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**The Impact of Rapid Organisational Change at
Richards Bay Minerals (RBM).**

By:

Mr. Novan Naidoo

Student number: 203518099

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Graduate School of Business, Faculty of Management
University of KWAZULU-NATAL

Supervisor: Khadija Kharsany

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DECLARATION

This research has not been previously accepted for any degree and is not being currently submitted in candidature for any degree.

I declare that this Dissertation contains my own work except where specifically acknowledged.

Signed:..........

Date:..... 25 JULY 2006

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ABSTRACT

Change is a process that affects everyone and businesses differently and it is constantly happening, whether it be planned or unplanned. The planned change of Mission Directed Work Teams (MDWT) at Richards Bay Minerals (RBM) was implemented from 01 July 2005, and its continuous improvement and mission orientation effect on employees and the performance of the company were vital to improved business success and growth. The effect of change on organisations can be assessed by people's attitudes and outlooks. In the global world of business, companies that cannot adapt to change or implement planned change successfully will be heading for disaster and failure. The ability to react to change and implement change timeously and effectively will determine the difference between success and failure. Change management therefore plays a crucial role in today's fast-paced world of business, and is a vital skill for any manager that wants to succeed beyond expectations. This dissertation describes and evaluates the process of change at RBM during the implementation of MDWT and the change management approach that was adopted. Kurt Lewin's Force Field Analysis (Misselhorn, 2005), semi-structured interviews and statistical analyses showed that MDWT impacted positively on employee attitudes and short-term financial performance, but the management of the change process was short-circuited in a few critical areas and needs to be addressed, especially with regards to involvement of the relevant stakeholders, training requirements and change reinforcement. Although organisations need to adapt to their environment, they tend to feel comfortable operating within the structure, policies and procedures which have been formulated to deal with a range of possible situations. To ensure operational effectiveness, organisations often set up defences against change and prefer to concentrate on the routine things they perform well. It is important, therefore, for management to understand the reasons for, and the nature of, resistance to change and to adopt a clearly defined strategy for the initiation of change. Change management requires maintaining the balance of the socio-technical system that influences the behaviour and attitudes of individuals and groups, and thereby the level of performance and effectiveness within organisations. Successfully managing change is therefore clearly essential for continued economic performance and competitiveness in the tough world of business. It is therefore important that change be managed, because if the pressure to change is ignored, it will eventually become a destructive force that will put the survival of the business in jeopardy.

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LIST OF ACRONYMS

BOP – Business Optimisation Program

CDI – Competitive Dynamics International

CIP – Continuous Improvement Program

KPA – Key Performance Area

KPI – Key Performance Initiative

MDWT – Mission Directed Work Teams

NUM – National Union of Mineworkers

QCSSP – Quality, Cost, Speed, Safety and People

RBEU – Richards Bay Employee Union

RBM – Richards Bay Minerals

ROI – Return on Investment

SAP – Systems Application Program

SORTE – Specific meaning, objective, research questions, tap into literature & execution

SPSS – Statistical Package for Students (Curve fitting $\geq 2^{\text{nd}}$ order systems)

UASA – United Association of South Africa

US – United States

1. INTRODUCTION

1.1 Introduction

Management of change is just as critical as the process of change. Change comes in different forms and magnitude, and is received by people differently. Some welcome change, some don't bother about it, while others resist it altogether. Although change carries risk, it also has an upside. Change offers an opportunity to learn, grow, and to develop new products, new services, new patterns of behaviour and new ways of doing business (Gowing, Kraft & Quick, 1999). Change is a process of action, reaction and interaction between management, the employees, the environment and other stakeholders (Pettigrew, Ferlie & Mckee, 1992).

In the global world of business, companies that cannot adapt to change or implement planned change successfully will be heading for disaster and failure. The ability to react to change and implement change timeously and effectively will determine the difference between success and failure. Change management therefore plays a crucial role in today's fast-paced world of business, and is a vital skill for any manager that wants to succeed beyond expectations. All businesses operate in a rapidly changing environment. A successful business is one that can act in harmony and proactively with the environment. Timely knowledge of that environment and the direction of change ensures a competitive advantage (Dannemiller, et. al., 2002).

The main source of organisational change is the external environment such as uncertain economic conditions, globalisation and global competition, level of government intervention, political issues and technological developments (Kroon, 1995).

Management of change in organisations is essential for continued economic performance and competitiveness. There are many approaches to managing change, some focus on work processes while others focus more on the structures and content of change.

The process of planned organisational change at Richards Bay Minerals will be evaluated by the researcher by comparing and contrasting it to the theory. Where necessary, recommendations will be made which will benefit the organisation in the future.

1.2 Background

RBM is a mining company, which was established in 1976 on the KwaZulu-Natal north coast that deals in pigment production for the paint industry. RBM's objective is to be the low-cost producer of pigment feedstock in the industry and is therefore developing a strategy to occupy this position in the market. From inception in 1976 RBM has proceeded through the life cycle of most companies i.e. from the introduction phase, to the growth phase, to the shakeout phase and eventually to the maturity and decline phases. During RBM's growth phase global pigment demand was greater than the supply and RBM embarked on several projects to increase production such as building a new mining plant and a new smelter. In 2001, the pigment market slowed down considerably because of the stagnant building market worldwide and caused pigment supply to exceed demand. This market slow-down impacted negatively on RBM's sales and it propelled the company into the decline phase of the business life cycle. Due to these adverse economic and markets changes worldwide RBM were forced to embark on an organisational restructuring program to remain competitive. More than 18% of jobs within the organisation were reduced through job attrition and retrenchments.

This process of change at RBM has since continued due to technological and legislative developments, with the introduction of new systems, new technology and new work programs such as the Continuous Improvement Program (CIP), SAP, Mission Directed Work Teams (MDWT), Six-Sigma and outsourcing. All these initiatives have been introduced as a process to managing the changes that have impacted on the pigment industry globally. In order for these changes to be effective the process and execution of Change Management at RBM is critical (B Ramsay, personal communication, March 16, 2006).

1.3 Literature Review

Chapter 2 of this research report details the literature review conducted by the researcher on change and the management of change processes. The change process, which is being evaluated, is the introduction of mission directed teamwork at RBM.

In MDWT, the entire organisation consists of work groups that perform the organisation's work (Robbins & Decenzo, 2001). Teamwork may have the effect of more positive and constructive generation of ideas to improve work processes, operations and cost effectiveness. Key aspects of the MDWT process are an accurate identification of customers' needs through sensitive feedback systems and QCSSP measures, and the development of teamwork throughout the organisation via training and leadership. MDWT advocates the establishment of mini-businesses within the company, each with their own name, missions (which are company aligned), visions, values, measures and monitoring systems. Through the mini-business approach everybody in the organisation becomes involved in a process of continuous improvement in which the aim is to build a self-actualising company through self-actualising people. MDWT progress is measured through visible scorecards or charts indicating customer satisfaction, supplier involvement and team performance via QCSSP trends.

Typical QCSSP measures (Mullins, 2005) include:

- Quality: non-conformances, defects and customer complaints.
- Cost: productivity, overtime expenses and floorspace.
- Speed: rate of production, percent of product recovery and repair times.
- Safety: accidents, safety suggestions and planned job observations.
- People: training, absenteeism, participation and labour turnover.

In short, the purpose of MDWT is to develop a positive mindset across the organisation, to raise individuals' confidence and self-esteem, to encourage them to use their common

sense, to entrench team-work and to help each person to understand the importance of his or her contribution to the organisation.

1.4 Motivation for Research

Richards Bay Minerals were forced to embark on an organisational restructuring program in 2001 to remain competitive in the pigment industry. More than 18% of jobs within the organisation were reduced through job attrition and retrenchments. Thereafter the process change continued with the introduction of new systems, new technology and new work programs such as the Continuous Improvement Program (CIP), SAP, Mission Directed Work Teams (MDWT), Six-Sigma and outsourcing. In order for these changes to be effective the process and execution of Change Management at RBM is critical.

It is therefore the intention of the researcher to review the change management process adopted by RBM during the process of MDWT. The change process will be evaluated by assessing the attitudes of the employees and the financial performance of the organisation. This research study will assist RBM in its future change initiatives by providing a report on the outcomes of the change management process for MDWT and also by providing recommendations.

1.5 Value of the Research Project

The study will bring value by:

- Providing a report on the management of change process undertaken for the implementation of MDWT.
- Providing practical recommendations for future change initiatives at RBM.

1.6 Problem Statement

In 2001, the worldwide pigment market began to slow down considerably because of the stagnant building market. As a result the global pigment supply exceeded the market demand. This market slow-down impacted negatively on RBM's sales.

Richards Bay Minerals have undergone several key changes thereafter within a period of five years. The management of these changes is critical to the success of the organisation in today's increasingly competitive environment.

Mission Direct Work Teams (MDWT) was implemented at RBM in 2005 to impose more positive and constructive generation of ideas, to improve work processes and operations and to improve cost effectiveness.

1.7 Objectives of the Research

The objective of this research is to analyse and assess the impact of rapid organisational change at Richards Bay Minerals using MDWT as a basis and to make recommendations to facilitate future change initiatives.

The impact of introducing and implementing MDWT at RBM will to be evaluated with respect to financial performance and employee attitude.

The specific aims of the study are:

- To examine the effect of Mission-Directed Work Teams (MDWT) on short-term financial performance at RBM.
- To forecast long-term performance at RBM.
- To assess the impact of MDWT on employee attitudes and outlook.
- To analyse the change management approach adopted for MDWT at RBM.
- To highlight the significance of Change Management to organisations.
- To make recommendations to facilitate rapid change for future initiatives.

The researcher will evaluate the change process, compare and contrast it to the theory and provide recommendations for change management, where necessary, which will benefit the organisation in the future.

1.8 Research Methodology

The research will be in the form of a single case study at Richards Bay Minerals and will involve an extensive literature review on the subject of change management, especially as it applies to the process of teamwork. Data for the case study will be collected through a combination of methods. Survey questionnaires and semi-structured interviews will form the basis of the data collection for the case study analysis.

The change management approach will be assessed in terms of employee attitudes, financial performance, employee grievances and employee expectations about future change. Change management is vital to all organisations in today's business environment. Kurt Lewin's Force Field Analysis (Misselhorn, 2005), semi-structured interviews, surveys and statistical analyses will be employed as research tools to assess employee attitudes, employee outlooks and short-term financial performance.

The success and growth of companies depend largely on how these companies adapt to change. Teamwork, leadership and constant monitoring are the important pillars of today's business environment. The business environment is dynamic and it is vital for organisations to continuously manage change in the face of these environmental pressures. The research methodology is covered in more detail in Chapter 3.

1.8.1 Sampling

The sampling method that was employed for the surveys was cluster sampling as it is a random sampling method and also helps to reduce the cost of sampling large populations. The entire RBM organisation was divided into mutually exhaustive subsets on the basis of departments.

The interviews were semi-structured in nature and conducted using the process of sequential sampling.

1.8.2 Data Collection Methods

A survey questionnaire and semi-structured interviews will be used to collect data. The researcher will seek to gain understanding and insight into the employee attitudes and behaviour through the data collected and its subsequent analysis. Employee grievances will also be analysed to ascertain levels of satisfaction with the change process.

A questionnaire made up of questions to determine levels of morale and employee attitudes was designed and distributed to the employees sampled. A copy of the survey questionnaire is attached in Appendix A.

The financial data of RBM was also utilised to assess the impact of the proposed changes on the performance of the business. The unit cost of production before and after the implementation of MDWT was plotted on a trend to determine the success of the change process for the business as a whole.

1.8.3 Data Analysis

The research is both qualitative and quantitative in nature. Therefore data analysis will be done both by statistical methods and qualitative methods. The statistical methods employed were linear, exponential and polynomial extrapolation to forecast the future unit costs of production at RBM. The surveys and interview questions will be analysed quantitatively to gain insight into and an understanding of the change management process undertaken by RBM.

1.9 Limitations of the Research

The limitation encountered in the research project was the non-response rate of targeted employees regarding the survey questionnaires. From the 1489 survey questionnaires that were emailed and posted only 188 employees responded by completing the questionnaire, which is equivalent to a 12.6% response rate.

Time was also a limited resource during the course of my fieldwork research. Ideally, the interviews should have been conducted on all 1489 permanent employees at RBM. However, this would have been too time consuming and could have jeopardised the completion of my dissertation.

Money was another limiting resource during the fieldwork research phase. An administration assistant would have been ideal to assist with typing, printing, copying survey questionnaires, collecting completed questionnaires and doing the preliminary data analysis and graphical representation. However, I did not have sufficient funds to make this possible and merely relied on my spouse to do parts of the administration work.

1.10 Structure of the Research

1.10.1 Chapter One

The first chapter of the dissertation introduces the research and the various chapters contained in this thesis and their content.

1.10.2 Chapter Two

Chapter two of the dissertation details the extensive literature review undertaken to explain change management. Various theories and models of change management are discussed in detail and related to the RBM. A number of textbooks, journals, websites and other sources of information have been consulted in order to present a comprehensive literature survey of the established models and theories.

1.10.3 Chapter Three

Chapter three details the research methodology that was employed to ascertain the impact of the change at RBM on both the employees and the performance of the business. The chapter discusses the various approaches adopted by the researcher to get the required information and responses from employees.

1.10.4 Chapter Four

Chapter four discusses the RBM case study in great detail. The history of the organisation, products and services that it provides to the market, the core business of the organisation and its main customers are covered as well as the approach the organisation used in introducing change.

1.10.5 Chapter Five

This chapter of the dissertation presents the results of the research. A number of techniques presented in Kotter (1979) will be used to analyse the case study. Both quantitative and qualitative techniques were used to assess both employee attitudes to change and financial performance at RBM.

1.10.6 Chapter Six

Chapter six presents the conclusions and recommendation of the dissertation. The recommendations that are made are based on the analysis and findings from Chapter five.

1.11 Conclusion

The management of change process is often not implemented carefully in many organisations, especially those that are focused primarily on a low-cost strategy. In order to ensure that businesses survive in today's rapidly changing world of technology and legislation it is imperative that management of change is taken seriously. Change affects everything and everyone. It is a pervasive force that if properly managed will result in long-term success and growth.

2. LITERATURE REVIEW

2.1 Organisational change and its meaning

“Change is a pervasive influence. We are all subject to continual change of one form or another. Change is an inescapable part of both social and organisational life (Mullins, 2005).” Organisational change occurs by management initiative, by evolution within a company, or through external pressures.

All businesses operate in a rapidly changing environment. A successful business is one that can act in harmony and proactively with the environment. In the business environment timely knowledge of that environment and the direction of change ensures a competitive advantage (Dannemiller, et. al., 2002).

The main source of organisational change is the external environment such as uncertain economic conditions, globalisation and global competition, level of government intervention, political issues and technological developments.

Organisational change that occurs by a deliberate endeavour is referred to as ‘planned’ organisational change. *Planned* organisational change is normally triggered by opportunities or threats presented by the external environment or in anticipation of future problems e.g. economic decline, new product development by competitors or further technological advancements. Planned change represents an intentional attempt to improve, in some important way, the operational effectiveness of an organisation.

The basic underlying objectives of ‘planned change’ can be seen as (Mullins, 2005):

- modifying the behavioural patterns of employees of the organisation.
- improving the organisation’s ability to cope with environmental changes.

Planned change can be achieved by the following eight-stage process (Mullins, 2005):

- Initial problem identification

- Obtaining data
- Problem diagnosis
- Action planning
- Implementation
- Follow-up and stabilization
- Assessment of consequences
- Learning from the process

Unplanned change, however, occurs when organisations are forced to adapt to the environment in order to remain competitive. An example of such a change will be if the US government intervenes in the Internet auction business and imposes surcharges to the service providers such as eBay. This will result in diminishing profits for Internet auction service providers, and they (the service providers) will be forced to make changes to their business approach so that they remain competitive and profitable.

Change is a phenomenon that is often resisted by both an individual and an organisation (www.managingchange.com). Individuals may resist change because of habit, inconvenience, a loss of freedom, personal perception, loss of remuneration, loss of security, fear of the unknown and the threat of being stripped of power. Organisations, however, may resist change because of a rigid culture, the need to maintain stability and the investment in large resources.

Management of change in organisations is essential for continued economic performance and competitiveness. The seven skills required by management to facilitate change are (Mullins, 2005):

- Managing conflict
- Interpersonal skills
- Project management skills
- Leadership and flexibility
- Managing processes
- Managing strategy

- Managing personal development

There are many approaches to managing change – for e.g. the joint problem solving matrix, Kurt Lewin’s force field analysis, Blake, Shepherd and Mouton’s intergroup problem solving, the Sigmoid curve approach, and training managers and leaders in the skills needed for managing change (all focused on processes); then there are restructuring the organisation from the top down, changing the procedures and systems, changing organisational goals and targets, and changing the definition and content of jobs (focusing more on the structures and content of change) (Misselhorn, 2005).

Management will need to involve employees and unions at the initial stages of change so that transition from old to new processes can be smooth. Organisational culture, managerial styles and the human factor are important issues to consider in minimizing the problems associated with change. Attention must not only be given to products and processes, but to people as well. The “people” aspects are in large part responsible for the success of change (Chang, 1994). Managing *change* also involves *managing the people* the change impacts on.



Figure 2.1: Impact of change on people (Chang, 1994)

People’s attitude to change will determine their reaction to it (refer to figure 2.1). Their attitudes will determine whether or not change will be resisted. Their attitudes are influenced by personal history, social experiences and the work environment. If the work environment is negative (i.e. an undesirable climate) then it is highly possible that change will be easily accepted.

Effective communication of impending change is vital and almost impossible to over-do.

The key tasks for managers when communicating change are:

- Identifying the *valid* information.
- *Filtering* and *structuring* valid information for the less skilled members of the workforce.

Managers must not just throw down facts about change and abdicate their own interpretive role. They must ensure that matters are explained lucidly, because employees need and deserve that help (Eccles, 1994). Cascading information down from the top runs the risk of declining comprehension and reassurance. A solution to this is direct communication link to and from top to bottom of the organisation. Top management must visit each unit or department, make presentations and answer questions in general meetings with all employees and intermediate managers. Direct contact between top and bottom in this way shows that top management is involved and committed to the change or changes. Direct contact from top to bottom also serves to reassure, involve and support the intermediate layers of management and supervisors.

The successful implementation of large-scale change can be achieved by the actions depicted in Figure 2.2 (Mullins, 2005). The top 5 action steps are common to any process of change. These steps are critical in the planning stage of change management. The last three action steps involve the actual change implementation process, and are essentially a cyclical process of creating goals, then implementing and maintaining change momentum and finally nurturing the change. Nurturing change involves evaluation, feedback and reinforcement of the change.

Change will be easier if it is in accordance with commonly accepted *values*, if the *time* is right, if *circumstances* are favourable, if the *ideas* are feasible and practicable, if the *yield* in terms of benefits is calculable and obvious, if people feel *obliged* to make the changes and if the *ability* and resources are available. *Resistance* will be less if people experience acceptance and support (Pheysey, 1993).

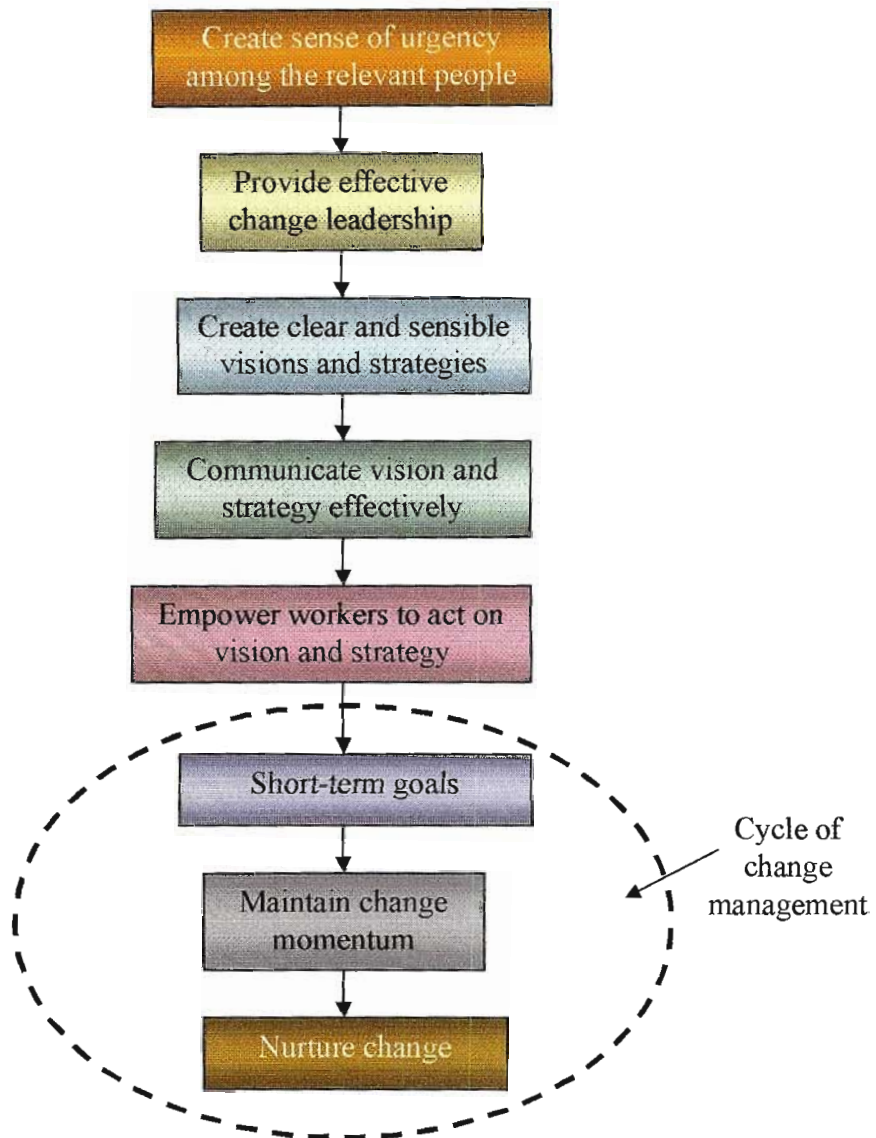


Figure 2.2: Actions for Successful Change

Successful change = V + T + C + (I x Y)x(O x A) – R, (Pheysey, 1993)

Where, V = values

T = timing

C = circumstances

I = ideas

Y = yield

O = obligation

A = ability

R = resistance

It is evident from the above equation that if any of the four items that are multipliers are zero, then the whole change attempt will most likely fail. In other words, without practical ideas (I), benefits (Y), people who care (O) and have the ability (A), change is doomed (Pheysey, 1993).

2.2 The Challenge of Change

Management of change must also focus on the culture of an organisation to achieve the desired behavioural changes amongst employees. An organisational culture includes commonly held *values* and *beliefs*. Behavioural change cannot occur without an explicit effort to reeducate people to adopt new values and norms (Cummings, 1980). In most organisations, such explicit account of culture is not taken. To avoid culture drag and hindrance, change agents (i.e. managers or other facilitators of change) must explicitly plan reinforcements (incentive systems, performance appraisal systems and measurements and control systems), social modeling (leadership by example), social interactions (communication about change, coaching, performance appraisal interviews and the development of group norms) and training interventions (educational programmes) to support new behaviours (Trompenaars & Prudhomme, 2004).

To embrace change, we must view it as an exciting challenge and concentrate on five areas (www.clement.net):

1. Focus on a vision.

Our vision or imagination guides everything we do. Our vision is led by a set of core values. Without a strong set of core values, passion is weak and commitment is soft. Core values provide a context for continuous growth and development that takes us toward our dreams. Our core values project forward to become our vision. How we see the world is what we project from ourselves.

2. Choose your outlook.

We reach another milestone in our growth when we accept responsibility for our emotions. We must take responsibility for our actions in response to circumstances for which we are not responsible. The only thing we can control is ourselves, so when we choose our thoughts, we are choosing our future.

3. Seek authenticity.

To create something we must *be* something. This timeless principle applies to every facet of our lives. Good intentions are useless if they stop there. One biggest difference between most people and authentic leaders is action. Real leaders make it happen.

4. Commit ourselves with discipline.

A key difference between real leaders and those who struggle to get by is self-discipline. Discipline means having the vision to see the long-term picture and keep things in balance.

5. Continually grow and develop.

A part of the growth process is seeking to be more effective.

2.3 Theories of Change Management

Writers and researchers alike have over the many years provided a broad spectrum of ideas, observations, theories and principles about the management of organisational change. They have provided society and management as a whole with a broad scope of theories and principles that can be adapted to the field of managing performance and attitude change in the workplace. Between 1924 and 1933 Elton Mayo and his colleagues conducted the Hawthorne studies which illustrated the significance of social needs and the value of group dynamics and participation (to facilitate change) in the work place (Misselhorn, 2005). The Hawthorne studies have *highlighted* that the need for worker-participation (which is currently a “change” buzzword) was identified early in the 20th century, and thus serves to amplify the value of worker participation as critical to

facilitating organisational change. Likert (1961) and Maier (1963) (as cited in Misselhorn, 2005) have made reference to participative management from the Hawthorne studies as a significant theme in managing change. Their theory draws attention to the importance of participative management and stakeholder involvement, and suggests that leaders in an organisation must identify and involve the main stakeholders at the onset of the change process.

Kurt Lewin (Misselhorn, 2005) proposed the process of unfreezing-change-refreezing in 1951 for the purpose of managing behavioural change in an organisation (refer to Figure 2.3 below). This three-phase process involves the following programme (Mullins, 2005):

- Unfreezing – which involves the process of reducing those forces which maintain employee behaviour in its present form.
- Change – involves the development of new employee attitudes or behaviours and the actual implementation of the change.
- Freezing – involves stabilizing change at the new level and appropriate reinforcement through supporting mechanisms such as policies, structures or norms.

During the unfreezing process the restraining forces that are likely to impede change must be identified and eliminated or significantly reduced. This process of identifying the restraining forces can be achieved through a joint problem solving approach such as brainstorming or root cause analysis.

From figure 2.3 below, it is clear that if the restraining forces are reduced and the driving forces are held constant, then the resultant force will be to the left. In other words there will be movement in the desired direction and the planned changes will have taken effect.

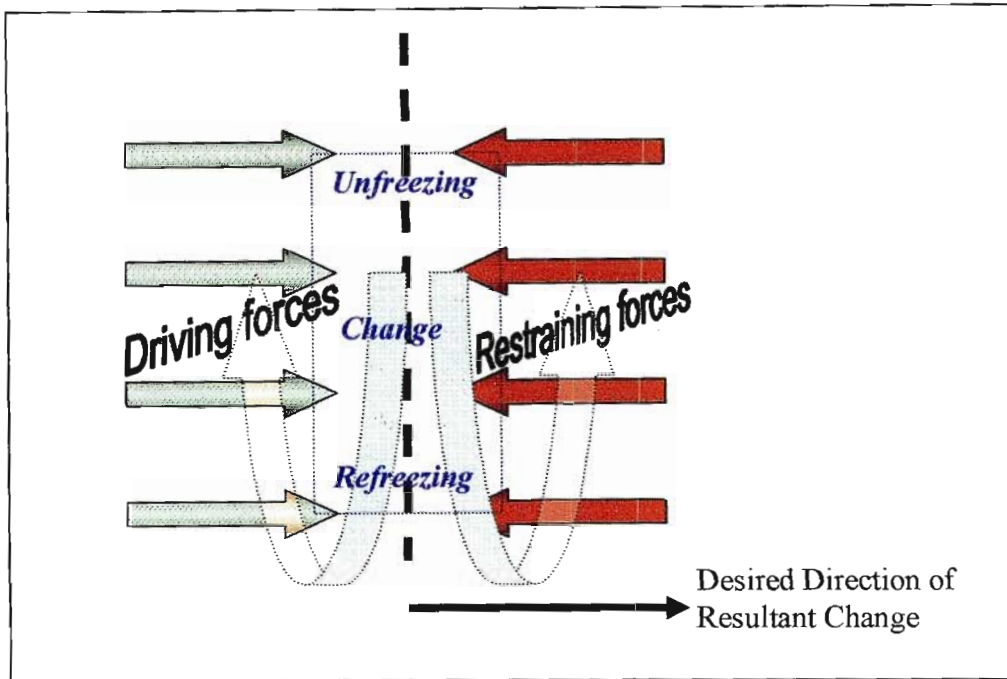


Figure 2.3: Schematic view of Kurt Lewin's proposal (Misselhorn, 2005)

Another significant contribution to managing behavioural change in organisations was made by McGregor in 1960 (as cited in Mullins, 2005), when he postulated Perception Theories X and Y resulting from workers' beliefs and perceptions. McGregor stated that a manager's attitude towards human nature and behaviour affected his/her style of leadership. Theory X perceptions were negative perceptions of workers and Theory Y perceptions were the exact opposite. Managers displaying Theory X perceptions would make unrealistic change demands that would not materialize, thereby re-inforcing the *cycle* of negativity and in that way maintain their negative perception of workers.

Edgar Schein (as cited in Misselhorn, 2005) drew attention in 1969 to changing *processes* (i.e. human behaviour, personality and relationships) and not just organisational structures (Misselhorn, 2005). Changing of structures alone in an organisation results in the workers being assigned new tasks, procedures, and roles. As a result new communication channels and human relationships need to be developed with new suppliers, customers and other departments. These new experiences, if not given careful

consideration, can adversely affect employee performance and directly undermine the change process. Another significant contribution made by Schein to change management was to approach each organisational change effort on its own merit (Misselhorn, 2005). He placed significant emphasis on the diagnostic process of organisational problems.

A relatively simple and straightforward framework for effective change management was provided by Beckhard and Harris in 1977 (Carnall, 1997). They have suggested that organisational change can be conceptualized as movement from present state to future state, with the most important state being the in-between *transition state*. The transition state was characterized by intensive planning to reach the future stage and implementation of the plans.

In 1984 Kolb (Mullins, 2005) made reference to the learning cycle (refer to Figure 2.4), and suggested that experiential learning, if conducted actively and not passively as per the learning cycle, will enable managers to cope with change and complexity. The learning cycle suggests that (Mullins, 2005):

- there is no end to learning but only another turn of the cycle.
- learners are not passive recipients but need to actively explore and test the environment.
- reflection and internalisation are important.
- it is useful in identifying problems in the learning process.

In 1986 Morgan (Blunt & Jones, 1992) asserted that organisations resisted change mainly because of two reasons:

- The conservative characteristics of organisational culture.
- The persistent formal organisational structures and processes.

Morgan's analysis offers us clues to understanding the generally recognized ability of African bureaucracies to resist change.

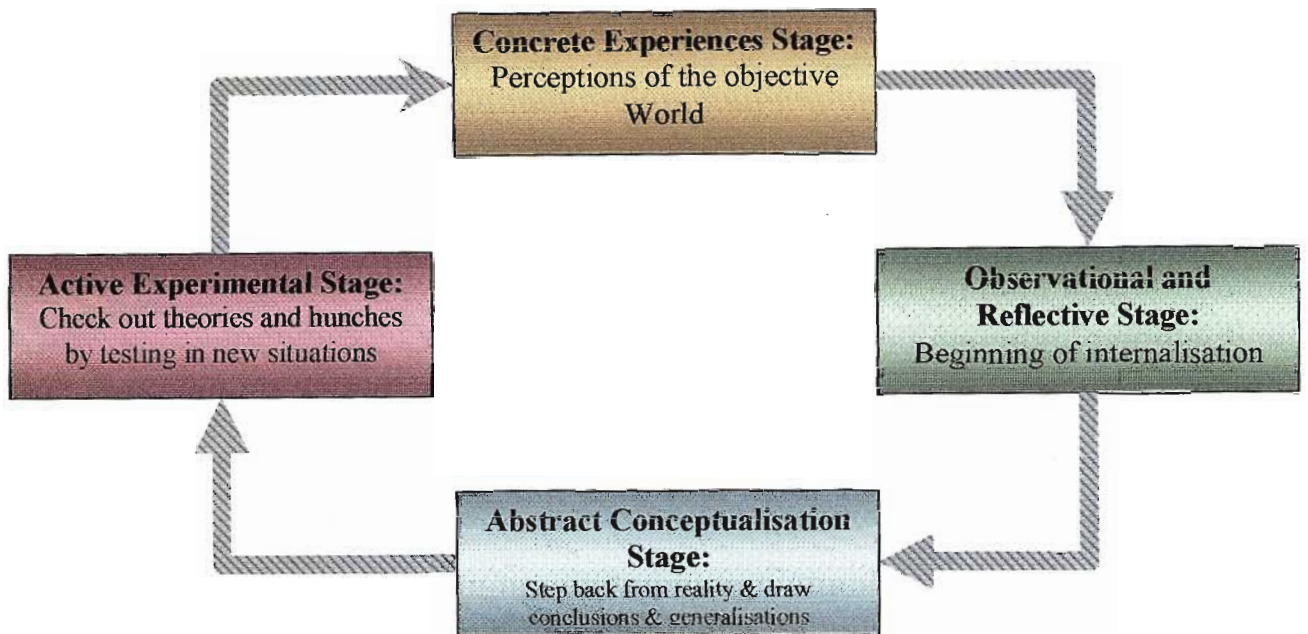


Figure 2.4: Kolb's learning cycle (Mullins, 2005)

Pasmore (Pasmore, 1994) defined four rules in 1994 for effective management of change as:

- Rule 1: To begin any change process with concern for its impact on people.
- Rule 2: To prepare people for change by educating them in what is needed.
- Rule 3: To involve people in the change as much as possible.
- Rule 4: To change *only* what needs changing in the entire system to produce better results.

Strategic change within any organisation is needed in today's world of rapid environmental change. The "Sigmoid Curve" developed by Charles Handy (Carnall, 1997) in 1994, emphasises the need for strategic change within an organisation (see Figure 2.5). The curve A1D1 on the Sigmoid curve shows the effect of strategic change within an organisation. The organisation must initiate strategic change long before the need for it is evident. Curve ABCD represents the performance of an organisation that does not plan for change.

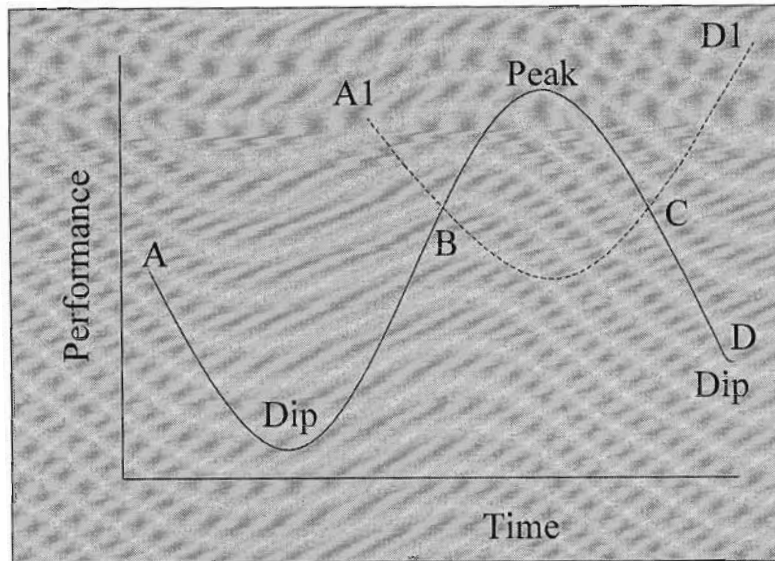


Figure 2.5: Sigmoid curve (Misselhorn, 2005)

Curve A1D1 represents the change intervention that an organisation should implement in order to avoid the declining performance from the peak to the dip at point D. This concept highlights the importance of forward planning in order to implement and manage successful change.

In 2002 Goleman (Misselhorn, 2005) adopted the 'deep and intense' approach to managing change by incorporating the heart, feelings and emotions. He made reference to the term of 'emotional intelligence', which refers mainly to understanding one's own feelings and emotions, as well as those of others. Managers need to understand their employees and how the change is affecting them, their relationships and performance. Thinking and Interacting was the main focus of Misselhorn's in-depth work on change management (Misselhorn, 2005). He referred to the importance of inter-relating the head functions of rationale, objectivity and innovation to the heart functions of emotions and feelings during the task of managing change.

2.4 Critical Change Management Issues

The following issues of change management (depicted in figure 2.6 below) need to be addressed in any organisation that is undergoing change, or planning change:

- Leadership to drive change
- Team playing
- Conflict management
- Negotiating skills to overcome conflict and manage change
- Cultural changes and developments
- Dealing with resistance to change

2.4.1 Leadership

Leadership is essential throughout the change process in order to ensure that the organisational goals are achieved. Leadership must be the driving force from the change conceptual stage through to the implementation phase in the workplace. Unlike management that involves activities directed at coping with complexity and bringing order to a system, leadership is about coping with change and is centred in developing vision and inspiring people to achieving new objectives (Kotter, 1995). Although management is essential to any organisation, leadership is critical for organisations undergoing change.

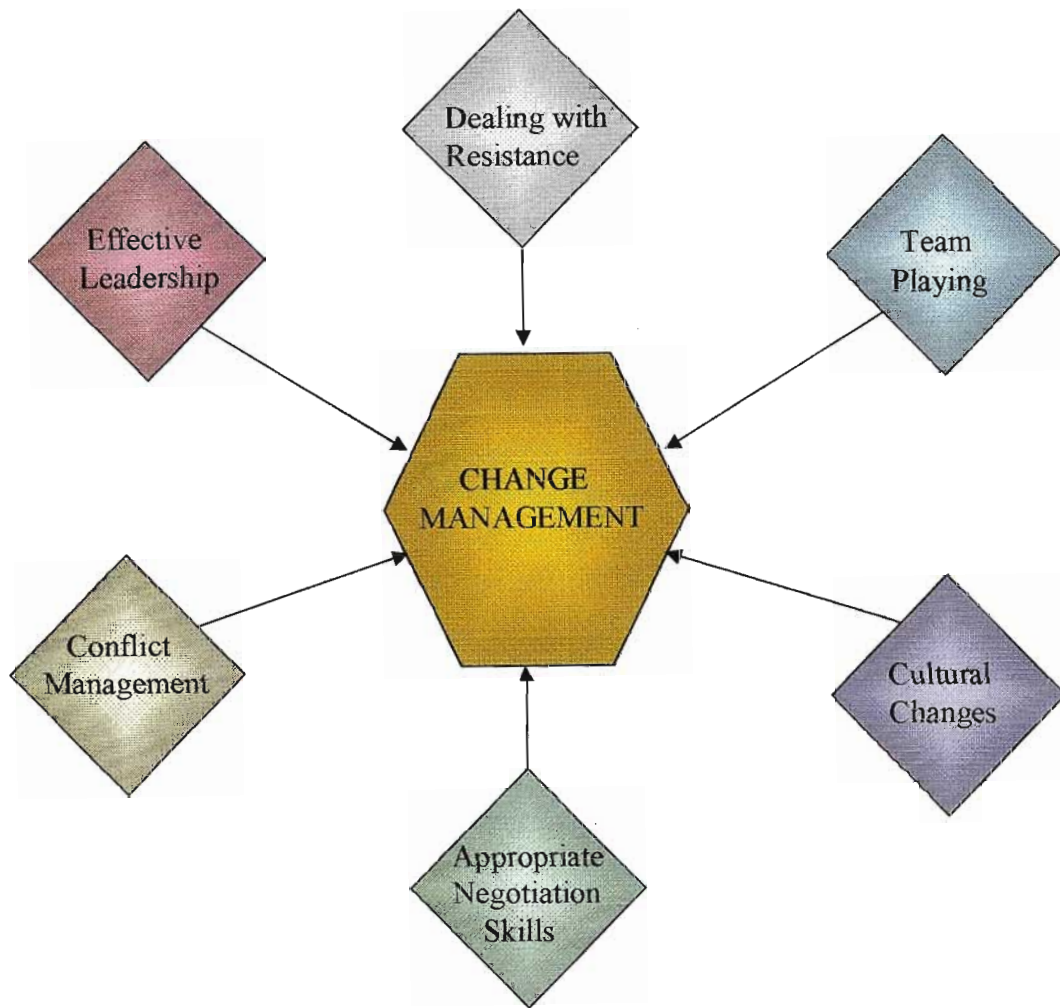


Figure 2.6: Factors effecting Change Management (Senior, 1997)

If the members of an organisation are to buy into change initiatives, they must trust its leaders. The activities that are therefore required of leaders are:

- Creating a sense of urgency in the workplace.
- Identifying and developing other leaders at various levels in the organisation to form a guiding coalition.
- Creating and building a shared vision in the workplace.
- *Actually* living out the values and behaviours required to meet objectives.
- Empowering others in the organisation to act on the vision.
- Consciously building the appropriate culture required for change.
- Coaching of organisational members.
- Walking the floor.

- Sharing information to motivate people.
- Developing participation through empowerment.
- Giving recognition when needed.
- Designing reward and incentive systems, which reinforce achievement.

The above issues of effective leadership during organisational change points to the need for a shift from a control orientation to a development orientation in modern organisations. Leaders must emphasize development of employees, instead of control over employees, and one of their key aspects is designing an appropriate incentive system.

Effective change leadership is the key to shifting people's perceptions from seeing change as a threat to seeing it as an exciting challenge (Quoted from Hooper & Potter in Mullins, 2005). This statement as cited in Mullins implies that effective leadership is essential for adjusting people's perception of change. It is important to emphasize at this stage that it is not only imperative to get people to stop viewing change as a threat or as something negative, but leaders must proactively promote change and in this way convince employees to view it as a challenge and as something positive and exciting.

2.4.2 Team Playing

Team playing, which refers to effective ways to work in teams, is another factor that impacts on change management within organisations. Improving the way people work within their teams in any organisation is crucial for the smooth transition from old outdated systems and procedures to new ways of working. Schultz's (Misselhorn, 2005) modified model (figure 2.7) of team formation can be used to improve teamwork in organisations.

The model in figure 2.7 suggests that teams form via the process of inclusion, control, interdependence and affection. Inclusion seems to be the initial concern when joining a group or team for the first time or when forming a team. It (inclusion) refers to being

accepted by the team. There are many ways, which people use to help their inclusion into teams such as humour, sharing common interests and outward appearance.

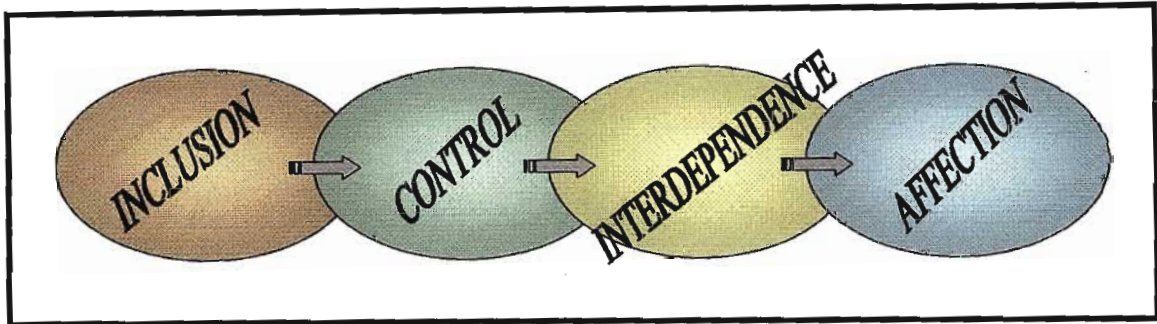


Figure 2.7: Schultz's modified team formation model (Misselhorn, 2005)

Control refers to the act of having influence or power in a team. The control phase of team formation seems to follow the inclusion phase. During the control phase of team formation members feel the need to exert their own influence on the team by having their ideas and initiatives accepted (Misselhorn, 2005).

The next phase in team formation is the interdependence phase. Interdependence is concerned with the degree of support and assistance, which team members get from one another. It is essential for a cohesive and coordinated effort towards getting a job done within teams. Interdependence is largely motivated by the need to belong and by the need for self-actualisation (Misselhorn, 2005).

Affection is the last phase in team formation and it is the 'glue' that keeps teams together. Affection refers to the essential human ingredient within teams, which shows that members care and are willing to make sacrifices for each other. It is the factor that will hold the team together when the pressure is *on* and nothing seems to be going right.

The Schultz's (Misselhorn, 2005) modified team formation model can be effectively used by managers and leaders to improve teamwork by the following action steps:

-
- At the beginning of group formation to promote inclusion by sharing interests and backgrounds and by breaking the ice with humour. If all members feel included then they will feel less pressured to please each other and can proceed to the next level of team formation (i.e. control phase).
 - At the next phase of group formation (i.e. control phase) group members feel the need to exert their influence over the team by enforcing their own ideas and initiatives. This control phase can be implemented in a structured and orderly manner such as by the process of brainstorming. This will allow all members' ideas to be considered for when solving a particular problem.
 - Interdependence can be used to improve teamwork by identifying members' strengths and harnessing these strengths to enhance the team's role in solving problems related to organisational performance.
 - Affection is the human ingredient that must be displayed by the team leader, so that it provides a lead for the other members to follow. This will tend to invoke respect and caring amongst members, and will improve teamwork by holding the team together in times of pressure. The process of rotating the leadership amongst members so that a level of respect and trust is developed can also invoke affection.

2.4.3 Culture

Culture in an organisation refers to a system of shared meanings, traditional customs, values and beliefs held by its members, which distinguishes it from other organisations and has been passed down and learned from the past (Trompenaars & Prudhomme, 2004). These common views, beliefs and values may have been held for so long that they are taken for granted and have dropped out of consciousness. A common phrase is “it’s just how things are done here”.

The advantages of organisation culture is that it provides members with sense of identity and belonging, it promotes commitment to goals larger than those held by individuals or groups; and it enhances stability by providing a set of common behavioural standards. Those members that do not display such behaviours are forced to adapt or they will be isolated from being accepted by other members.

The disadvantage of an entrenched organisational culture is that it may prove to be a major obstacle to change.

An appropriate model to illustrate the nature of organisation culture is shown in Figure 2.8, which is the ‘tip of the iceberg model’ (Misselhorn, 2005).

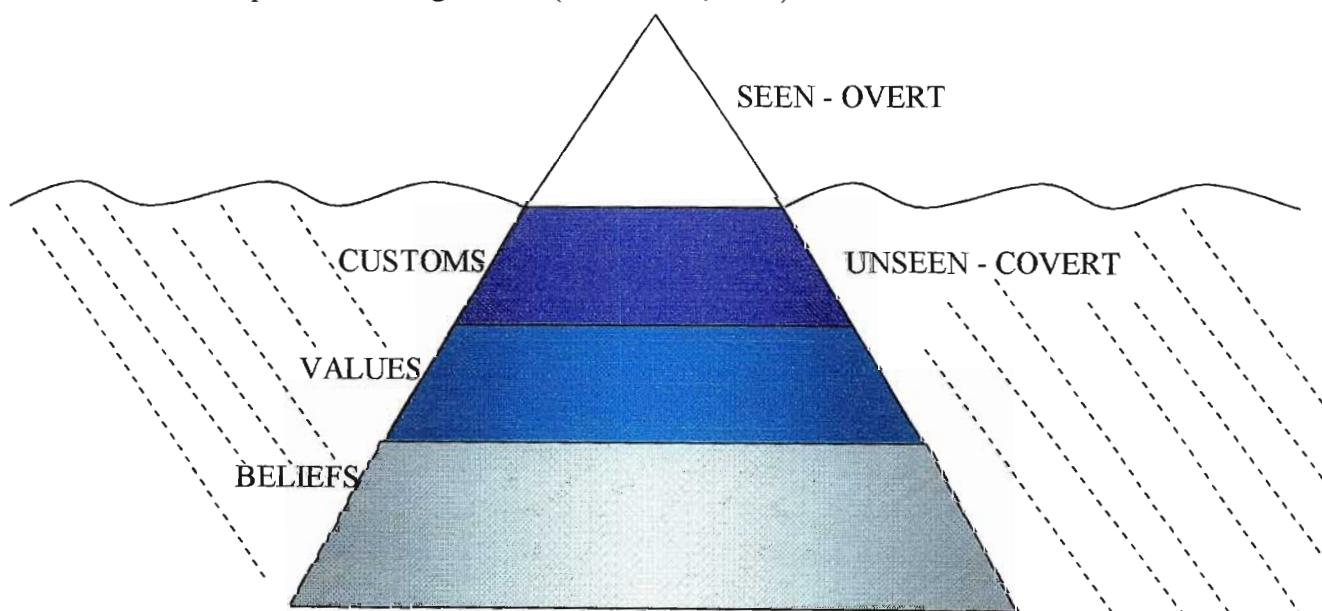


Figure 2.8: Tip of the Iceberg Model for Culture (Misselhorn, 2005)

Culture exists mostly beneath the surface (i.e. mostly in covert behaviour) of an individual, and it is evident in three levels. The first level, which *can* be seen, is *customs*; the second level, which is less easily observed, is *values* and the third level, which is deeply rooted, hard to identify and to change, is *beliefs*. It can be deduced from the above model (figure 2.8) that in order to implement change in an organisation the main obstacle to overcome, with regards to culture, is members' beliefs. Beliefs are the set of accurate or inaccurate, valid or invalid assumptions we have about reality (Misselhorn, 2005). At RBM a culture of *compliance* prevails amongst the employees, in that their customs, values and beliefs are associated with meeting KPI's (Key Performance Initiatives) and KPA's (Key Performance Areas).

In order to change the culture of an organisation, it must be stressed that the peoples' *beliefs* about work must be targeted as the main element to be changed. People's *customs* and *values* also require attention, but this can be done with less effort. In order to change people's beliefs, it is important to have an open discussion involving staff at all levels of the organisation. The more this discussion can be encouraged to be open and frank, the more people will understand each other's beliefs. This discussion can then be used as a platform to promote a common set of beliefs for a change in culture. Managers of each department must make a concerted effort to set up these discussion sessions and people must be allowed to speak freely. It will be advisable to allow free speech and not to allow the discussion to turn into debate. People must be allowed to listen and absorb the opinions and points made by each other.

The following tactical steps is strongly recommended to bring about the required cultural changes within an organisation with regards to customs and values (Trompenaars & Prudhomme, (2004).

- Top management must be closely involved in modeling new employee behaviour and roles.
- New stories, rituals and symbols must be generated to replace those currently in existence at the workplace.

- Employees possessing the desired customs and values must be visually supported.
- New employees must be recruited that possess the desired values and customs.
- Formal rules and procedures must be written up to promote the desired behaviour customs and values.
- Participative management is imperative to ensure the new desired values and customs are adopted by members, since they will feel a sense of ownership in the new norms, values and customs.

2.4.4 Conflict Management

Conflict Management refers to the procedure for handling conflict within an organisation so that better relations and better solutions are built in the process (Tushman & Anderson, 1997). Conflict occurs in an organisation when there is an incompatibility of goals arising from opposing behaviours between individuals or groups; and it (conflict) is intended to obstruct the achievement of the goals of the other individual or group (Mullins, 2005).

The traditional view of conflict is that it is bad for the organisation, and it is associated with negative features such as inefficiencies, ineffectiveness, dysfunctional consequences, hostility, destruction, irrationality and aggression. However, conflict is not always bad for the organisation, and if it is properly managed it can result in positive outcomes such as creativity and innovation. The task of management during a change process is not to suppress conflict, but to recognize its existence and manage it effectively, so that its negative aspects can be reduced and its positive aspects increased (Kroon, 1995). Some of the disadvantages resulting from conflict are (Mullins, 2005):

- People feel defeated and demeaned in the workplace.
- The distance between people and groups increases.
- A climate of mistrust and suspicion develops.
- Individuals and groups concentrate on their own narrow interests.
- Resistance develops rather than teamwork.

- Employee turnover increases.

All of the above can only lead to a decrease in motivation and morale within the organisation, which is detrimental to good performance. As a result it is important to identify conflicting situations when they arise, and manage them effectively.

The advantages of conflict within an organisation are (Mullins, 2005):

- Better ideas are produced.
- People are forced to search for new ideas.
- Long-standing problems are brought to the surface and resolved.
- Stimulation of interest and creativity of employees.
- Clarification of ideas and views of individuals or groups.

Managers need to create the right amount of conflict in an organisation, so that there is never too little, which results in lack of creativity and innovation; or never too much, which will result in disruption and defiant employee behaviour.

Organisational change is one of the major sources of conflict; since it (change) results in new goals, job redesign, new functional and personal relationships, etc. The conflict arises because of conflicting goals, disagreements over new methods of doing the job, distrust or incompatibility from new relationships, etc. Other sources of conflict are (Mullins, 2005):

- Limited company resources - where departments have to fight for a share of the annual budget.
- Departmentalization and specialization - as a result of differing goals and objectives two departments may not be willing to co-operate with each other.
- Differences in perceptions of a particular situation between two employees can result in conflict about the course of action to follow, or decision to be taken.
- The nature of work activities - where two or more departments depend on each other to complete a task, conflict can arise when one department is slow to complete tasks.

- Inequitable treatment – where a supervisor favours one person over others to perform acting functions when he/she is on leave.
- Leadership style and managerial behaviour – where subordinates are opposed to management decisions regarding tasks directly affecting them.
- The age gap – where older employees with experience tend to differ with younger employees with high qualifications and far-fetched ideas.

2.4.5 Appropriate Negotiation Skills

Appropriate negotiation skills are necessary to resolve undesirable conflict situations within organisations (Kanter, 1983).

The sources of conflict mentioned already can be categorized into four basic groups, i.e. resources and structure, job and work methods, relationships and personal (Misselhorn, 2005). The strategies that are used for managing conflict differ in their measure of success and creativity, and in their power to avoid or defuse future conflict situations. The most efficient methods for dealing with conflict are determined by the source of the conflict, which are given in Table 2.1 below:

SOURCE OF THE CONFLICT	CHOICE OF APPROACH
Resources and Structure	Bargaining
Job and work methods	Joint problem solving
Relationships	Team building
Personal	Counselling

Table 2.1: Methods for dealing with conflict (Misselhorn, 2005)

Bargaining refers to the process of maximizing one's strengths and minimizing one's weaknesses in order to achieve the desired goal, e.g. management can improve resource distribution by making a special case to the Board of directors or by allowing flexibility to transfer funds between budget headings.

Joint problem solving is a process of finding common solutions to common problems by working together in a group and involving appropriate stakeholders. This method of problem solving is intended to encourage participation of those members that are in conflict so that a common solution can be achieved. In essence joint problem solving involves coming together as a group, discussing the problems and issues, formulating various possible solutions and gaining consensus from conflicting parties on the best solution. Some examples of joint problem solving approaches are Blake, Shepherd and Mouton Intergroup Problem Solving, Joint Problem Solving Matrix, Vroom and Yetton's Seven Rules Model (Misselhorn, 2005).

Team building refers to the process of bringing individuals together in a team and agreeing on expectations of one another through honest sharing of positive and negative perceptions of each other. This form of conflict handling must be emphasized as a learning experience and should be conducted in a controlled environment where members are allowed to speak for a specific time period.

Personal counselling refers to finding appropriate advice and recommendations to heal personal stress and anxiety. This is normally the responsibility of the supervisor or the Human Resource department, but in extreme cases professional help can be sought.

After choosing the appropriate method for solving the conflict, the following steps are recommended for leaders to facilitate the actual negotiation process (Misselhorn, 2005):

- Making *contact* and sustaining it with the other person is vital during discussions.
- *Listening* during discussions and *locating* the key issues is critical in the negotiation process of conflict handling.
- *Exploring* the significant issues of concern should be achieved by asking appropriate questions such as: Tell me more about that? What do you have in mind? How do you see that working in practice?
- *Acknowledge* and *affirm* the other person's value and merit. Show respect to the other person's views even if you may not agree on them.

- Try to *resolve* the conflicting issue by formulating a course of action that can be tested out in practice. Do not leave the discussion with the issues ‘hanging in the air’, but rather propose some workable solution that can be tested in practice.

2.4.6 *Dealing with Resistance to Change*

Dealing with resistance to change is essential to ensure the change process flows smoothly (Hultman, 1999). Tactics that are available to management for dealing with resistance to change are education and communication, participation, facilitation and support, negotiation, co-optation, coercion and manipulation (Kotter, Schlesinger & Sathé, 1979). Education and communication is aimed at helping people see the need for the logic of change. It can involve one-on-one discussions with employees, presentations to groups, memorandums, reports or company briefs. These types of communication methods must be made out to be sincere and believable. Education and communication is ideal when resistance is due to inadequate and inaccurate information and if the resisters are critical to implementing the change. It requires time and effort, especially when a large number of employees are involved.

Participation is another method and is aimed at involving potential resisters in the design and implementation process and generally leads to commitment from employees and not just compliance. This tactic is, however, time-consuming and is therefore inappropriate if the change process is rapid.

Resistance to change can also be averted by facilitation and support, which involves providing training in new skills, giving employees time off after commissioning, or providing emotional support. This tactic suits resistance where employees find it difficult to adjust, but is time consuming and expensive.

Negotiation as a means to resolve resistance to change involves some sort of monetary gain to employees i.e. higher rate of pay or increased company benefits specifically to implement the changes. It is appropriate when people of power are the potential

resisters who may feel that they will lose out on remuneration. Negotiation is an expensive tactic to overcome resistance and should be considered only when the other methods are inappropriate and less desirable.

Co-optation is another method to deal with employee resistance and involves giving employees a desirable role in the design and implementation of the change e.g. by inviting supervisors and superintendents into designing the change process. This tactic is appropriate when inexpensive and quick change is required and is strongly recommended for all change processes in organisations.

Manipulation is a tactic for dealing with resistance that is similar to co-optation but involves the use of information and events to have a desired (covert) impact on participants. E.g. using company briefs and road shows to mould people's desire for change. Manipulation is appropriate when time is short and the desired change process is rapid, but is recommended for all change processes so that information is effectively communicated to all stakeholders (i.e. employees, the community, shareholders, etc.).

Coercion is also another method for dealing with resistance and involves forcing people to accept change by using scare tactics such as threatening them with job loss, loss of promotional possibilities or pay cuts. It is appropriate when time is short and speed is required e.g. when a company is failing and the threat of closure is imminent. This tactic tends to create resentment amongst employees and should only be utilised if the company is in dire straits (Kotter et. al., 1979).

3. RESEARCH METHODOLOGY

The research conducted was in the form of a single case study analysis of MDWT at RBM and involved both qualitative and quantitative methods of data collection. Quantitative methods of data analysis were essential to evaluate RBM's financial performance as a result of the new change process. Quantitative financial data analyses were conducted by determining the cost of production before and after the planned change of MDWT at RBM. The purpose of this quantitative research methodology was to determine the effect, if any, of teamwork and MDWT on the cost of production. The expected outcome would be a decrease in the cost of production after implementing MDWT at RBM due to the effects of teamwork and continuous improvement.

Forecasting of production costs was also done using the SPSS statistical package for this research study of MDWT. The forecasting method employed was linear extrapolation of past and current data together with assumptions and estimations of future market developments. The forecasting of future cost performance is imperative for change management as it gives an indication of the levels of re-inforcement needed and appropriate change-strategies that can be set up, if required (Dannemiller et.al., 2002).

Qualitative data collection and research techniques are a mixture of rationale, explorative and intuitive processes, where the researcher plays an important role in the analysis of data (Ghauri et al., 2002). Qualitative research methods were utilised extensively in this study for evaluating employee attitudes and their outlooks for the future of change. The RBM Human Resource department's documentation on employee grievances was also scrutinized in order to ascertain if grievances increased during and after the change process of MDWT.

A company-wide survey was conducted by myself with all RBM permanent employees to determine the levels of satisfaction about the change and impending ones within RBM. The survey was in the form of a questionnaire (refer to Appendix A for a copy of the survey questionnaire) for recording the responses of employees, and was issued in both

English and Zulu. The survey is an effective tool to get opinions, attitudes and descriptions as well as for getting cause-and-effect relationships (Mouton, 2005). The type of survey that was utilised for this study at RBM was the *descriptive* survey based on the five-point Likert scale viz. strongly agree, agree, unsure, disagree and strongly disagree. Such surveys are concerned with identifying the phenomena whose variance we wish to describe, which in this case is employee attitudes. The focus of descriptive surveys is on obtaining a representative sample of the relevant population, as the concern is with accuracy of the findings and whether they can be generalized (Mouton, 2005). Furthermore, a review of earlier research studies and literature is important to determine the kind of questions to be included in the survey questionnaire. Mullins and similar research studies (www.managingchange.com) were utilised as references in determining the questions to be included in the survey questionnaire for the research study of RBM (refer to Appendix A for the survey questionnaire). In business studies descriptive surveys are often used to understand the behaviour of employees with regard to motivation, job satisfaction and grievances (Mouton, 2005).

The sampling method that was employed for the surveys was cluster sampling as it is a random sampling method and also helps to reduce the cost of sampling large populations. The entire RBM organisation was divided into mutually exhaustive subsets on the basis of departments.

The following departments made up 6 subsets:

- Mining Plants
- Mineral Separation Plants
- Administration, Finance and Human Resources
- Smelter
- Smelter Feed and Products
- Engineering

Thereafter a random sample of employees from each subset was selected.

The sample size for each department was calculated by using the following statistical equation (Lind, Marchal & Wathen, 2005).

$$n = [(z \times s)/E]^2$$

where:

E = maximum error allowed above the standard deviation.

s = standard deviation of responses from mean response.

n = sample size.

z = standard normal value corresponding to the 95% confidence interval.

The standard deviation was ascertained by doing a pilot study of employees in my department at RBM on their responses to the MDWT survey. The standard deviation calculated on this pilot study was 17.5%, and this will be used to calculate the appropriate sample size for the survey of the entire organisation.

For the purpose of this study the maximum allowable error of the results (outside of the standard deviation) will be within 5%. This error of 5% was chosen since it is small and it will result in a relatively large sample. A large sample is desirable so that the results obtained are a better reflection of the total population.

The 95% confidence level was used in the sample size calculation in order to obtain a large sample of the total population. A large enough sample is required to ensure that it is representative of the entire population. However, the sample must not be too large to interfere with timely responses and limited resources.

The equation for sample size is:

$$n = [(z \times s)/E]^2$$

where E = 5% and Z = 2. The value of Z was obtained from normal distribution tables, where Z = 1.96 \approx 2 for a confidence interval of 95%.

$$\begin{aligned}\text{Then } n &= [(2 \times 17.5) / 5]^2 \\ &= 49\end{aligned}$$

Therefore $n = 49$

A sample of 49 employees in each of the six departments was therefore required for the survey to be representative. As a result a total of 294 employees (49×6) in the whole company were required to complete the survey questionnaires so that statistical inferences about RBM could be made with a confidence level of 95%. The total number of permanent employees at RBM that are currently affected by MDWT are 1489. Therefore the percentage of employees required for the survey was 19.7% (i.e. $294/1489$ %). However, since response rates for mail surveys generally range between 10 to 15 percent, it was decided to give the survey questionnaires to the entire 1489 permanent employees at RBM (Mullins, Walker, Boyd and Larreche, 2005).

The results of the surveys were plotted on a pie chart and analysed by making statistical inferences from the chart about employee attitudes and behaviours.

Interviews were also conducted by myself and a few of my work colleagues with key permanent employees to ascertain levels of satisfaction and morale. This was conducted mainly in English, but translators were used for several Zulu employees. The interviews were semi-structured in nature and conducted using the process of sequential sampling. Interviews were conducted daily with employees chosen at random during the lunch breaks in the RBM canteen. A sample of the semi-structure interview questionnaire that employees were asked to answer is given in Appendix C.

3.1 Limitations of the Research Project

The limitation encountered in the research project was the non-response rate of targeted employees regarding the survey questionnaires. From the 1489 survey questionnaires that were emailed and posted only 188 employees responded by completing the questionnaire, which is equivalent to a 12.6% response rate. However, this was considered to be representative of the entire population of RBM employees, based on the following calculation.

188 employees yields an average of $188/6$ employees per department.

i.e. = 31 employees per department on average

Now the equation for calculating sample size is (Lind et. al, 2005):

$$n = [(z \times s)/E]^2$$

where $H = 5\%$, $s = 17.5$ and $n = 31$

$$\text{Then } 31 = [(z \times 17.5)/5]^2$$

$$\text{Therefore } Z = 1.6$$

From the normal distribution tables the confidence level at $Z = 1.6$ is $0.4452 \times 2 = 89\%$.

Therefore a sample of 31 employees per department is representative with a confidence level of 89% (i.e. the sample is representative at a confidence level of 89%).

Another limitation was the estimation of the maximum allowable error (E) of 5%. This error of 5% was a realistic estimate and chosen since it was fairly small and would result in a relatively large sample. A large sample is desirable since it will be a better reflection of the total population.

Other limitations that were encountered in the study were:

- Time, and
- Money

Time was a limited resource during the course of my fieldwork research. Ideally, the interviews should have been conducted on all 1489 permanent employees at RBM. However, this would have been too time consuming and could have jeopardised the other aspects of the dissertation such as the collation, typing and editing, which may have delayed the submission of the final completed dissertation report.

Money was another limiting resource during the fieldwork research phase. An administration assistant would have been ideal to assist with typing, printing, copying survey questionnaires, collecting completed questionnaires and doing the preliminary data analysis and graphical representation. However, I did not have sufficient funds to make this possible and merely relied on my spouse to do parts of the administration work.

Interviews were conducted mainly in English, but translators were required for employees that preferred to converse in Zulu. It must be emphasised that translations are a limitation since the actual feelings and meanings of the employee may not be successfully communicated and could be lost in the process

4. THE RBM MDWT CASE STUDY

4.1 The Research Problem

The paint-pigment market was leveling off and slowly declining from 2001 due to a global economic decline in the building industries. This resulted in increased global competition amongst pigment feedstock manufacturers. RBM embarked on a series of strategic change initiatives in order to maintain its market share and to continue to remain profitable in the paint-pigment industry.

Change is a process that affects everyone and businesses differently and it is constantly happening, whether it be planned or unplanned. The planned change of MDWT at RBM was implemented on 01 July 2005 to have the effect of more positive and constructive generation of ideas to improve work processes, operations and cost effectiveness. Continuous improvement, which is the cornerstone of MDWT is vital for business success and growth. The effect of change on any organisation can be assessed by examining financial performance, people's attitudes and outlooks. In the global world of business, company's that cannot either adapt to change or implement planned change successfully will be heading for disaster and failure. The ability to react to change and implement change at the right time and effectively will determine the difference between success and failure.

4.2 MDWT Conceptual Stage

Conceptualisation is the ability to view the complexities of the operations of the organisation as a whole, including environmental influences, and the ability to make decisions (Mullins, 2005). The decision that is made is usually to implement some form of planned change in order to steer the organisation in a particular direction. The difference between success and failure is not only to introduce change, but the *type* of change to introduce is key for success (Kotter, et. al., 1979).

In 2003 the concept of MDWT was initiated by the RBM management committee to inculcate continuous improvement at the workplace on a regular basis at all levels of the organisation. This was decided because the paint-pigment market was leveling off and showing signs of slow decline, thus causing increased global competition amongst pigment feedstock manufacturers. The decision was taken to implement MDWT so that RBM is able to sustain or increase its profitability and return on investment. The desired effect of MDWT was to instill a culture of continuous improvement in employees and teams, in alignment with the low-cost marketing strategy of the company. The MDWT initiative came into effect against the backdrop of another significant change initiative that was implemented at RBM in 2001, i.e. Business Process Reengineering (more commonly referred to at RBM as Business Optimisation Programme or BOP).

In June 2004 the management committee at RBM took a decision to implement MDWT in 2005. After the decision was finalized in 2004 RBM management approached the employee unions viz. National Union of Mineworkers (NUM), Richards Bay Employee Union (RBEU) and United Association of South Africa (UASA) to sell the concept to them and gain their stance on the issue. All three employee-unions were positive about the impending introduction of MDWT. The main reason for their positive response was due to the morale boosting effect of teamwork. The successful implementation of change is dependent on the willing and effective co-operation of staff, managerial colleagues and unions (Mullins, 2005). There should be full and genuine participation of all concerned as *early* as possible (Mullins, 2005). RBM Management had the opportunity of involving or approaching the unions (employee representatives) earlier (during the conceptual stage, when the decision to implement MDWT was not finalised), but failed to take advantage of this opportunity. This procedure of early involvement tends to minimise the problems associated with change such as employee resistance and excessive conflict. Furthermore it tends to give the employees a sense of ownership of the new system, which makes implementation of the change less difficult. Therefore, management should consider this procedure as significant when implementing future 'planned' change.

The MDWT facilitators had to undergo intensive training and development in order for them to effectively implement the MDWT program at RBM. In November 2004 the facilitators spent a week with CDI, the service provider for MDWT in Cape Town, assessing the program at a practical level. Thereafter in December 2004, RBM embarked on a departmental survey to assess the employee reaction to the concept of MDWT. Road-shows were conducted across RBM where presentations were made to the employees about the role of MDWT for continuous improvement and team work. It was estimated that between 60 to 70% of all staff were covered in the departmental survey (this was based on the personal interview with employees). At the end of each road-show employees were required to give their thoughts and opinions of MDWT and its suitability for RBM. The response was mainly positive and employees were enthusiastic about developing teams and working together as a group (B. Ramsay, personal communication, March 16, 2006). Other positive responses were:

- Improvement in employee morale was envisaged.
- Increased opportunity for recognition was also identified.
- Incentive schemes of monetary value for 'high flyers' were possible.
- Process problem solving would be improved.

The negative responses to the concept were:

- Increased workload for team members.
- No time to carry out MDWT due to other work pressures and deadlines.

Figure 4.1 below depicts the change conceptualisation and assessment phase at RBM, showing the degree of positive and negative responses of employees.

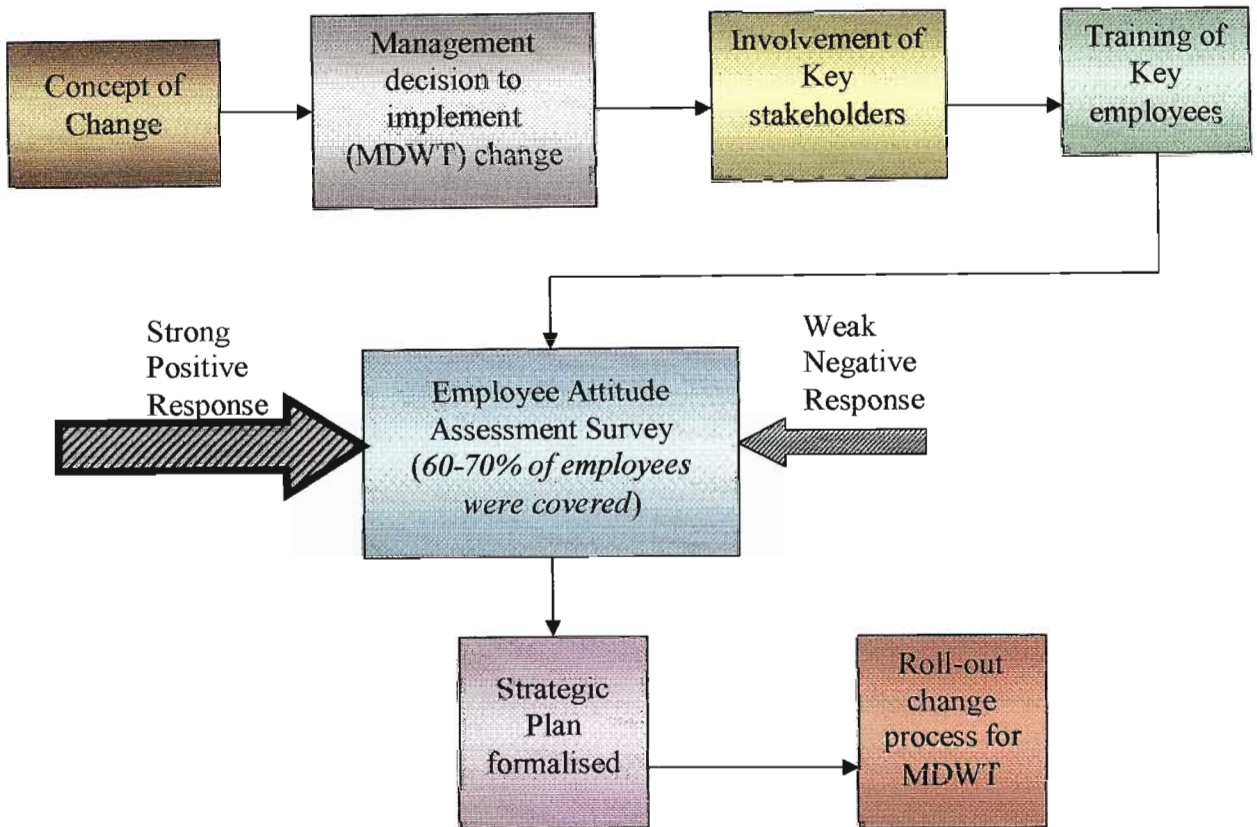


Figure 4.1: MDWT Change Conceptualisation Phase

4.3 MDWT Planning Stage

Planning is the process of working out what steps should be taken when, how to take them, anticipating what could go wrong along the way and planning how we deal with potential problems before they arise or as they arise (DiMaggio, 2001).

The following key steps are recommended when planning for change in an organisation (Mullins, 2005):

- Develop a clear vision.
- Identify the *significant* steps in the change process.
- Communicate the staged plan to all concerned (i.e. all stakeholders).
- Avoid undue haste.
- Inspire confidence by forestalling problems and communicating regularly.

In December 2004 the MDWT strategy was introduced at RBM (see Appendix B for the 4 year MDWT strategy). This strategy defined the vision of change for RBM. Between January 2005 and March 2005 the planning process of MDWT was conducted. Communication of the MDWT process and education of employees were emphasised by the project facilitation team during the planning process. This was achieved by the publication and distribution of 18 flyers, 4 articles in the RBM newsletter and 3 company briefs issued by the Chief Executive Officer (Mr. George Deysel). During the planning process the project team also facilitated visits to other companies in Africa that were successfully implementing MDWT. However, these visits were confined mainly for team leaders. Table 4.1 below lists the planning process in chronological order.

Start Date	End Date	Duration	Task
17-01-05	23-02-05	28 days	MDWT presentations to create understanding and assess readiness (senior, middle and line management only)
19-01-05	02-02-05	11 days	Team members for facilitation contracted.
19-01-05	31-01-05	9 days	Physical environment identified and set up.
19-01-05	31-01-05	9 days	Steering committee formed
19-01-05	31-01-05	9 days	Facilitators were chosen
19-01-05	31-01-05	9 days	Roles and responsibilities were assigned
19-01-05	31-01-05	9 days	Project plan drawn up
19-01-05	31-01-05	9 days	Risk assessment of project undertaken
19-01-05	31-01-05	9 days	Change control process – reasons for MDWT.
19-01-05	26-01-05	6 days	Communication channels set up.
19-01-05	19-01-05	1 days	Article on MDWT in RBM newsletter.
31-01-05	31-03-05	59 days	Five Newsletters on MDWT circulated to all.
01-02-05	01-02-05	1 days	Project kick-off (Project team & facilitators finalized and introduced to RBM via flyer).

Table 4.1: MDWT project roll-out structure

Start Date	End Date	Duration	Task
02-02-05	28-02-05	19 days	Change readiness assessments – workshops for team leaders to assess levels of readiness for project implementation.
08-02-05	28-02-05	15 days	Communication to supervisors and all team members – Presentations on MDWT to all employees and dealt with potential questions.
28-02-05	03-03-05	4 days	Project launch functions for MDWT team leaders – Speech by RBM Managing Director

Table 4.1 (cont.): MDWT project roll-out structure

Figure 4.2 below depicts the MDWT planning process followed during the process of change management at RBM. Stage 7 of the planning process, depicted in figure 4.2 below, was conducted to communicate relevant details of the MDWT program to the supervisors and team members. This was achieved by making presentations about both the current phase of the project and the impending implementation stage. Thereafter questions from the employees about the change process were addressed. However, not all team members were involved at this crucial stage of the project. This is an indication that RBM was trying to hasten the planning process in order to meet deadlines and to realize the benefits of MDWT as early as possible. The drawback of this undue haste is that key employees are left out of the *change* equation and tends to open the door to resistance, which is undesirable. It was estimated from my personal interviews that only between 20 to 30% of all employees were involved during this assessment phase.

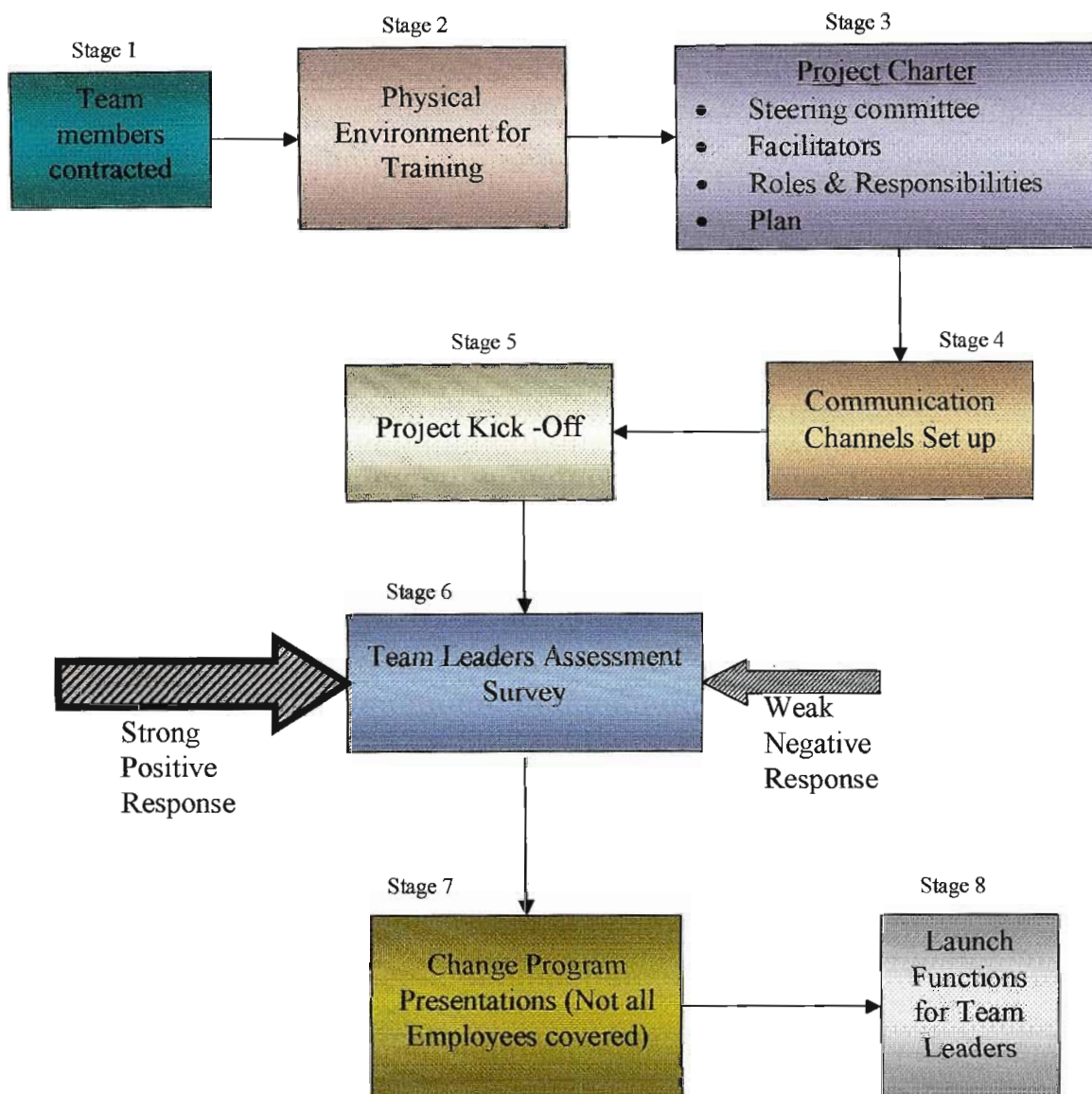


Figure 4.2: MDWT Planning stages

4.4 MDWT Implementation

The idea (of implementation) is to make things happen and make them happen right (Thompson, Strickland & Gamble, 2005). Implementation involves getting things done and delivering results by the specific techniques, actions and behaviours as set out in the planning stage. Feedback is vital in implementing change as it measures performance and attitudes; and indicates if the organisation is headed in the right direction.

On 1st July 2005 Mission Directed Work Teams was officially started company-wide at Richards Bay Minerals. All teams were required to start up their 'mini-businesses' as prescribed by MDWT procedure within a period of one month. During the implementation stage, the project team facilitators offered their assistance to set up the mini-businesses and to answer any related questions. The project team facilitators visited the new teams on a weekly basis to monitor progress and offer assistance.

Team members that were not formally trained for the MDWT programme were required to read about it from the MDWT training manual. This practice is undesirable for the process of change, since all employees must be given some form of formal training, so that resistance to change is minimised. It is important that staff members themselves feel a sense of involvement and know how they can play their part in achieving the goals and objectives of the organisation (Mullins, 2005). They (staff) should be given 'ownership and partnership' of the (MDWT) process by appropriate training (Mullin, 2005).

Although many employers continue to have reservations about the cost and the extent of tangible business returns from training, the development of vocational skills via training has been identified as a key factor in sharpening competitiveness and delivering hard, bottom-line improvement in profits (Mullins, 2005). Training of employees with respect to change initiatives is therefore imperative, and should be viewed as an essential ingredient in the recipe for change.

The first audit of the MDWT was conducted from 31 July to 7 August 2005 to evaluate the initial start-up of the mini-businesses. This audit was done to assess the employees understanding of the MDWT program and its implications for RBM. The audit results showed that management teams were highly aware of the change and its implications, but that shop floor teams were confused as to the implications of MDWT and the effect on the company (B. Ramsay, personal communication, March 16, 2006). The shop floor teams failed to understand the concept of MDWT, but they were aware of its aim to improve the performance of the company in terms of cost reduction and improved profitability. This difference in understanding of the change process by management and

workers on the shop floor indicates that the communication mechanisms employed for MDWT were ineffective in reaching lower down the organisation.

Monthly audits were conducted thereafter and incentives were offered to those teams that performed well in Mission Directed Work Teams. The shop floor teams that were initially slow to start were gaining better understanding of the new process, but it took approximately three months before a thorough grasp of the program was achieved (B. Ramsay, personal communication, March 16, 2006). This is evidence of a lack of either involvement or communication with these employees in the organisation during the conceptual and planning stage.

The purpose of the monthly audits with each team was to enable management to gain important feedback about the change process. This feedback is essential in change management to review the progress of change and to provide the necessary re-inforcement and guidance. Employees and team members also need this type of feedback and re-inforcement in order to be clear about their work endeavours and to arouse their enthusiasm and drive for the new process. The feedback on MDWT was presented to all employees in the monthly company briefs. The feedback provided was concentrated mainly on team statistics and audit results, but failed to provide any information on financial performance, employee attitudes, motivation and continuous improvement. The follow-up and feedback, after change implementation, should satisfy the employees with regards to the following (Mullins, 2005):

- Have the desired results been achieved?
- Has the process been successful?
- What might have been done differently?
- How do those affected feel about the new situation?
- How can those not responding well to the change be helped?

Although the first three issues in the above list are more difficult to satisfy early in the change implementation process, the last two issues need to be addressed and communicated to employees as early as possible. The effect of change on financial

performance needs to be conducted and assessed at least 6 months after implementation. This will serve as a guide to team leaders and team members to either carry on in the same vein, or to *up* their game.

Table 4.2 below lists the implementation process in chronological order.

Start Date	End Date	Duration	Task
01-07-05	01-07-05	1 day	Official start of MDWT company wide.
01-07-05	31-07-05	31 days	Project team facilitators provide assistance on request, and inspect physical team environment.
31-07-05	07-08-05	8 days	First MDWT audit conducted by facilitators of the project team.
14-08-05	17-08-05	3 days	Monthly company-wide brief gives feedback to employees on MDWT.
31-08-05	06-09-05	7 days	Second MDWT audit conducted by facilitators of the project team.
15-09-05	18-09-05	3 days	Monthly company-wide brief gives feedback to employees on MDWT.
30-09-05	30-09-05	1 day	Third MDWT audit conducted by team coach or team sponsor.
07-09-05	07-09-05	1 day	High flying teams presented with incentives.
18-10-05	21-10-05	4 days	Monthly company-wide brief gives feedback to employees on MDWT.
31-10-05	02-11-05	3 days	Fourth MDWT audit conducted by project team facilitators.
01-12-05	To date	Ongoing	MDWT becomes integrated into the work environment at RBM

Table 4.2: MDWT implementation steps



5. ANALYSIS OF RESULTS

5.1 Analysis of RBM Approach to MDWT

The MDWT initiative came into effect against the backdrop of another significant planned change initiative that was implemented at RBM in 2001. This planned change was Business Process Reengineering, more commonly referred to at RBM as Business Optimisation Programme or BOP.

The effect of BOP on RBM employees was essentially negative, since the workload per employee increased and job losses were extensive. The morale of the employees was low as a result of the business-reengineering programme or BOP, and against this backdrop MDWT was initiated. Therefore, it is apparent that, implementing MDWT was a deliberate attempt on the part of senior management to lift the morale of the employees through the process of teamwork.

Other changes that occurred at RBM prior to the introduction of MDWT were:

- The implementation in 2001 of the Continuous Improvement Programme (CIP) or Kaizen.
- The implementation of SAP in 2002 as a common and single programme that replaced several other programs.
- Outsourcing of key departments from 2002 onwards such as Procurement, Information Technology and Refrigeration.

The CIP initiative was undertaken to identify ways to improve RBM's processes by making it more efficient, and thereby more cost effective. This was in-line with RBM's objective of being the low-cost producer in the pigment feedstock manufacturing industry. Another impact of cost saving is the immediate effect of improving the shareholders' return on investment (ROI).

The implementation of SAP in 2002 was carried out in order to speed up and simplify the process work functions such as raw materials ordering, ordering of spares and new

equipment, capturing of hours worked by employees, booking of in-house and external training needs, conducting and capturing of employee performance appraisals etc. Therefore the purpose of SAP was to fast track and simplify work and other related job functions and to support more effective and efficient ways of working.

RBM appears to have followed the Unfreezing-Movement/Change-Refreezing procedure, according to the Kurt Lewin's force field analysis model (Misselhorn, 2005), in their change management approach for implementing MDWT. The Kurt Lewin's model is a highly effective and appropriate approach for change management as it emphasises the involvement of all relevant stakeholders as early as possible in the change process.

The unfreezing steps in the change management approach at RBM were:

- Training of all team leaders for MDWT.
- Implementing MDWT on 1st July 2005.
- The information provided in the form of newsletters, company briefs and flyers regarding the introduction of MDWT.

The indication of the movement or change steps in the change management process were:

- All employees forming teams in the company before the first audit on 31st July 2005.
- All employees following the new MDWT programme and changing their way of working.
- The changes in attitude and behaviour of employees as a result of the team work efforts.

The refreezing steps of the change management approach were:

- MDWT audits being carried out on a monthly basis by project facilitators, team coaches and team sponsors.
- Feedback on MDWT statistics at the monthly company briefs.
- Gift incentives being issued to high-flying teams at RBM.
- Encouragement and coaching of teams by the project facilitators.

Table 5.1 presents an analysis of the MDWT change management process at RBM in terms of Kurt Lewin’s model (Misselhorn, 2005). The several and diverse steps involved in the process are categorized both by stages (unfreezing, movement/change and refreezing) and by level (individual, structures and systems and culture and climate).

Levels	Unfreezing	Movement/Change	Refreezing
Individual	Team leaders were identified and chosen. Training of Team Leaders was conducted.	Formation of mini-business teams.	Monetary incentives for excellent team efforts.
Structures and systems	Project team for MDWT was formed. MDWT training courses were set-up.	Continuous improvement and innovation resulting from new ideas within teams.	Monthly MDWT audits were conducted. Monthly company briefing sessions - outlining MDWT statistics.
Culture and Climate	Concept and planning of working together in teams.	Building interdepartmental relationships.	Gift incentives for top teams.

Table 5.1: Applying Lewin’s model to the RBM MDWT change effort

The movement-change steps need to be maximized in order to obtain the maximum benefit from MDWT. This could have been done at the very outset by identifying the driving and restraining forces and applying a concerted effort to reduce the undesirable forces and encourage the desirable forces. Examples of driving forces that could have been encouraged were:

- Training of all employees to a certain degree regarding MDWT.

- Involving all stakeholders (or suitable representatives) in the decision-making processes such as unions and community members.
- Constant flow of information from management to employees about their intentions and the significance of MDWT.

Examples of restraining forces that could have been reduced at the outset of the change management process are:

- The high workload per employee ratio as a result of the business process re-engineering process at RBM.
- Uncertainty and the lack of understanding of SAP.
- No training for many employees on MDWT.
- The culture of complacency within RBM. Under-estimating the new and old competitors in the market place is risky.
- Insufficient information about need for change to employees lower down in the organisation.

The above driving forces and restraining forces should have been addressed at the very outset of MDWT so that the actual change process would have been maximized (i.e. the employees would have driven the change). As a result, RBM management need to identify the driving forces and the restraining forces for current and future change initiatives, and focus on reducing the restraining forces and encouraging the driving forces.

The refreezing phase of MDWT, as in Table 5.1 above, also needs reinforcing. The following steps need to be taken during the refreezing phase of change management:

- Refreezing should show open commitment from top management (this is currently not evident at RBM).
- Refreezing should also address the process of creating a culture of teamwork. This can be achieved, in part, by printing T-shirts, new uniforms and stationery for employees depicting MDWT labels and logos. This is further indication of management commitment to MDWT.

Unfortunately, the change process is not smooth even if one is attentive to Lewin's model of change (Misselhorn, 2005). Changing behaviour at both individual and organisational levels means inhibiting habitual responses and producing new responses that feel awkward and unfamiliar to those involved. It is all too easy to slip back to the familiar and comfortable. In moving from a known present state to a desired future state, organisations must recognize that the intervening *transition* state requires careful management. An important part of this change management lies in recognizing and accepting the disorganization and temporarily lowered effectiveness that characterize the transition state (Carnall, 1997).

To heighten stakeholder involvement, RBM formed a MDWT management team comprising of project leaders, project facilitator and auditors. However, the formation of a transition management team that is composed of a broad cross-section of employees is recommended for future change initiatives of a similar nature.

Edgar Schein (Misselhorn, 2005) drew attention to changing *processes* (i.e. human behaviour, personality and relationships) and not just organisational structures. Changing of structures (or systems) alone in an organisation results in the workers being assigned new tasks, procedures, and roles. As a result new communication channels and human relationships need to be developed with new suppliers and customers and other departments. This change in processes is extremely relevant to the MDWT initiative at RBM. The new experiences resulting from new tasks can adversely affect employee performance and undermine the change process, if not given careful consideration. Therefore in order to give attention to processes such as human behaviour, personality and relationships, the following guidelines are recommended for the management of MDWT at RBM.

- Orientation of employees must expose them to what is happening in other departments and functions. This will build up their confidence by understanding the objectives, activities and problems of others, thus enabling intelligent communication with those in other functions.

- Line managers at RBM need to be trained in interpersonal and interactive skills to understand human behaviour, perceptions, motivation and personality.
- Senior management should adopt a more leadership style approach by motivating and encouraging employees rather than to *only* concentrating their efforts on systems, tasks and structures.

The following are the basic principles of managing change in an organisation such as RBM (Misselhorn, 2005):

- *Feedback is the basic source of information and inspiration for change.* Members in an organisation need to know how they are performing, the pressures impacting on the organisation and the market situation. They need this information to learn from their actions and experiences. Feedback is essential during any change process for problem diagnosis and to make choices for improvement.
- *There needs to be a strong desire for change amongst employees.* If members are satisfied with their work and the status quo, then there will be no desire to realise changes, hence change will not occur. This strong desire for change can be stimulated in employees by communication, education and employee-participation.
- *Lack of resources is a barrier to change.* Feedback and a strong desire for change may be present in the organisation, but if the resources available are limited, then change is impeded. The critical resources for change in an organisation are money, time and people.
- *Reinforcement is critical to sustain changes.* After implementing change it is imperative to reinforce this change process by regular monitoring, encouragement and recognition. This will ensure that the change is not short-lived.
- *Involvement of appropriate stakeholders helps to overcome resistance and enriches the process.* Managers in the boardroom may sometimes overlook practical problems associated with the process that other members can easily identify. Hence employee involvement is recommended early on the any change process.

These basic principles of managing change can be carried out at RBM by following the practical steps outlined below.

- Management needs to assess the situation at hand. Objectivity is essential for effective change management, since any preconceived ideas and thoughts will tend to cloud judgment.
- All relevant stakeholders (or role players) need to be involved from the outset of the change process (Van Tonder, 2004). The depth of involvement of each stakeholder will depend on his or her ability to contribute to the process of change.
- Management needs to adopt a definite approach in dealing with change implementation. This approach could be directive, participative or facilitative and will depend on the readiness of all the stakeholders. If the majority of stakeholders have a low level of readiness (i.e. they are not enthusiastic) then a more directive approach is needed. If the majority of the stakeholders, however, have a high level of readiness (i.e. they have enthusiasm, drive and energy) then a more participative approach is required.
- The planning phase for change processes in any organisation is a difficult phase, as it attempts to forecast what might occur in the implementation phase. Planning must be done deliberately in steps with the relevant stakeholders. This phase must include contingency steps to take if the business is showing signs of receding (Williams, Woodward and Dobson, 2002).
- The implementation stage of the change process involves timing of events, scheduling of activities, acquisition and delivery of resources and the development of human resource support services (Paton and McCalman, 2000). Implementation does not happen exactly as planned, therefore after each stage management need to re-assess the situation and incorporate other approaches such as problem solving, team-building, conflict handling and analysis of key steps.

The management of change will be facilitated if the environment we trade in can be predicted in advance. In other words, if changes in the economy, government policies, society and technology can be foreseen, then we can plan ahead for change and in this way manage it effectively. One way of achieving this is to follow the principles based on the Sigmoid curve (see figure below).

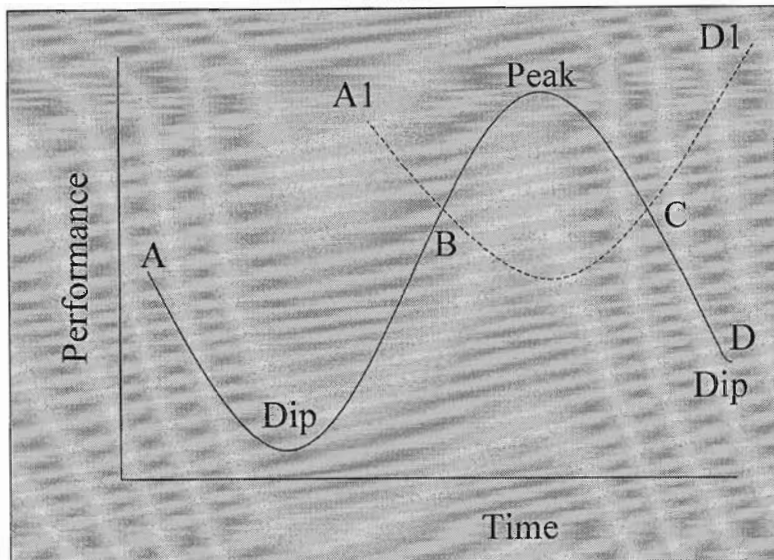


Figure 5.1: Sigmoid curve (Misselhorn, 2005)

RBM should adopt this change management approach as a process to improve performance and ensure growth of the business, especially now in the current decline phase of the business cycle. This approach involves creating changes when the performance is on the rise (i.e. during growth) prior to the period of peak performance, so that the business experiences sustained growth.

5.2 Analysis Of Survey Results

The survey is an effective tool to get opinions, attitudes, descriptions and cause-and-effect relationships (Mouton, 2005). The type of survey that was utilised for the research study at RBM was the *descriptive* survey. Such surveys are concerned with identifying the phenomena whose variance we wish to describe, which in this case is employees' attitude to MDWT. A copy of the survey questionnaire that was used to assess the attitudes of RBM employees following the implementation of MDWT is attached in Appendix A.

From the 1489 employees that were targeted only 188 employees responded by completing the questionnaires, which is equivalent to a 12.6% response rate. However, this was considered to be representative of the entire population of RBM (refer to Chapter

3 above for the detailed explanation) and accurate inferences could be made from the survey data.

Each questionnaire had 14 questions which produced a total of 2632 responses (i.e. 14 x 188). Table 5.2 and Figure 5.2 below summarises the responses of the 188 employees to the survey questionnaires.

Response Type	Number of Responses	% of Total Responses
Strongly Disagree	32	1.2
Disagree	329	12.5
Unsure	611	23.2
Agree	1363	51.8
Strongly Agree	297	11.3
Total	2632	100

Table 5.2: Summary of responses to survey questionnaire conducted at RBM

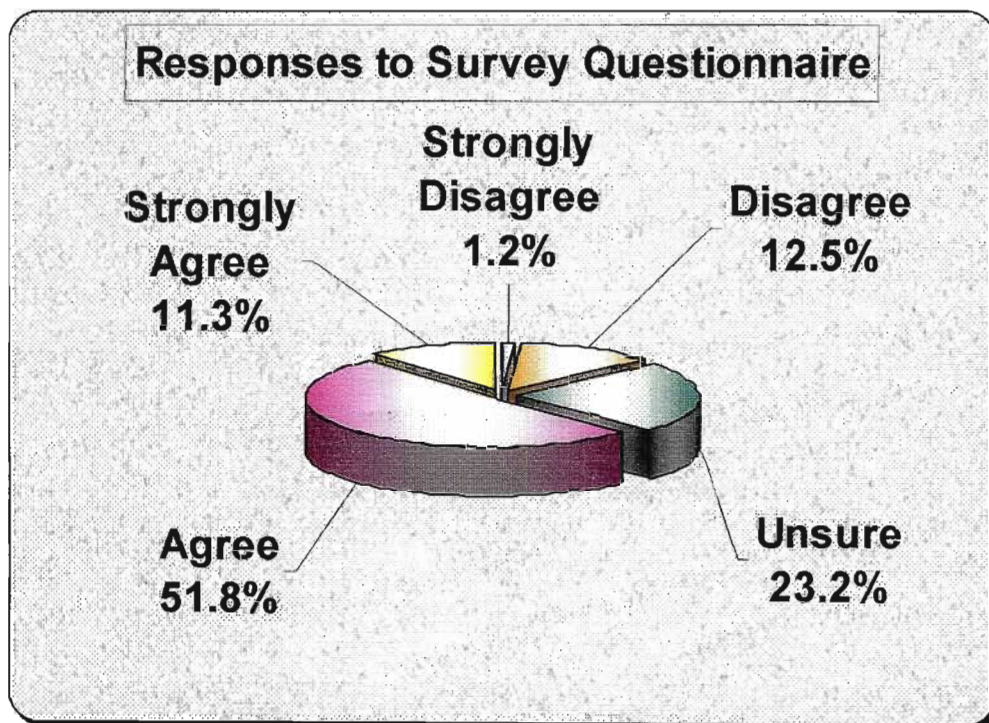


Figure 5.2: Pie chart of survey responses obtained at RBM

The results from the survey questionnaire show that there is essentially a positive attitude amongst employees at RBM regarding MDWT. Figure 5.2 above indicates clearly that only 12.5% of the employees were in disagreement with MDWT, and a mere 1.2% of them were in strong disagreement to MDWT. The 23.2% of the employees that responded as being *unsure* is not desirable, and they need to be persuaded to display a more *definite* positive attitude towards MDWT at RBM by effective change management approaches.

The 1.2% of the employee responses that were in strong disagreement was in response to question number 12 of the questionnaire, which deals with training for MDWT. Training is therefore an issue in change management that needs to be addressed by RBM. It is important that employees themselves should feel a sense of involvement and know how they can play their part in achieving the goals and objectives of the organisation (Mullins, 2005). They (employees) should be given 'ownership and partnership' during the training process (Anderson & Anderson, 2001).

There were a total of 329 responses that were in *disagreement* (refer to Table 5.2 above) with the survey questions. 25% of these responses indicated that training was inadequate (question 12 of the survey), and another 25% showed that communication was a problem (questions 5 and 10 of survey). The issue of inadequate training of employees for the MDWT programme has been highlighted as a problem again by the survey results. This emphasises the need for employee training during a change process, and must be taken into account for future change at RBM with regards to introduction of new systems, programmes or procedures.

The survey results have also highlighted the need for effective and meaningful communication between teams and departments at RBM. The aim of communication is to inform, remind and to bring about a certain activity (Kroon, 1995). The communicator and the receiver of information must have a clear message to achieve the aim of communication. Good communication within an organisation can lead to a reduction in costs, an increase in productivity and better employee relations. Communication is the most crucial factor in the success or failure of a business in South Africa, particularly if

one looks at the various cultures, languages and the possibilities for misunderstanding and conflict (Kroon, 1995).

The following methods can be used to improve communication between teams and departments at RBM:

- Interdepartmental meetings can be held to discuss the functioning of each department and thus improve understanding and promote more effective communication.
- Team-building and bonding exercises can be organised to promote interpersonal relations between group members.
- The training department should include training modules on effective ways to communicate between all levels in the organisation.
- Illiterate employees must be trained on basic reading and writing.
- Basic English and Zulu courses must be provided for employees that need them.

Question 13 of the survey was concerned with the employees' outlook for the future of MDWT. The results from the survey showed that *only* 8.3% of employees were negative about the further implementation of MDWT. This shows that most RBM employees are up to the challenge, have enthusiasm and a positive attitude towards the change process.

There were a total of 611 responses that were *unsure* (refer to Table 5.2 above) about the survey questions. 27% of this total was unsure if their values were aligned with RBM's values (question 4 of the survey), and another 22% were unsure about their relationships with the suppliers and customers (question 11 of the survey). The uncertainty issue regarding the alignment of personal and company values could most probably be due to a communication problem, as the employees may be unaware of the values of RBM. The values of RBM must therefore be emphasised to all team leaders and team members during the MDWT audits by the project facilitators. The second issue of uncertainty was human relationships and this can be addressed by team building exercises and interpersonal skills training courses.

The results of the survey questionnaire show that there is essentially a positive attitude amongst employees at RBM regarding MDWT since a total of 63.1% of respondents were both in *strong agreement* and *agreement* with the survey. Furthermore, although 23.2% are unsure, these individuals can be influenced to display a more positive attitude by concentrated efforts to improve communication and relationships within RBM.

The solutions to the problems that have been highlighted by the surveys are important in remedying the situation. Team leaders and managers must deal with problems as they arise with objectivity and by following a step-by-step problem solving procedure.

Examples of some problems solving procedures are (Misselhorn, 2005):

- Inductive-Deductive method.
- SORTTE method.
- Systematic Problem solving procedure.
- Joint Problem Solving Matrix.
- Blake, Shepherd and Moutons Intergroup problem solving.

5.3 Analysis Of Personal Interviews

Interviews are often considered as the best data collection method, but they are highly complex and need to be conducted accurately (Ghauri, et. al., 2002). Semi-structured interviews were conducted for this study of MDWT at RBM (refer to Appendix C for a copy of the interview questions). Employees were approached during the lunch breaks at the firm's canteen and interviewed. The interviews were conducted by the process of sequential sampling i.e. the interview process continues until no new points are uncovered.

The interviewing phase of the fieldwork was started on 23rd June 2006, continued for a period of 10 working days, and ended on 6th July 2006. A total of 168 employees were interviewed during the 15 days, and this equated to 11.3% of the total work population.

The common point that emerged from the interviews was that the employees were essentially positive and upbeat about the change process at RBM. The negative responses that were recorded dealt mainly with the aspect of human relationships. This indicates that insufficient attention was focused on team playing and team-building during the change process. It also emphasises that MDWT can be straining the relationships amongst employees. The process of cultivating team playing and also implementing team-building programs within teams can overcome the problems associated with relationships. Team building refers to the process of bringing individuals together in a team and agreeing on expectations of one another through honest sharing of positive and negative perceptions of each other. This process must be emphasized as a learning experience and should be conducted in a controlled environment where members are allowed to speak for a specific time period about each member of the team. Team leaders must also be trained in joint problem solving, so that teams function effectively and achieve practical solutions to organisational problems.

Team playing, which refers to the way people work within their teams in an organisation, is also crucial for effective team work. This process can be improved at RBM by team leaders taking the following steps (as proposed by Schultz's modified model) (Misselhorn, 2005):

- At the beginning of team formation to promote inclusion of team members by sharing interests and backgrounds, and by breaking the ice with humour. If all members feel included then they will feel less pressured to please each other and can proceed to the next level of team formation (i.e. the control phase).
- At the next phase of group formation (i.e. the control phase) group members feel the need to exert their influence over the team by enforcing their own ideas and initiatives. This control phase can be implemented in a structured and orderly manner such as by the process of brainstorming. This will allow all members' ideas to be considered for when solving a particular problem.

- Interdependence can be used to improve teamwork by identifying members' strengths and harnessing these strengths to enhance the team's role in solving problems related to organisational performance.
- Affection is the human ingredient that must be displayed by the team leader, so that it provides a lead for the other members to follow. This will tend to invoke respect and caring amongst the team members, and will thus improve teamwork by holding the team together in times of pressure. The process of rotating the leadership within teams so that a level of respect and trust is developed can also invoke feelings of affection amongst the team members.

There were also some practical suggestions for change management from employees during the interview process, such as:

- Sending teams to companies such as Toyota, Hillside Aluminium and Mondi to see MDWT in action so that there is a process of learning.
- Promoting team bonding outside the work environment by having team braais, team sports events and team tours.
- Printing MDWT stickers, memo pads and stationery to create more awareness and exposure of the teamwork initiative.
- Team members' roles should be rotated to improve team performance, to promote better understanding and to break the monotony.

5.4 Evaluation Of Financial Performance

The financial performance of RBM will be assessed in order to determine if the implementation of MDWT resulted in any financial benefits. Financial benefits such as cost savings are expected at RBM because of the process of continuous improvement, which is the cornerstone of MDWT. The production cost to production volume ratio (Rands/ton of product) at RBM is displayed below in Table 5.3* and Figure 5.3* for the

period from July 2004 to April 2006. This ratio is useful to determine if the costs related to production decreased after the implementation of MDWT in July 2005.

* The exact financial performance figures of Richards Bay Minerals cannot be disclosed due to the RBM confidentiality clause. Hence the financial figures quoted are similar only with respect to its trend, and is therefore not the actual figures for RBM.

Month	Production Volume (tons)	Production costs (Rands)	Ratio (Rands/ton)
Jul-04	62967	780948	12.40
Aug-04	99272	1257156	12.66
Sep-04	56200	713248	12.69
Oct-04	83105	1114126	13.41
Nov-04	90605	1245819	13.75
Dec-04	98314	1351818	13.75
Jan-05	94099	1261515	13.41
Feb-05	90198	1178211	13.06
Mar-05	90922	1187669	13.06
Apr-05	93374	1219698	13.06
May-05	117991	1589929	13.48
Jun-05	109732	1433374	13.06
Jul-05	126321	1650068	13.06
Aug-05	130183	1700515	13.06
Sep-05	116284	1478987	12.72
Oct-05	124328	1581297	12.72
Nov-05	117252	1475177	12.58
Dec-05	130171	1655612	12.72
Jan-06	134410	1709527	12.72
Feb-06	118404	1546652	13.06
Mar-06	130641	1706498	13.06
Apr-06	127980	1698135	13.27

Table 5.3: Financial Performance at RBM

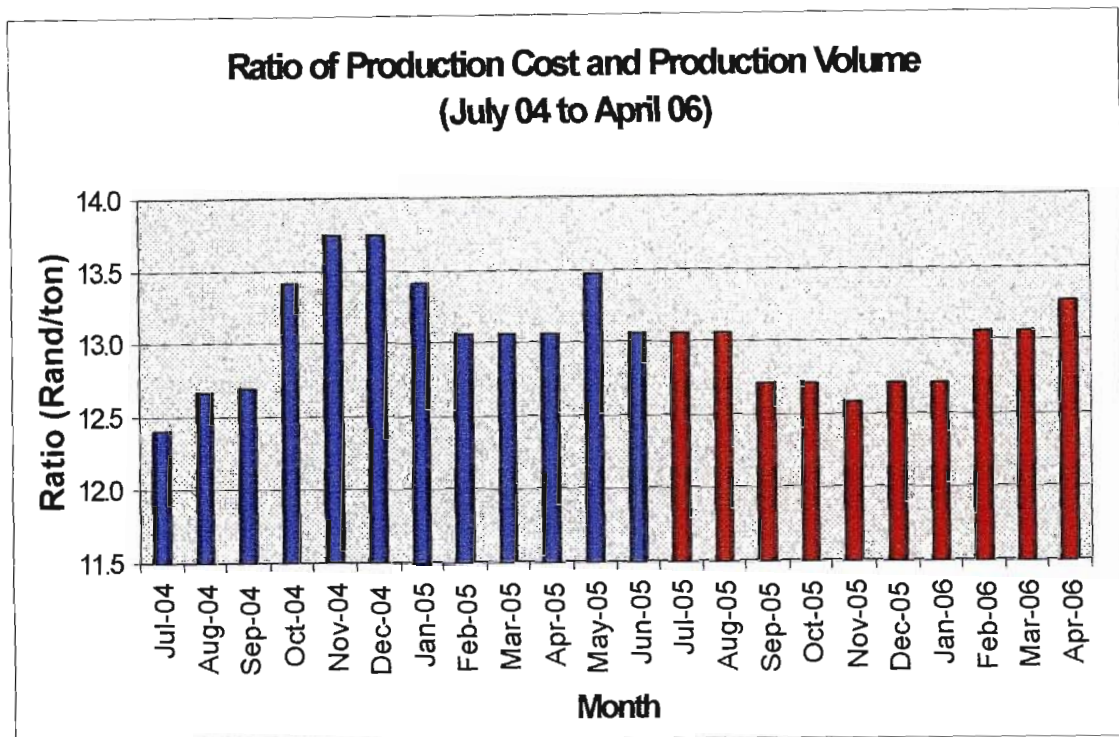


Figure 5.3: Financial performance trend at RBM

The blue section of the trendline indicates the financial performance at RBM prior to implementing MDWT, and the red section represents the financial performance at RBM after implementation of MDWT.

It is evident for the above trendline that there was an increase in production cost per ton immediately after September 2004 until December 2004, and this was attributed to the culture of managers spending the major part of their allocated cost budgets towards the end of the financial year. Another contributing factor to the increase in costs during this three-month period is due to the increased spending on safety and housekeeping in the production plants in anticipation for the RBM internal safety competition, which is held early each year.

After December 2004, the figure shows that cost of production decreased until February 2005. Thereafter the cost of production remained essentially consistent up until August 2005. Once again this can be explained by the culture within RBM, where managers are

fairly tight on budgetary controls towards the beginning of the financial year so that they ensure overspending is curtailed.

The cost per ton of product remained constant for two months after MDWT was implemented at RBM, but thereafter the costs declined for the next five months from September 2005 to January 2006. This improvement in the financial performance of RBM could be attributed to the effective change management and the continuous improvement focus of MDWT.

The cost per ton of product increased for the next three months from February 2006 to April 2006, which indicated that the financial performance during this three-month period deteriorated. A possible explanation for this was management's failure to provide appropriate feedback to reinforce the change process. Employees generally see change as a novelty and once it wears out, they revert back to their old habits and ways of working. *Reinforcement is critical to sustain changes.* After implementing change it is imperative to reinforce this change process by regular monitoring, encouragement and recognition. This will ensure that the change is not short-lived.

5.5 Forecasting Of Financial Performance

The forecasted cost of production for the 12 months from May 2006 to April 2007 is shown in Table 5.4 and Figure 5.4 below. The method of 'polynomial' extrapolation was used to calculate these forecasted financial figures. Refer to Appendix D for a detailed quantitative forecasting calculation of the cost of production using the SPSS statistical package.

Month	Ratio (Rands/ton)
May-06	13.52
Jun-06	13.82
Jul-06	14.16
Aug-06	14.56
Sep-06	14.99
Oct-06	15.47
Nov-06	15.98
Dec-06	16.53
Jan-07	17.11
Feb-07	17.70
Mar-07	18.32
Apr-07	18.94

Table 5.4: Forecasted cost of production at RBM

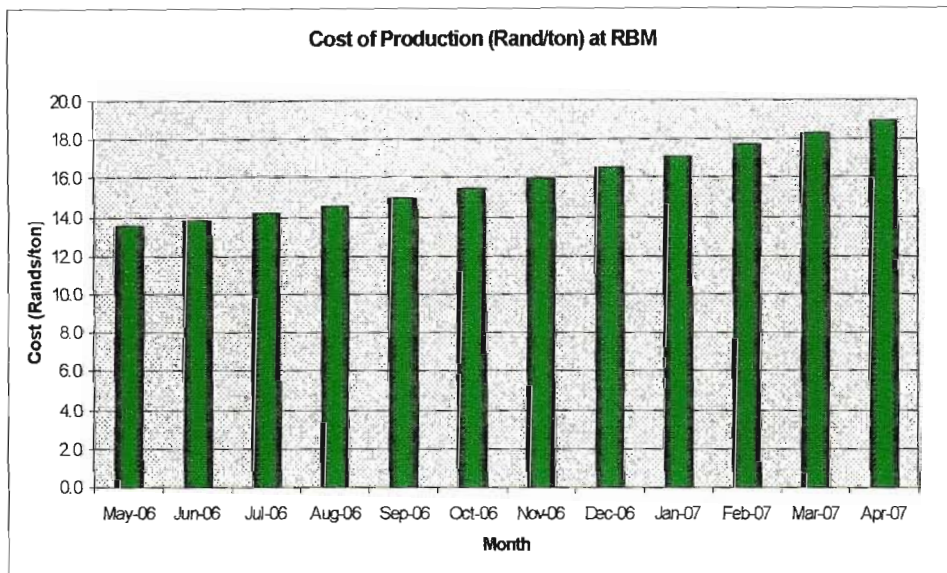


Figure 5.4: Trend of forecasted cost of production at RBM

It is clear from figure 5.4 above that the cost of production per ton of product is expected to increase gradually for the next year. This indicates that there needs to be a concerted change management effort to ensure continuous improvement at RBM and in doing so to drive production costs down. The following action steps are recommended to drive down the production costs for the next 12 months.

- Management must consistently monitor MDWT and other change initiatives.

- *Reinforcement is critical to sustain changes.* After implementing change it is imperative to reinforce this change process by encouragement and recognition. This will ensure that the change is not short-lived
- The leadership style of management must include management by walk-about and to walk-the-talk.
- Appropriate and consistent incentive schemes must be in place to motivate employees to perform.

The long-term financial forecast for RBM was calculated based on the average quarterly figures for the past 3 years. The extrapolation method was utilised in order to forecast these financial figures for the next 5 years. Refer to Appendix E for a detailed quantitative forecasting calculation of the long-term cost of production at RBM using the SPSS statistical package. The forecasted figures are summarised in table 5.5, and also depicted in figure 5.5 below.

Year/Quarter	Ratio (Rands/ton)
2006 3rd Q	14.32
2006 4th Q	15.22
2007 1st Q	16.14
2007 2nd Q	17.12
2007 3rd Q	18.18
2007 4th Q	19.33
2008 1st Q	20.58
2008 2nd Q	21.92
2008 3rd Q	23.36
2008 4th Q	24.91
2009 1st Q	26.55
2009 2nd Q	28.30
2009 3rd Q	30.15
2009 4th Q	32.10
2010 1st Q	34.15
2010 2nd Q	36.31
2010 3rd Q	38.57
2010 4th Q	40.93
2011 1st Q	43.39
2011 2nd Q	45.96
2011 3rd Q	48.62
2011 4th Q	51.39

Table 5.5: Long-term financial forecast for RBM

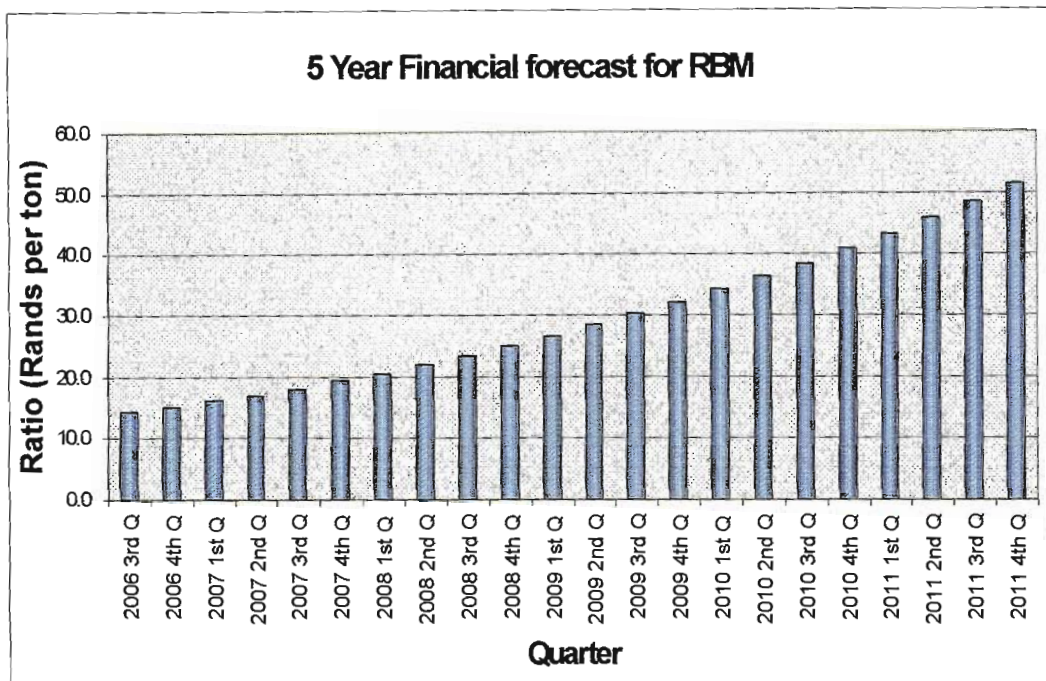


Figure 5.5: The forecasted long-term financial performance at RBM

It is evident from both table 5.5 and figure 5.5 above that the financial performance at RBM is expected to increase over the next 5 years until 2011. This cost increase is gradual initially, but escalates from the second quarter of 2009. Although this forecast merely represents an extrapolation of the current financial performance, and will not be entirely accurate (as with all forecasts), it does, however, indicate an increasing trend in the production costs at RBM. This increasing trend is detrimental to the profitability of the company and the action steps mentioned above must be implemented over the long-term period to ensure that costs are driven down.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The implementation of MDWT at RBM was undertaken to inculcate a continuous improvement culture amongst the employees, to develop a positive mindset across the organisation, to raise individuals' confidence and self-esteem, to encourage them to use their common sense, to entrench team work and to help each person to understand the importance of his or her contribution to the organisation.

RBM management appears to have followed Kurt Lewin's (Misselhorn, 2005) *Unfreezing-Change-Refreezing* procedure of change management in implementing MDWT. The Kurt Lewin's model is a highly effective and appropriate approach for change management as it emphasises the involvement of all relevant stakeholders as early as possible in the change process.

The results of the survey questionnaire showed that there is essentially a positive attitude amongst employees at RBM regarding MDWT since a total of 63.1% of respondents were both in *strong agreement* and *agreement* with the benefits of MDWT. The results of the MDWT survey indicated that:

- 51.8% agreed with the benefits of MDWT,
- 23.2% were unsure about the benefits of MDWT,
- 12.5% disagreed with the benefits of MDWT,
- 11.3% strongly agreed with the benefits of the new program, and
- 1.2% strongly disagreed with the benefits of the program.

The survey also showed that there were two recurring issues that employees felt negative about viz. training and communication. This emphasises the need for employee training, and the need for effective communication during any change process especially in South Africa, where there are various cultures and languages, and the possibilities for misunderstanding and conflict are amplified.

An examination of employee grievances in the Human Resource department showed that there was no change in the number of grievances at the onset of MDWT or during the implementation process.

The feedback from the personal interviews indicated that the employees are essential positive and up-beat about MDWT at RBM. However, negative responses were also recorded and dealt mainly with the aspect of human relationships. This emphasises that MDWT can be straining the relationships amongst employees and teams. Effective team playing and team building programs can overcome these relationship problems.

The evaluation of the financial performance at RBM showed that there was an initial improvement in the cost performance after MDWT was implemented, but this improvement was not sustained. This improvement in the financial performance of RBM could be attributed to the effective change management and the continuous improvement focus of MDWT. The subsequent poor cost performance thereafter was attributed to the lack of re-inforcement and feedback from management.

The forecasted cost of production per ton of product is expected to increase gradually according to the forecast trend calculation. This is an early warning indication that a concerted change management effort is needed to ensure continuous improvement at RBM in order to drive production costs down.

6.2 Recommendations

The strong culture of *compliance* in RBM needs to be changed to a culture that will stimulate and promote teamwork and continuous improvement. The culture that will promote teamwork and continuous improvement is a mixture of the *role* culture and the *person* culture. The role culture focuses on areas of clearly defined work procedures, systems and communication channels; and the person culture focuses on participative decision-making. Furthermore goals and objectives must be set by work teams in alignment with the company's purpose and mission.

RBM's change management agents need to identify the driving forces and the restraining forces for current and future change initiatives, and focus on reducing the restraining forces and encouraging the driving forces

To heighten involvement, RBM formed a MDWT management team comprising of project facilitators and project auditors. However, the formation of a transition management team, which is composed of a broad cross-section of employees at RBM, would be recommended for future change initiatives of a similar nature.

The following practical suggestions from employees during the interview process are recommended to strengthen the MDWT process.

- Teams should be sent to companies such as Toyota, Hillside Aluminium and Mondi to see MDWT in action so that there is a process of learning.
- Team bonding should be promoted outside the work environment by having team braais, team sports events and team tours.
- MDWT stickers, memo pads and stationery should be printed to create more awareness and exposure of the teamwork initiative.
- Team members' roles within the teams should be rotated to improve team performance, to promote better understanding and to break the monotony.

The following methods can also be used to improve communication between teams and departments at RBM.

- Interdepartmental meetings can be held to discuss the functioning of each department and thus improve understanding and promote more effective communication.
- Team-building efforts and bonding exercises can be set in motion to promote interpersonal relations between group members.
- The training department should include training modules on effective ways to communicate between all levels in the organisation.
- Illiterate employees must be trained on basic reading and writing.
- Basic English and Zulu courses must be provided for employees that need them.

Relationship problems arising from the process of MDWT should be addressed by team building exercises, interpersonal skills training and training leaders in conflict handling.

In order to drive down the cost of production the following action steps are recommended.

- Management must consistently monitor MDWT and other change initiatives.
- *Reinforcement is critical to sustain changes.* After implementing change it is imperative to reinforce this change process by encouragement and recognition. This will ensure that the change is not short-lived
- The leadership style of management must include management by walk-about and to walk-the-talk.
- Appropriate and consistent incentive schemes must be in place to motivate employees to perform.

Employees need tangible recognition or incentives to reward performance, but they also require more intangible rewards in the form of ownership of projects, meaningful participation in teams, growth and learning opportunities (Sullivan and Lytton, 2000). The effect of MDWT should therefore be positive for the long-term success of RBM

since it provides meaningful participation in teams. However, the tangible rewards that is currently offered by RBM for MDWT appears to be insufficient. There are many forms of tangible reward options that are recommended for employees such as profit-share schemes, gain-sharing and production-related bonuses. Such incentives, together with the above mentioned intangible rewards would ensure both short and long-term success of RBM in the pigment feedstock industry.

The issue of inadequate employee training for the MDWT programme was highlighted as a significant problem by the survey results. This emphasises the need for employee training during a change process, and should be taken into account for future change at RBM with regards to introduction of new systems, programmes or procedures. All employees must be offered some form of formal training depending on their involvement in the change process. Specifically, new systems and programmes require learning new skills that can only be provided by adequate training. This would facilitate effective understanding and implementation of the new system or programme.

Team leaders, management and supervisors within RBM need to ensure swift and effective conflict management during the process of change. This would prevent relationship problems from escalating out of control. Training in the appropriate negotiation skills for handling conflict must be provided for all leaders, especially with regards to bargaining, joint problem solving, team building and counselling

Dealing with resistance to change is essential to ensure that any change process flows smoothly. Change management tactics that are available to management for dealing with resistance to change are education and communication, participation, facilitation and support, negotiation, co-optation, coercion and manipulation. Depending on the type of change required (i.e. rapid, medium or slow change), one or more of the above tactics must be used before and during the change process to minimise the effects of resistance (Kotter, et. al., 1979).

Team playing, which refers to effective ways to work in teams, is another factor that impacts on the change management process within organisations. Improving the way people work within their teams in any organisation is crucial for the smooth transition from old outdated systems and procedure to new ways of working. This can be attained by recognizing the steps involved in teamwork such as inclusion, control, interdependence and affection, and thereafter facilitating these steps.

Furthermore, the management of change will be facilitated if the environment we trade in can be predicted in advance. In other words, if changes in the economy, government policies, society and technology can be foreseen, then we can plan ahead for change and in this way manage it effectively. One way of achieving this is to follow the principles based on the Sigmoid curve. RBM should adopt this change management approach as a process to improve performance and ensure growth of the business, especially now in the current decline phase of the business cycle. This approach involves creating changes when the performance is on the rise (i.e. during growth) prior to the period of peak performance, so that the business experiences sustained growth.

Finally, it must be emphasized that in order to portray any new change process in a positive light amongst the employees, effective *promotion* of the new process must be executed before and during the change. This can be achieved with the assistance of the marketing department, who are skilled in the task of marketing and promotion. This *promotion* must be focused on creating a high level of awareness amongst all employees, and can be done by:

- Signs and posters everywhere within the company.
- Competitions to stimulate interest about the new change process.
- Publicity in the local newspapers.
- Brochures, flyers and articles in the company newsletters.
- Inviting guests, facilitators and suppliers to present talks about the new process.

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8. APPENDICES

8.1 Appendix A

Mission Directed Teamwork (MDWT) Survey

Researcher: Novan Naidoo
 Supervisor: Khadija Kharsany____
 School/ Programme of Graduate School of Business
 University of KwaZulu Natal.

Permission to use my responses for academic research
 I hereby give permission that my responses may be used for research purposes provided that my identity is not revealed in the published records of the research.

Initials and surname _____

Race (W/B/I/C): _____ Sex (M/F): _____

Age: _____ Occupation: _____

Postal address: _____

Postal code: _____

Contact numbers: Home: _____ Cell: _____

Signature: _____


Please tick one box that most closely represents how you feel about each statement.

Statement	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
	1	2	3	4	5
<ul style="list-style-type: none"> ➤ MDWT is an asset to the company. ➤ iMDWT iyigugu kulenkaphani. 					
<ul style="list-style-type: none"> ➤ I believe in what MDWT is trying to achieve. ➤ Ngiyakholelwa ezinhlosweni zale MDWT 					
<ul style="list-style-type: none"> ➤ I know how my job contributes to MDWT's aims and objectives. ➤ Ngiyazi ukuthi umsebenzi wami uxhumana kanjani nezinhloso ze MDWT. 					
<ul style="list-style-type: none"> ➤ My values and those of RBM's are now very similar. ➤ Ugqozi lwami nolwenkaphani luyefana. 					
<ul style="list-style-type: none"> ➤ Communication within my team is positive and effective. ➤ Ukuxhumana eqenjini lami kuhle futhi kunempumelelo. 					
<ul style="list-style-type: none"> ➤ MDWT has improved the way we work. ➤ iMDWT isiyithuthukisile indle engisebenza ngayo. 					

<ul style="list-style-type: none"> ➤ The benefits of MDWT outweigh the problems. ➤ MDWT ayisiyo inkinga, ihlose imiphumela emihle. 					
<ul style="list-style-type: none"> ➤ MDWT is being carried out due to necessity, not desire. ➤ iMDWT yenziwa ngoba kunesidingo, hhayi ngoba kufanele. 					
<ul style="list-style-type: none"> ➤ I am committed to my work team. ➤ Ngizinikele eqenjini lami 					
<ul style="list-style-type: none"> ➤ Communication between departments has improved. ➤ Ukuxhumana namanye amaqembu sekuthuhukile ngale MDWT. 					
<ul style="list-style-type: none"> ➤ Good customer and supplier relationships have developed. ➤ Ubudlelwano kuma khasimende nama Kilayenti sekukhulile. 					
<ul style="list-style-type: none"> ➤ I have undergone adequate training to make MDWT function properly. ➤ Ngiqeqeshwe ngokwanele ukwenza iMDWT isebenze kahle. 					
<ul style="list-style-type: none"> ➤ I am looking forward to the next level of MDWT, which introduce methods of team work. ➤ Ngilangazelela igxathu elilandelayo le iMDWT eliza nezindlela ezintsha zokusebenza kweqembu lami. 					
<ul style="list-style-type: none"> ➤ MDWT is being carried out regularly and generates new ideas. ➤ iMDWT siyenza njalo futhi isinika amasu amasha. 					

Please return all completed forms to N. Naidoo at Post code 49 before 30 June 2006.

**NB: This survey is completely anonymous, and your personal details regarding names and contact details will not be disclosed.

 TEAMWORK VISION: To be a world best workplace organization.		2005	2006	2007	2008
4 Year Plan Objectives Target Milestones Drivers	<ul style="list-style-type: none"> • Goal alignment throughout RBM • Employees identify with business objectives and understand their contribution 	<ul style="list-style-type: none"> • Committed and motivated employees • Improved Employee Morale <ul style="list-style-type: none"> - Absenteeism - Losses • Model workplace 	<ul style="list-style-type: none"> • Maximized overall equipment effectiveness • Improved workflow, on-time delivery and responsiveness • Competent and flexible work teams 	<ul style="list-style-type: none"> • Improved products and services to the zero-defect level • Total customer satisfaction • Elimination of waste and making value flow • Personal effectiveness 	
	<ul style="list-style-type: none"> • Mini-Business Goal Alignment Module • 2 Audits • Multi-level meetings 	<ul style="list-style-type: none"> • Leadership Module • 5S Module • 4 Audits • Multi-level meetings • # CIP's implemented • Teamwork reward 	<ul style="list-style-type: none"> • Asset Care Module • Workflow Module • Team Coaching Module • 4 Audits • Multi-level meetings • # CIP's implemented 	<ul style="list-style-type: none"> • Quality Assurance Module • Service Quality Module • Process Improvement Module • Self Development Module • 4 Audits • Multi-level meetings 	
	<ul style="list-style-type: none"> • Strategy On A Page • Org Performance Communication 	<ul style="list-style-type: none"> • Commitment • Participative leadership that promotes teamwork, continuous learning and flexibility • Feedback from involvement 	<ul style="list-style-type: none"> • Ownership • Employee development 	<ul style="list-style-type: none"> • Continuous improvement of quality performance • Service level agreements with suppliers and customers • Application of waste elimination tools • Personal vision, values and goals 	

8.3 Appendix C

INTERVIEW QUESTIONNAIRE FOR MDWT CHANGE PROCESS

Researcher: Novan Naidoo
Supervisor: Khadija Kharsany____
School/ Programme of Graduate School of Business
University of KwaZulu Natal.

Permission to use my responses for academic research
I hereby give permission that my responses may be used for research purposes provided that my identity is not revealed in the published records of the research.

Initials and surname _____

Race (W/B/I/C): _____ Sex (M/F): _____

Age: _____ Occupation: _____

Postal address: _____

Postal code: _____

Contact numbers: Home: _____ Cell: _____

Signature: _____

1. In your opinion, what are the positive effects of MDWT, if any?

2. In your opinion, what are the negative effects of MDWT, if any?

3. Have there been any changes to efficiency and costs?

4. Has there been any conflict within your team that could not be resolved?

5. What is management doing to make MDWT work better at RBM?

6. Are you getting sufficient feedback from RBM Management regarding the effect of MDWT thus far?

7. Have we changed the way we work after MDWT was implemented?

8. Has the work atmosphere at RBM improved?

8.4 Appendix D

Using the SPSS package the following output was obtained for the forecasted cost of production at RBM from May 2006 to April 2007.

Regression Analysis

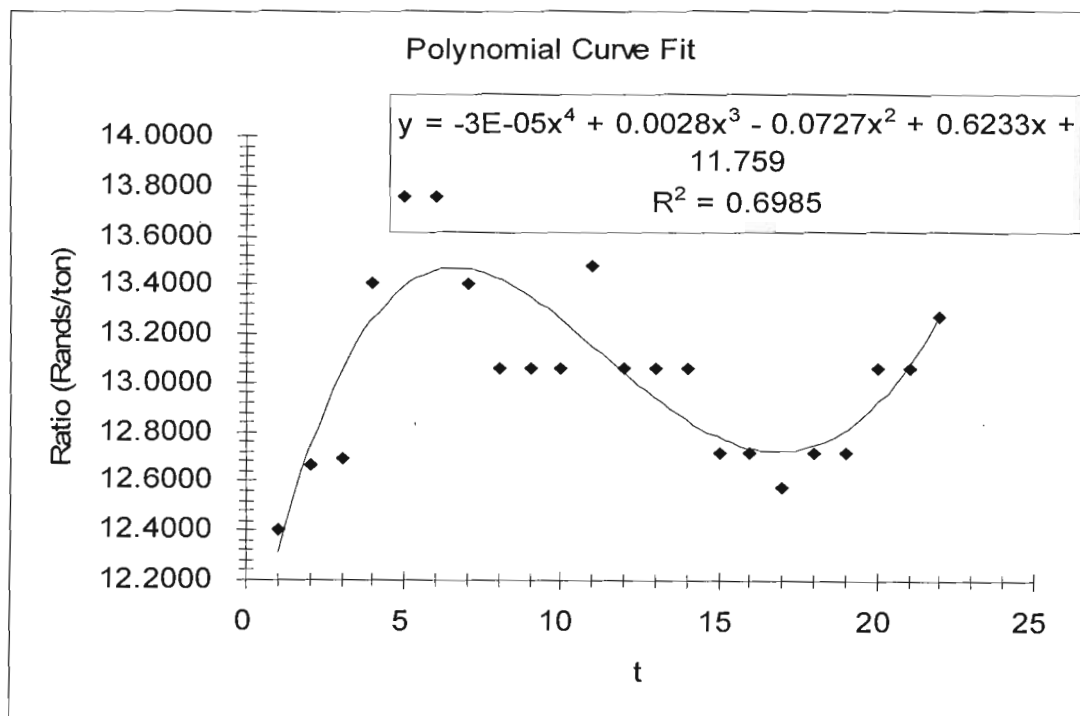
R² 0.699
 Adjusted R² 0.628
 R 0.836
 Std. Error 0.223
 n 22
 k 4
 Dep. Var. Ratio (Rands/ton)

ANOVA table

Source	SS	df	MS	F	p-value
Regression	1.9659	4	0.4915	9.85	.0003
Residual	0.8485	17	0.0499		
Total	2.8144	21			

Regression output

variables	coefficients	std. error	t (df=17)	p-value	confidence interval	
					95% lower	95% upper
Intercept	12.3127					
t	0.4864	0.1286	3.781	.0015	0.2149	0.7578
t ²	-0.0643	0.0258	-2.495	.0232	-0.1187	-0.0099
t ³	0.0027	0.0019	1.460	.1625	-0.0012	0.0067
t ⁴	-0.00003142	0.00004406	-0.713	.4854	-0.00012438	0.00006153



Appendix D (continued)

Predicted values for: Ratio (Rands/ton)

<i>t</i>	<i>t</i> ²	<i>t</i> ³	<i>t</i> ⁴	Predicted	95% Confidence Intervals		95% Prediction Intervals		Leverage
					lower	upper	lower	upper	
0	0	0	0	12.31271	11.92100	12.70443	11.69984	12.92558	0.691
1	1	1	1	12.73743	12.49262	12.98225	12.20630	13.26856	0.270
2	4	8	16	13.04939	12.83843	13.26035	12.53299	13.56579	0.200
3	9	27	81	13.26380	13.04799	13.47962	12.74540	13.78221	0.210
4	16	64	256	13.39512	13.18124	13.60901	12.87752	13.91273	0.206
5	25	125	625	13.45706	13.25651	13.65762	12.94482	13.96930	0.181
6	36	216	1,296	13.46257	13.27801	13.64714	12.95638	13.96876	0.153
7	49	343	2,401	13.42385	13.24845	13.59925	12.92092	13.92677	0.138
8	64	512	4,096	13.35234	13.17598	13.52870	12.84908	13.85560	0.140
9	81	729	6,561	13.25873	13.07568	13.44178	12.75309	13.76437	0.151
10	100	1,000	10,000	13.15296	12.96440	13.34151	12.64530	13.66062	0.160
11	121	1,331	14,641	13.04421	12.85565	13.23276	12.53655	13.55187	0.160
12	144	1,728	20,736	12.94090	12.75785	13.12395	12.43526	13.44654	0.151
13	169	2,197	28,561	12.85071	12.67435	13.02708	12.34745	13.35397	0.140
14	196	2,744	38,416	12.78057	12.60516	12.95597	12.27764	13.28349	0.138
15	225	3,375	50,625	12.73662	12.55205	12.92119	12.23043	13.24281	0.153
16	256	4,096	65,536	12.72429	12.52374	12.92485	12.21205	13.23653	0.181
17	289	4,913	83,521	12.74823	12.53435	12.96211	12.23063	13.26583	0.206
18	324	5,832	104,976	12.81234	12.59653	13.02816	12.29394	13.33075	0.210
19	361	6,859	130,321	12.91978	12.70882	13.13074	12.40338	13.43618	0.200
20	400	8,000	160,000	13.07293	12.82812	13.31774	12.54180	13.60406	0.270
21	441	9,261	194,481	13.27344	12.88173	13.66515	12.66057	13.88631	0.691
22	484	10,648	234,256	13.52219	12.84476	14.19962	12.69692	14.34746	2.066
23	529	12,167	279,841	13.81931	12.70963	14.92900	12.61367	15.02495	5.543
24	576	13,824	331,776	14.16419	12.45739	15.87099	12.39350	15.93488	13.113
25	625	15,625	390,625	14.55544	12.06109	17.04979	12.01694	17.09394	28.005
26	676	17,576	456,976	14.99094	11.48888	18.49300	11.45730	18.52457	55.204
27	729	19,683	531,441	15.46779	10.70514	20.23044	10.68187	20.25371	102.098
28	784	21,952	614,656	15.98237	9.67094	22.29380	9.65336	22.31138	179.299
29	841	24,389	707,281	16.53027	8.34418	24.71637	8.33062	24.72993	301.630
30	900	27,000	810,000	17.10636	6.67969	27.53304	6.66904	27.54368	489.343
31	961	29,791	923,521	17.70473	4.62926	30.78019	4.62077	30.78868	769.548
32	1,024	32,768	1,048,576	18.31872	2.14169	34.49575	2.13482	34.50261	1177.928
33	1,089	35,937	1,185,921	18.94092	-0.83726	38.71910	-0.84287	38.72472	1760.735

The R² figure is high at 0.6985, which indicates a good correlation.

8.5 Appendix E

Using the SPSS package the following output was obtained for the forecasted cost of production at RBM from May 2006 to April 2007.

Regression Analysis

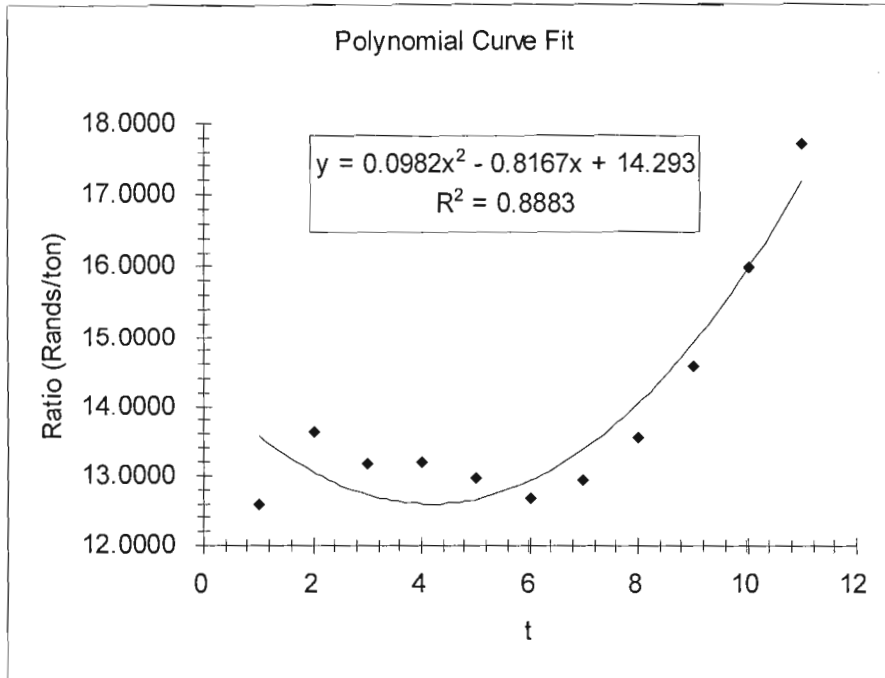
R ²	0.888		
Adjusted R ²	0.860	n	11
R	0.943	k	2
Std. Error	0.597	Dep. Var.	Ratio (Rands/ton)

ANOVA table

Source	SS	df	MS	F	p-value
Regression	22.6649	2	11.3324	31.82	.0002
Residual	2.8490	8	0.3561		
Total	25.5139	10			

Regression output

variables	coefficients	std. error	t (df=8)	p-value	confidence interval	
					95% lower	95% upper
Intercept	13.5747					
t	-0.6203	0.2115	-2.932	.0189	-1.1081	-0.1325
t ²	0.0982	0.0204	4.820	.0013	0.0512	0.1452



Appendix E (continued)

Predicted values for: Ratio (Rands/ton)

<i>t</i>	<i>t</i> ²	<i>Predicted</i>	<i>95% Confidence Intervals</i>		<i>95% Prediction Intervals</i>		<i>Leverage</i>
			<i>lower</i>	<i>upper</i>	<i>lower</i>	<i>upper</i>	
0	0	13.57472	12.52631	14.62313	11.84472	15.30472	0.580
1	1	13.05262	12.32663	13.77862	11.49673	14.60852	0.278
2	4	12.72693	12.15307	13.30078	11.23594	14.21791	0.174
3	9	12.59763	12.03152	13.16374	11.10960	14.08565	0.169
4	16	12.66473	12.05797	13.27148	11.16077	14.16869	0.194
5	25	12.92823	12.30143	13.55503	11.41607	14.44038	0.207
6	36	13.38813	12.78137	13.99489	11.88417	14.89209	0.194
7	49	14.04443	13.47832	14.61054	12.55641	15.53245	0.169
8	64	14.89713	14.32328	15.47098	13.40614	16.38812	0.174
9	81	15.94623	15.22023	16.67222	14.39033	17.50212	0.278
10	100	17.19173	16.14332	18.24014	15.46173	18.92173	0.580
11	121	18.63363	17.12235	20.14491	16.58968	20.67757	1.206
12	144	20.27192	18.18080	22.36305	17.76862	22.77523	2.309
13	169	22.10662	19.32993	24.88332	19.00763	25.20562	4.071
14	196	24.13772	20.57501	27.70043	20.31847	27.95697	6.703
15	225	26.36522	21.91868	30.81175	21.71060	31.01983	10.441
16	256	28.78911	23.36236	34.21586	23.19060	34.38763	15.551
17	289	31.40941	24.90688	37.91194	24.76286	38.05596	22.328
18	324	34.22610	26.55273	41.89948	26.43031	42.02190	31.092
19	361	37.23920	28.30023	46.17817	28.19492	46.28347	42.194
20	400	40.44869	30.14959	50.74779	30.05806	50.83932	56.012
21	441	43.85459	32.10097	55.60821	32.02068	55.68849	72.950
22	484	47.45688	34.15445	60.75931	34.08346	60.83030	93.442
23	529	51.25557	36.31011	66.20103	36.24689	66.26425	117.950
24	576	55.25067	38.56802	71.93332	38.51136	71.98998	146.964
25	625	59.44216	40.92820	77.95612	40.87712	78.00719	181.000
26	676	63.83005	43.39068	84.26942	43.34441	84.31569	220.605
27	729	68.41434	45.95550	90.87318	45.91338	90.91530	266.351
28	784	73.19503	48.62267	97.76739	48.58417	97.80590	318.841
29	841	78.17212	51.39221	104.95204	51.35687	104.98737	378.703