:

Initial State- the company involved did not have any form of established control systems in place. This state of organised chaos was exceptionally disruptive and prohibitive to the smooth operation of the company. The need for this project was apparent, but even if it was decided not to undertake the project there would have been some form of control systems in place as soon as was humanly possible.

Concluding State- after the introduction and refinement of the processes aforementioned it was determined very rapidly that there were benefits developing and the process was showing immense potential. The management team were greatly impressed with the results and were very supportive of the process as a whole. The feedback from management and staff was invaluable in the refinement process and led to a streamlined series of systems.

Future State- The initial plan for future action involves the ongoing effort for continual improvement to outline the dynamic structure of the processes involved. After analysing the costs involved in introducing these processes (which follows) it was immediately understood that any costs incurred would be outweighed by the benefits including the increase in time utilisation (and therefore productivity) that were being received.

Cost Analysis- the costs involved are negligible with the exception of one important item that was planned to be purchased before this project was initiated. The costs of introducing the processes into the workplace were virtually nil. An advantage of this project was that the costs were ridiculously small compared to the benefits that were being reaped. The savings that are to be had are subjective, as it is hard to assess what time was *potentially* saved by using the checklist. However this personal experience might reflect an example of the savings that can be made. Failed to locate a survey mark for a height datum in Sydney, after discovering my mistake, I had to drive for 4 hours to complete literally 5 minutes work. This error cannot happen again as the checklist has been updated and has now been introduced into the workplace. The loss of 4 hours and \$480 to the company could not be tolerated. The only true cost of introducing these systems into the workplace is the time taken to research and draw up the checklists and the cost of printing the checklists. The only drawback of the new processes is the extra five minutes taken on the worksite to complete the checklists. This has to be counted against the numerous imponderables that have to be taken into account, for example time lost through incomplete work, replacing files that have been lost, contacting clients for job verification and most importantly the added reduction to the potential to be sued.

It is quite fortuitous that the main costs involved in applying this project were to do with the time involved. The physical costs, which shall be looked at in greater detail later, were not huge, however if we were to apply the cost of my time taken to complete this project and charge it at my current rate then the costs become quite large indeed. The best way to understand the potential costs is to examine the time taken at each stage of the process:

Checklists.

Development – this was a time consuming process that involved the collection and reviewing of data from all staff in the office and examining the existing systems that were in place. In total this took some 45 hours to complete.

Prototyping – this stage took significantly less time due to there being a limited number of ways to create a checklist. This stage took some 5 hours to complete.

Refinement – this stage was not too time consuming, even allowing for changes that were made in the checklists. After reviewing the feedback from the staff it was apparent that there were a number of changes that had to be made to the checklists. To refine all checklists took some 3.5 hours.

Implementation – the problem here was to constantly remind individual workers that they were to complete their allotted checklists. This was an ongoing process but not a time consuming one. The implementation time taken was some 2 hours

Overall this totals some 55.5 hours allotted to the areas of checklists alone. This translates into an estimated \$3,885. The ongoing costs for these checklists are related to the reprinting and distribution of checklists. It has been estimated that this will take some 10 minutes due to the speed of the printer. This translates into \$11 per time.

The printer purchased for the reproduction and transfer of files to a digital medium was the only capital purchase that was made within the business. Management had already decided this and there was not any time taken by the author of this project for such things as development or refinement. However there was a fair amount of time taken for the implementation of this item.

Considerable time was allotted to the training of the staff on its use. This represented 1.5 hours for each worker in the office (it should be noted that this is an average as some understood the process more quickly than others). If the cost of this is added to the purchase cost of the printer (purchase price \$4,500 but only \$2,500 with trade in) then we arrived at a total of \$3,310. It should be noted that the hourly costing rate of \$70 per hour was discarded for this section, as there is a difference in the rate that I am charged out at and the rate that the management team is charged at, to this end a new hourly rate was used and was taken as an overall average all staff. There are no ongoing costs for this part of the project except for the servicing of the printer and the obvious costs of paper and power. The service costs are negated because printer is under the existing service contract and therefore no change occurs in the cost.

For the refinements to the filing system again there was a limitation as to the types of changes that could be made and this directly influenced the time taken in the development and prototyping stages. The two stages were completed in some five hours. The real costs involved in this section were applicable to the refinement and implementation of the system. It should be noted that this is a continuing cost and that any figures given for future cost projections are only given in comparison to the current implementation costs. The refinement of the filing system cost an immediate \$65 for the purchase of blank work folders and tags that are placed on the existing folders. The estimated time taken for this stage was two hours.

The implementation costs for the new filing system were difficult to estimate. This was due to it being an ongoing process and must be repeated fairly often. The time taken to change over each individual file is relatively small. Factoring in time taken to recognize and reprint the file number, the testing was completed in two minutes (this is due not only to the replacement of the file number but also to the removal of information stapled to the front of the old file and the placement of all the documents into the new file). However the time taken will vary for each file, because of the difficulty factor of each file (i.e. the legibility of the initial file number and the individual speed of the processor). So far it has been estimated that some 15 percent of the files have been changed over to the new system and

that the time taken to do this was in the region of 20 hours. Again it should be noted that it is impossible to give an accurate estimate, as the two minutes taken to change over each file is not considered by all the staff to be a major disruption. It is now considered just part of the process. The 20 hours are again costed out at a different rate as the management team rarely performs it. Therefore the new average for all staff is considered to be \$60 per hour, and this equates to some \$1,200 worth of man-hours.

The processes and procedures of this project are very large area of the project and again the only costs involved are the estimated costs of its implantation, prototyping, etc. The physical costs are negligible but are greatly outweighed by the benefits reaped from their introduction (which shall be examined later). The main cost area was development and again there was a period of time taken to analyse existing information, draw conclusions and act on the results. The processes and procedures sections of this project are covered in section four and include such areas as plan production, field notes and digital data storage. The collection of data for these areas was a time consuming process, and it has been established that this section alone accounted for 35 hours. This is a cumulative count for the nine different areas that are included in section four. The actual development of the changes has been established at another 27 hours. The prototyping stage was comparatively small because there were limitations as to the types of changes that could be made. This took some 12 hours to complete. The refinement process was comparatively small owing to the accuracy of the initial changes that were made. This was responsible for some 4 hours. Therefore accounting for a total of 78 hours of my time being used, resulting in a cost to the company of \$5460.

The implementation of these changes corresponded with a number of changes brought in at the same time. This suggests that the actual time accounted for the implementation was not totally accurate as the staff had to adapt to other changes at the same time. The break down of the time figures are presented below:

1. Job completion and Accounts – 5 minutes for changes per job/3 jobs per day – 15 mins per worker per day =90 min per day over a week period = 7.5 hours.

2. Time Sheets – 5 minutes per job for the office clerk/ 8 jobs per week =40 per week over a two week period = 1.3 hours

3. Plan Production - with the use of the high speed scanner and checklist – 5 minutes per plan – average of 3 plans per day per worker =1.5 hours per day over a week trial period = 7.5 hours.

4. Field Notes and Data Collection – 4 checklists per day (on average) = 10 minutes + downloading and backing up data = 10 minutes per week over a trial period of one week = 1 hour.

5. Data storage - in comparison to the existing system there was no change what so ever in the time taken.

6. Job Instructions - the time taken in this area is again negligible as the existing system was to record these instructions onto a blank piece of paper before the implementation of a green checklist.

7. Correspondence with clients – 15 minutes per day by the office clerk/ over a week trial period = 1.25 hours

8. Correspondence with Statutory Authority – 2 minutes per checklist for the office clerk/ 5 times per week (on average) = 10 minutes.

9. Job files, identification and traceability – 2 minutes per file per worker/ 4 files per day = 40 minutes per week.

The whole estimated cost for the introduction, review implementation and training section of this new system totalled \$12,985 (this includes the cost of the printer). Another cost that has to be factored in was the cost of being certified by the ISO auditor. This cost has been factored at being approximately \$3,500. Therefore the total cost is \$16,485. This was quite an alarming figure when first realised but it was noted that the bulk of this cost is related to the man-hours involved.

As previously mentioned the benefits of this project outweigh the costs involved. A good example being due to the increased efficiency and reduced processing

errors and the possibility of a “lost” job have been greatly reduced. On average the standard business contracts for this office is in the region of \$3,000. And it would only require the non-loss of four contracts, to justify the expense of the new system. This is an intangible figure but if repeat business is factored in the figure becomes larger.

The immediate benefits were broken down and assessed in regard to costs of the new system. It should be noted that the principle intangible questions are: what could have been achieved during the lost time/man hours? And how valuable would it have been to the company? To answer these questions an assumption was made. To complete an average \$3,000 contract can take 20 hours. Therefore every 20 hours saved in processing has been assumed to save the business \$3,000.

1. Job Completion and Accounts: the problem here is the possible undercharging of clients. It has been assessed that on average 8 hours per week are lost through undercharging. This equates to some \$560 costed at my rate of \$70 per hour.
2. Time Sheets: this has a direct link to the aforementioned area and therefore no immediate figures have been given.
3. Plan Production: large savings were made in this area alone. The office in total loses some 8 hours of productive time per week. This equates to \$560 costed at my rate
4. Field Notes and Data collection: this area represented a reduction in lost time of 4 hours per week. This equates to some \$280 costed at my rate.
5. Data Storage: this area represents some 5 hours per week of lost time, this equates to \$350 per week costed at my rate.
6. Job instructions: it has been assessed that there was a saving of 2.5 man-hours in the search for clarification of job instructions. This equates to some \$175 costed at my rate of \$70 per hour.

7. Correspondence with Clients: the office clerk assessed that this area represents some 5 hours per week in lost time, and this equates to around \$250 per week costed at the office clerks rate.

8. Correspondence with Statutory Authorities: it should be noted that this area is vastly important not only in the immediate savings but also for the options of repeat business and future liability. This area as been assessed to represent 1 hour a week in lost time, and equates to \$110 costed at the director's rate.

9. Job Files, Identification and Traceability: being a large area and represents a significant portion of savings, and has been assessed at some 10 hours per week of lost time and resulting in a loss of \$900. This is based on the average office rate of \$90.

Totally this accounts for a saving of 38.5 hours per week or 1 employees entire weekly work time. These figures were quite astounding when first realised, because they represent (using the aforementioned rate of 20 hours per \$3,000 contract) nearly \$6,000 in potential earnings. The \$3,185 worth of work time saved represents a 25% return on the initial outlay cost for this project in the first week of implementation.

There are a number of intangibles that although can be mentioned cannot be accurately assessed. Owing to the increased harmony level in the workplace all the staff are happier now and more productive now as a result of the new system's success. While this increase may have been absorbed within the initial gains that were made in the first week, they should be more easily recognizable over a longer period of time. Although a figure can be placed on the increase in productivity it cannot be fully assessed in regard to things such as the effect on interaction with clients (the happy worker Vs the unhappy worker).

Another major intangible that cannot be further assessed is the prospect of future liability. The first area of concern is any dealings with statutory authorities. An example of this is the possibility of a strata plan not coming out of council on time and therefore affecting the sale of that property. This results in loss of income to the client and a possible liability case for the business. This has not yet

occurred but is a concern for all involved. With the increase in civil liability suits over the last ten to fifteen years the fear of liability is something that cannot be overlooked.

After the trial periods had expired and the results had been examined it was apparent to the owners of the business that this project had to be implemented. The savings that had been achieved in the trial period and the areas of weakness that had been exposed led to the conclusion that regardless of the ongoing costs of the project and bearing in mind any potential risks, it would ensure the future economic viability of the business to introduce the new systems permanently.

5.3 Discussion

After reviewing all the data that was collected there was one problem that kept repeating itself. The major problem was in the human error area. This is difficult to resolve, as the number of factors that are present are difficult to control. The human errors were made due to general oversights (for example “I forgot to do that”) or a lack of understanding/training of the new systems. General oversight problems have been reduced due to constant reinforcement and repeatability, but it is apparent that this is a problem that will never be completely resolved. A realistic approach would be to minimise this problem as much as possible in the search for continual improvement. One point that has been discussed is the problem of placing responsibility for error on one individual person. Previously if an error had been made it was difficult to find that person responsible short of examining labelling/drafting styles. This leads to a general reprimand to all staff.

However with the introduction of the new systems it is now possible to identify which individual has made the error and provide positive criticism and feedback in a constructive way to reduce any further errors.

Understanding/training errors have been approached with the concept of repeated positive instruction and clean information pathways. This is a time consuming process but the benefits are apparent. The level of competency in the office has begun started to level out as each worker is sharing their expertise in any given

area with each other. This has led to a more self-sufficient work environment and increased productivity in its own right.

It is important to note that when human contributions are being assessed it is impossible to predict or eliminate all errors. Humans, by nature, are fallible and care must be taken when approaching their errors so as not to castigate or intimidate the individual worker. A smooth and harmonious workplace environment is essential within the business and any disruption leads to a reduction in productivity. An obvious consideration is that if a worker is terminated or leaves of their own volition, the introduction of a new individual into the system can cause major disruptions and increased training costs.

By introducing the systems into the workplace the concept of repeatability has now been standardized. The results have shown that by having a uniform standard for each step in the workplace human error has been reduced and problem areas have been identified and examined for future action.

The implementation issues involved with this project are nil. Thanks to the rewards that are available any risks involved are not regarded as being prohibitive. This has been decided because the potential risks involved are the resistance of the employees to change and not any tangible financial risks. Any change in the procedures of the workplace may result in the addition of unwelcome tasks to the workload of any individual worker. Given time and the rewards that are available this is not a problem that would warrant the non-introduction of the project.

5.4 Conclusions

The system overhaul that has been completed in the workplace has yielded impressive results. The amount of human error that was identified before and after the change in the systems has been considerable. A reduction in the number of errors that were made after the implementations has led to a more productive workplace and a content working environment. The systems that were in place,

while still operable were not adequate because they lacked a set structure that allowed repeatability of action to assure quality. It was quite surprising to note that even though there were major concerns about computer or equipment failure, the only area of concern was to do with human action. Any failure of the equipment or computer systems was directly the result of human operation. For example, if files were not in the right place in the computer this was due to the worker saving or moving them. The overall conclusions that have been drawn from these results are in chapter 6.

Chapter 6

Conclusions and Further Research

6.1 Introduction

The aim of the project is to design an effective quality assurance system for a small surveying and engineering firm. Investigating the current office procedures and comparing them against the ISO 9000:2000 standards achieved this. This chapter concludes by discussing the results and determining what aims and objectives to be fulfilled. It will also introduce further topics, which may require research.

6.2 Discussion

The overall aim for this project was to develop a Quality Assurance system for a small surveying business. This was to be done by comparing the existing system, as is, to the standards set out by the ISO9000:2000 system. Objectives were to achieve this parity with the international system while still maintaining the financial viability of the business and not significantly increasing operational costs.

The ISO9000:2000 standard was chosen for its flexibility of introduction. This system acknowledges that not all elements of the system are required to be implemented for certification. If the auditor is satisfied as to the reason that a certain element has not been included this will not affect the overall accreditation. As this company is a small business with fewer than ten employees it was very apparent that this element was needed.

By first reviewing the current systems in place it was quickly identified that there were serious shortfalls in the operational procedures of the company. It must be pointed out that these shortfalls do not affect the overall service the business

provides but more the way in which it is provided. The main finding was that the record keeping area of the business was the main area that needed to be reviewed and improved. This area was responsible for a major drain on productivity and was acting negatively on the worker environment. This obviously in turn affects the financial outcome of the business.

When this project was submitted to management team and the possible improvements in productivity were assessed, the reception was thankfully positive. The only concerns that were raised were possible disruptions in the workplace while the proposed changes were introduced and the possible cost involved. One of the underlying objectives of this project was to introduce the systems without major capital investment.

After the analysis of the current administration policies was carried out the gap analysis tool was used to define exactly what areas were required to be examined in greater detail and what type of changes were needed. The gap analysis revealed quite serious problems in the office procedures and was extremely useful in suggesting those problems to be tackled initially.

The overall cost analysis was easy to achieve. The purchase of a photocopier/scanner is able to relay plans straight to the workstations, and the purchase was approved prior to the new system being introduced and implemented. Other costs were minor in completing the project. An increased amount of photocopying to produce the various checklists and pre-numbered work folders totalled a small outlay of \$65.

The projected benefits of the systems to be introduced were not easy to put a definitive cost on as it related not only to direct financial flow increases but also to the office productivity levels that would not be able to be measured in the immediate short term. However there were a number of areas that could be assessed. These included the number of return visits to various worksites to finalize information lists, returned phone calls to clients regarding missed information and time consumed in locating files within the office.

These three areas were foreseen to be reduced significantly and on that basis the project was approved.

The results achieved were well above the targeted results. This was due to a number of factors: firstly the targeted results were understated, it was not initially evident as to how much time was taken up in these areas and the amount of productivity lost. Secondly, due to the level of disorganisation that was already in the workplace any changes to improve the work systems already in place was going to have a major impact on the way that the office was run. Thirdly, because of the positive way that staff and management got behind the new system there was an immediate change rather than an incremental one. It must be said that this factor was of immense relief as some of the changes did actually increase the amount of paperwork that had to be completed and the resistance to this increase was nil.

There were necessary changes to be made to the projected systems, and the new systems now in place are by no means complete and definitive. Any changes in the workplace should be dynamic in nature and the ongoing challenge to increase productivity is a daunting one. However with the acceptance from management and staff it is apparent that the information transitions now in the workplace will increase the speed of future innovations.

It can be said that the quality assurance system that is now in place in the workplace is on par with the requirements of the ISO9000:2000 standard to the knowledge of the author. When the auditor arrives to assess the office for accreditation it may be obvious that the new systems are not yet at their operational peak, however it can be said with confidence that if this is the case any fine-tuning will be implemented immediately and accreditation will follow quickly.

6.3 Further research and recommendations

Putting aside the potential requirements for the accreditation procedure there have been other areas that have been looked at for further improvements within the

business. These observations have been grouped into two areas for ease of definition: short term goals and long-term strategic objectives. The proposed resultant plans are contingent on a number of factors. The foremost being the financial validity and viability of the business.

Short Term Goals

The first idea floated is to update the computer systems within the office. This will be done in conjunction with the purchase of a network hub to allow the transfer of documents at high speed within the office. The additional purchase of external zip drives will also be considered to allow the removal of sizable files to be placed in the home offices of the owners.

A new security system will be purchased for the office. This will not only be for the computer systems themselves but also for the building. The hiring of a security firm has been suggested and will be finalised at a later date. The computers will become password protected with two levels of access. One will be an operator level for the staff so as to access any programs required. The other will be for the supervisors and will have unrestricted access for the partners/management team.

The backing up and securing of all files will be examined in conjunction with the purchase of a central hard drive that will be stored at the residence of one of the partners at the end of each day. All files will be backed up and transferred via the broadband network to the hard drive.

The installation of an intercom system is to be undertaken so as to allow immediate inter-office communication. This has been fully endorsed by the staff and has been put at the top of the list of priority.

The possible hiring of another front office manager has also been suggested to reduce the workload. These suggestions are totally dependant on the success of the business in the next twelve months and are being considered now to be phased in as the funds become available.

The application of the ISO9000:2000 standard to other areas of the business has also been discussed and will require more investigation. This apply would in the area of fieldwork and not to be undertaken lightly. However, having established the new standards in the office it would now be logical to project into the field as well. The next step will be in the areas of training, definition of management responsibility and resource management.

Long Term Strategic Objectives

The first suggestion put forward has been the upgrading of the companies work car fleet. At the moment there are four vehicles of various ages and models in the existing fleet because of this could be a detrimental reflection of the business. Replacements would require a significant capital outlay and will be taken under advisement.

The relocation of the business offices has also been suggested to allow it to be more centralized in the town and to allow for better storage and management of files and equipment. Again this is a major undertaking and will be looked at when necessary in the future.

The expansion of the business has also been discussed and it is possible that a regional office may be looked at in the Kendall area. This is an immediate consideration as it would expand out the client base of the business and if successful provide the additional capital for further expansion and purchase of capital items.

The hiring of a qualified town planner would also add to the range of services that could be supplied to the customer. All of these goals will require careful planning and research and consideration has been brought forward to enable possible implementation in the future.

Appendix A

Project Specification

For: Craig Beer
Topic: Quality Assurance
Supervisors: Jo Devine / David Thorpe / Kevin McDougall
Sponsorship: Faculty of Engineering and Surveying, USQ

Project Aim: The project aim is to analyse the quality assurance system for a small surveying and engineering firm and compare against the AS/NZ ISO 9000:2000 with the objective to improve the current quality assurance system.

PROGRAMME: Issue A, 24 March 2006

1. Analyse the current administration and office procedures in a small survey practice and compare them against the AS/NZ ISO 9000:2000
2. Identify potential areas of improvement to the current system.
3. Define potential costs and benefits associated with implementing improvements to the system.
4. Present a formal report of findings and recommendations to the company.

As time permits:

5. Analyse the field work procedures and data collection methods in small practice and compare them against the AS/NZ ISO 9000:2000
6. Incorporate any improvements into the formal report submitted to the company.

AGREED:

_____ (Student) _____ (Supervisor)

___/___/___

___/___/___

_____ (Supervisor)

___/___/___

Appendix B

General instruction checklist

General Job Checklist		
Job Number:		
Job Address:		
Client Name:		
Client Phone:		
Client Billing Address:		
Quoted Price:		
Job Due Date:		
Plan/Title Ordered:		
Sewer Plans Ordered:		
Additional job instructions:		

Detail plan checklist

Topographic Plan Examination Checklist		
Job No:		
Work Type:		
Plan Panel		Remarks
Title Reference(s) shown and checked		
Client name		
Project Surveyor name		
Completion date		
Plan & sheet number shown on all sheets		
Plan		
Check client specifications		
Benchmark shown		
Cadastral boundaries shown and correct		
Easements shown		
Lot numbers and areas shown		
Description of adjoining land		
Road names shown		
Reduction ratio		
North point		
Warning notes		
Services		
Sewerage		
Drainage		
Telecommunications		
Electricity		
Water		
Gas		
Project Surveyor .	/ /	

Detail checklist (field work)

Topographic Checklist		
Job No:		
Work Type:		
Field work		Remarks
Place Benchmark		
Survey marks to fix boundary		
AHD		
Site structures and feature		
Sufficient levels		
Kerb and gutters		
Sewer location and info		
Stormwater info and info		
Telecommunications		
Electricity		
Trees - height, spread & dia.		
Surface treatments		
Client instructions fulfilled		
Field notes		
Job number, date and staff		
Description of structure and features		
Source of AHD		
Street name		
Adjoining dwelling info		
Fences		
Services -inverts, pipe size and direction		
Project Surveyor		
/ /		

Identification survey checklist

Identification Survey Examination Checklist		
Job No:		
Survey		Remarks
Sufficient information for re-establishing boundaries		
Origin of marks shown FOUND on field notes		
Located buildings and sheds		
Buildings measured and offsets to occupations		
Description of all improvements		
House description		
Adjoining property information		
Deposited Plans		
Location of any easements		
Restriction on the use of land (floor level etc)		
Description of adjoining land		
Road names shown		
Reduction ratio		
North point		
Warning notes		
Services		
Sewerage		
Drainage		
Telecommunications		
Electricity		
Water		
Gas		
Project Surveyor	/ /	

Subdivision application checklist

Subdivision Application Checklist		
Job No:		
Development Type:		
Preparation of application	Date Requested	Date Received
Final Plan of Subd'n		
Telstra Clearance		
Country Energy Quote		
Country Energy Payment		
Country Energy Clearance		
Certif. Of Compliance		
Owners Consent		
Lodgement to Council	Date	
Plans lodged to council		
Plans received from council		
Plans sent to client/rep.		
Job Action Notes:		
Action	Date	

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