EXPLORING PROCEDURES TO FAST TRACK PROJECTS IN ESKOM GAUTENG OPERATING UNIT.

by

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Abstract

The fast track project strategy is designed to execute design, procurement and construction phases concurrently to significantly decrease the project schedule. The design phase is more important in fast track projects because design and construction are implemented almost simultaneously.

The successful implementation of design procedure in fast track projects is very challenging because the compressed schedule interferes with the inherently iterative nature of design, resulting in sub-optimal design. The typical lack of time for pre-project planning in fast track projects outcomes in insufficient development of project and design scope, causing costly changes during project implementation which result in project cost exceeds and the project is behind schedule and the quality deteriorates of the final output. The fast track project delivery strategy is being utilised in industrial projects to reduce the time to the market, making the study of best practices for management of design in fast track industrial projects more cogent (Deshpan, 2009).

As this study is deductive in nature, contributing in testing a theory and using questionnaire as an instrument for collecting data, therefore, the research methodology of this study is considered quantitative.

In fast track projects, the different phases of the project such as the design, procurement and construction are implemented concurrently. This makes major fights with the important design procedure because the design is rushed in order not to delay the construction on site. As a result there will be mistakes on the designs, because what is on site/field must correspond to the final design drawings. There are numerous reasons for fast tracking a project. If there is a lack of investment in time and resources in the planning phase, then the project will be behind schedule and the costs will be very high. *Experts have often recommended project managers to anticipate, accept and budget for changes / rework in fast track projects* (Williams 1995). All the relevant stakeholders should be dedicated to the project. *The feedback from various stakeholders has to be received in less time in a compressed schedule resulting in many problems including increased noise generation, information overload, delay in information transmission, translation difficulties between disciplines, lack of time for reflection and exploration of design and rapid transmission of errors* (Elvin 2003).

Table of Contents

Table of Figures

Table of Tables

Abbreviations

AMD	Acid Mine Drainage
BAR	Basic assessment report
BOM	Bill of material
BOQ	Bill of quantities
CE	Cost estimate
CRA	Concept release approval
DRA	Definition release approval
DRT	Design Review Team
DWA	Department of Water Affairs
EA	Environmental authorisation (record of decision)
EIA	Environmental impact assessment
EIR	Environmental impact report
EMM	Ekurhuleni Metro Municipality
EMP	Environmental management plan
ERA	Execution release approval
ESA	Electricity supply agreement
ERPM	East Rand Proprietary Mines
FRA	Finalisation release approval
HOA	Handover approval
IC	Investment Committee
KVA	Kilo Volts Amperes

LCC	Life cycle cost
LLTM	Long lead time material
MVA	Megavolt-ampere
NDP	Network development plan
PCA	Project cancellation approval
PCR	Project change request
PLCM	Project life cycle model
PM	Project Manager
PMBoK	Project Management Body of Knowledge
PMO	Project Management Office
PRF	Planning Review Forum
SAIDI	System average interruption duration index
TCTA	Trans-Caledon Tunnel Authority
TEF	Technical Evaluation Forum
WBS	Work breakdown structure

Chapter 1 - Introduction

1.1 Background

The demand for project completion in a shorter period has led to several methods of schedule compression. The Project Management Body of Knowledge (PMBOK) classifies fast tracking as a schedule compression technique. In fast tracking, phases or events that normally would be prepared in sequence are executed in parallel; in simple terms they are overlapped (Dehghan et al., 2001). Overlapping can cause rework and an increase in risk. Work is done before detailed information is completed; resulting in trading cost for time and an increase in the risk of accomplishing the minimised project schedule (PMBOK, 2008).

Overlapping has many terminologies; such as concurrent engineering, parallel engineering, phased construction, fast tracking, flash-tracking, and agile project management (Dehghan et al., 2001).

Concurrent engineering has been utilised in the engineering industry over the past several decades to achieve as much as 50% reduction in product development cycle (Bogus et al., 2003). The decrease in schedule is accomplished by using concurrent, overlapped processes instead of sequential product and procedure design.

The traditional construction project delivery process is planning, design, procurement, construction and commissioning. The planning and design stages are implemented in a sequential method, while procurement and construction can overlap (Trevor, 1998).

The main objective of fast track projects is to use the project cost in implementing maximum events of the design, procurement and construction phases in parallel, in order to minimise the schedule. In a fast track project, the design, construction and procurement phases overlap. Usually, when the construction begins, the design is ten percent done. The design phase starts concurrently with the procurement process (Deshpande, 2009).

1.2 Overview of the Design Phase

In the traditional project output sequence, the design process is a repeating process with an aim of achieving a desired result. The planning stage involves the planners, come up with a schematic design on the basis of the requirements given by the customer. All the relevant stakeholders give their inputs based on the preliminary designs that are presented by the design engineer. The designers then address the comments given by the stakeholders. The

designs are then taken to the Technical Evaluation Forums (panel reviewing the preliminary designs). After incorporating all the comments and feedback, the design drawings are finalised.

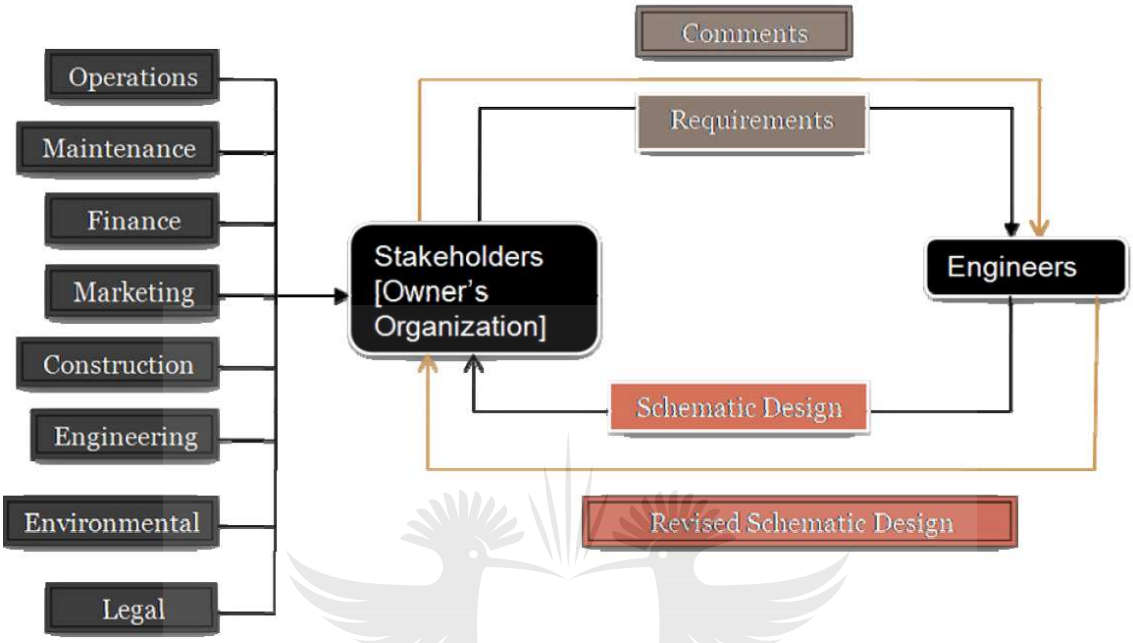

Figure 1: Iterative Design Process: Front End Planning (Deshpande, 2009).

The designers then work on the design documents and detailed design drawings. The information is then gathered for all of the engineering disciplines.

In some cases some of the information that is unavailable at that stage is assumed using best engineering judgment. The final document is named Design Hand Over (DHO). The DHO goes through the Design Review Forum (panel reviewing the final designs). Comments are made by the DRF members, and the design engineer addresses the comments and revises the document accordingly.

The engineer then takes the final DHO to Project Execution where the designs will go for bidding. Thus, the traditional project output process, where all phases are in sequence, gives an opportunity for producing the quality designs. The traditional projects are regarded as the sequential separation of phases and the design process is regarded as the organisational separation of design discipline.

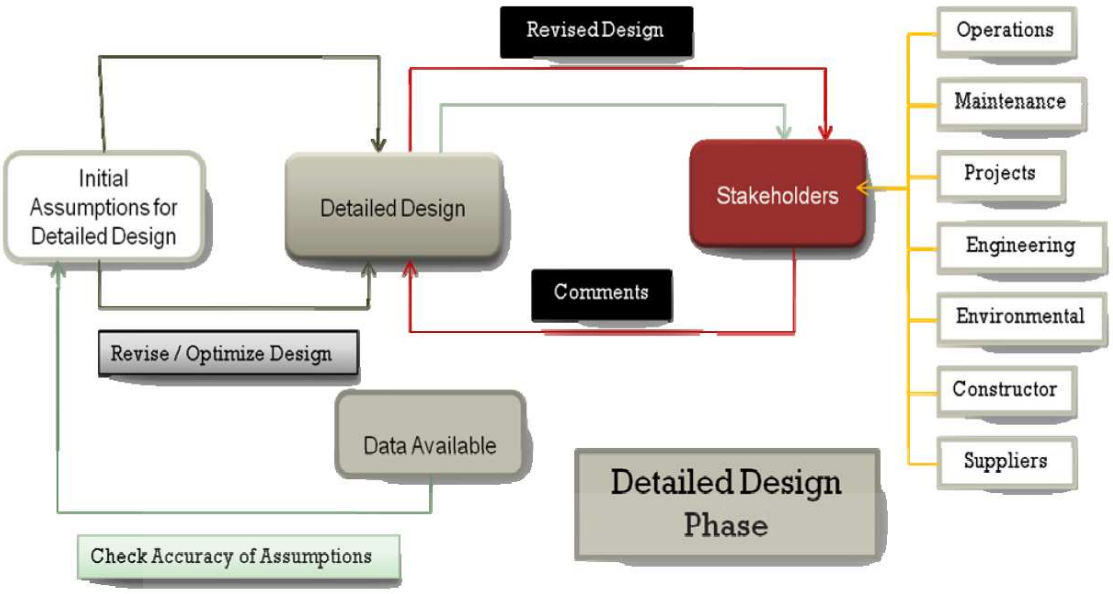

Figure 2: Iterative Design Process: Detailed Design Phase (Deshpande, 2009).

In fast track projects, the different phases of the project such as the design, procurement and construction are implemented concurrently. These make major tensions with the important design procedure because the design is rushed in order not to delay the construction on site. As a result there will be mistakes in the designs, because what is on site/field must correspond to the final design drawings. There are numerous reasons for fast tracking a project. If there is lack of investment in time and resources in the planning phase, then the project will be behind schedule and the costs will be very high. "Experts have often recommended project managers to anticipate, accept and budget for changes / rework in fast track projects" (Williams, 1995). All the relevant stakeholders should be dedicated to the project. "The feedback from various stakeholders has to be received in less time in a compressed schedule resulting in many problems including increased noise generation, information overload, delay in information transmission, translation difficulties between disciplines, lack of time for reflection and exploration of design and rapid transmission of error" (Elvin, 2003).

1.3 Rationale of the research

Urgent projects can come up because of a couple of reasons; such as a new business opportunity, safety against sudden threats, or replacing severely damaged equipment. In these cases, critical decisions from management are taken, and stakeholders must be committed to the project (Project Management Institute, 2006). This study was aimed at exploring the

procedures which could be used when planning, implementing, evaluating and maintaining fast tracked projects and implementing them, without compromising the projects' quality, scope of works, costs, and schedules.

1.4 Problem Statement

According to (Steyn et al., 2007), *fast tracking is a decision sometimes made to overlap project phases; to start a phase, or elements of it, before a preceding phase has been fully completed.* Fast tracking has to be managed and monitored, so that the project becomes successful. And important key leadership actions (Young, 1998) during project planning which assist in the success of the project are as follows:

- Project stakeholders – collect data, meet with customer, involve in planning, utilise their experience and skills.
- Project tasks – check the skills that are needed, list the work, select which planning tools to be utilised, confirm selections, and established standards.
- Project team - involve in planning, encourage vision, arrange as suitable, pay attention to detail, encourage one agreement, confirm duties, and explain all conclusions.
- Team members – encourage involvement, share and discuss past experience, pay attention to understand, answer questions, decide personal goals, maintain passion and obligation, coach and improve skills, confirm tasks.

The act of assessing an issue involves weighing its significance in terms of its effect on the project. Cleland has proposed four measures for first assessing an issue namely: *strategic relevance, action ability, criticality and urgency* (Cleland, 1999). The *strategic relevance* of a subject refers to whether it will have a long term effect on the project. There are two decisions involved: take action on the subject or live with the effect of the subject. In some cases, the strategic subjects will be addressed to the senior managers and it is the responsibility of the project manager to see to it that the subject is given attention and monitored. The *action ability* of the subjects entails the project team taking action to address the challenges on the subject. The *criticality* of the subject is the determined effect that the

subject can have on the project's results. The *urgency* of the subject involves the tie period in which something has to be done.

There are scheduling problems which make it difficult for the project to meet the deadline (Thomsett, 2002). The delays disturb the schedule of the project. The delay has to be engaged in the final phase in order to meet the deadline. It is essential to meet the final deadline in order to avoid unfinished, non-quality outcomes of the project. It is the project manager's duty to be on schedule and to meet the deadline. The deadline is flexible only if the delays cannot be overcome.

Unsteady economic circumstances influence business leaders to suit their business missions and models to current circumstances. A project environment assessment can assist such arrangement efforts. There are eight steps of the project environment assessment process (Hossenloop, 2010) namely;

i. *Confirm the reason for change,*
ii. *Determine the change objectives,*
iii. *Plan and perform an assessment,*
iv. *Design an improvement solution,*
v. *Plan the change,*
vi. *Implement the change,*
vii. *Monitor and control the change, and*
viii. *Re-assess and continue improving.*

All projects have risks. The risk management principles are to form the following;

i. Risk management plan,
ii. Risk profile,
iii. Risk officer,
iv. Risk reserve,
v. Constant monitoring of risks,
vi. Communication channels, and
vii. Complete project documentation (Nicholas, 2005).

When closing a project, the history of the project is supplied in order to avoid mistakes. This involves the success, failures, and challenges of the project, sharing this data (change management forms and change logs) with other stakeholders and documenting it (Richman, 2006).

This study sought to identify or establish procedures which could be used when planning, implementing, evaluating and maintaining fast tracked projects and implementing them, without compromising projects' quality, scope of works, costs, and schedules.

1.5 Research objectives

Studies have shown that waste in project expenses is attributed to incompetent management of design and construction procedures. According to Deshpan (2009), the *increasingly competitive business environment has resulted in increasingly aggressive attempts to compress construction project schedules. Some of these projects, where schedule reduction is more than fifty percent of the traditional time required to deliver the same project are now being called "flash track" projects.*

The main objective of the study is to develop various methods that would enhance ways of fast tracking urgent projects compare the normal and fast track projects, and to determine which method is viable and convenient that leads to successful project goals. The study will include the following learning outcomes (Fox and Van Der Waldt, 2007)

- Improvement in leadership skills on project managers in Eskom,
- Project managers will have control over the urgent projects, which leads to speedy productivity,
- Shorter completion time,
- Cost control,
- Quality of the product,
- Transparency because the whole organisation is involved,
- Safety against sudden threat,

- Replacement of severely damaged equipment which will result in reliability and continuity of electricity supply,
- New assets and reduced maintenance, and
- Good customer relations

1.6 Methodology

The research methodology can be either quantitative or qualitative, or both based upon the research problem defined and the ways in which the research information will be gathered. Quantitative method works mainly with numbers, while qualitative method works typically with words or images. Both quantitative and qualitative methods are concerned with collecting, analysing, interpreting data and then deciding to what extent the evidence supports the original research objectives or hypotheses (Remenyi, 2002). Malhotra & Birks (2006) believe that quantitative research is used to create generalized results unlike the qualitative research, which tends to create results that are less likely to be generalized.

As this study is deductive in nature, seeking to contribute towards theory testing and using a questionnaire as an instrument for collecting data, the quantitative research design has been adopted.

The research strategy helps in formulating the study in such a way that guides the researcher in obtaining answers to the research questions. Thus, the strategy must contain clear objectives, sources of data, in addition to the constraints that might face the researcher such as, accessibility to data, time, location and other issues (Saunders et al., 2003).

Since this research is deductive and quantitative in nature, and tries to examine the fast tracking urgent project methods that exist in Eskom GOU, the survey strategy turns out to be the most appropriate strategy for this research study. The methodology will further be described in chapter 3.

Data for this research was collected through a questionnaire survey. The questionnaire consisted of three sections, namely background information, research questions, and what measures does Eskom take to categorise the project as a fast track project. In order to reduce sampling error, random sampling was used. The data analysis will be described in chapter 4.

1.7 Research questions

The associated research questions are as follows:

- Are there any fast tracking urgent project methods that are utilised by Eskom Gauteng Operating Unit on improving the managing skills in project managers?
- Are the proposed fast tracking urgent project methods an improvement over the existing methods from the viewpoint of project managers?
- How can the existing fast tracking urgent project methods (if there are any), be of better-quality from a project management viewpoint?
- What will be the short and long term period solutions on testing the recommended fast tracking urgent project methods before it can be fully applied on the operating unit?

1.8 Study Population

This study was conducted at Eskom Distribution specifically in the Gauteng Operating Unit (GOU). There are challenges such as the following;

- Demand for electricity is high due to an increasing population growth,
- Land issues which makes it a challenge to build new substations (for instance there are wetland issues and the route for HV lines should be changed or determining the new site location, lengthy processes of acquiring wayleaves and servitudes), and
- Long waiting period for long lead materials (long lead materials are materials that need to be ordered nine months prior to the commissioning date).

1.9 Research Purpose

The purpose of this study was to develop various methods that would enhance ways of fast tracking projects.

1.10 Significance of the Research

The purpose of this study was to develop various methods that would enhance ways of fast tracking projects, depending on the complexity of the projects in Eskom Gauteng Operating Unit. The research would assist in avoiding customer dissatisfaction and delay in project commissioning. As a result the business would improve further. These various methods were

tested in Gauteng Operating Unit, with the view to implement the same methods in other Operating Units, if found to be successful.

Chapter 2 - Literature Review

2.1 Introduction

According to Squires III and Murphy (1983), the fast track process is defined as "a method of construction by which actual construction is commenced prior to the completion of all design, planning, bidding and subcontracting stages in order to alleviate the effects of inflation".

Under the fast track approach, the title holder gives the architect a summary of what is going on in the project. The architect then arranges all the required documents and the preliminary designs. The chosen contractor gives a rough estimation of the cost of construction then goes towards the organization negotiations.

According to Jonathan Lister (Lister, 2003); *Fast tracking is a project development strategy designed to complete a project in a small time frame.* Fast tracking methods contain risks. It is advisable that during fast tracking, the tasks are run concurrently. And the team members do not focus on one thing, work is delegated accordingly.

All the team members must be able to complete their specific tasks and making quick appropriate decision in order to minimize the project going into a risk of not being completed within the required duration. Distributing project control has a huge negative impact because the project will have many errors. Some decision taken by the team members are never discussed with the relevant stakeholders.

It is very important to keep communication with other stakeholders, and when errors occur, they can be discussed accordingly. And the manager should also understand how other minor tasks contribute to the project.

During fast tracking, the critical path of the project should be changed. It is important to make changes on the critical path especially when there are some challenges or some tasks are completed.

Characteristics of Fast Track

The following are the characteristics of fast tracking (**http://www.fasttrackmanage.com/fast-track-concepts.html)**;

- It consist of a purpose,
- It has a structure,

- It depends on standardized procedures and methods.

Normal and Fast tracking Project Life Cycles

Figure 3: Normal project life cycle.

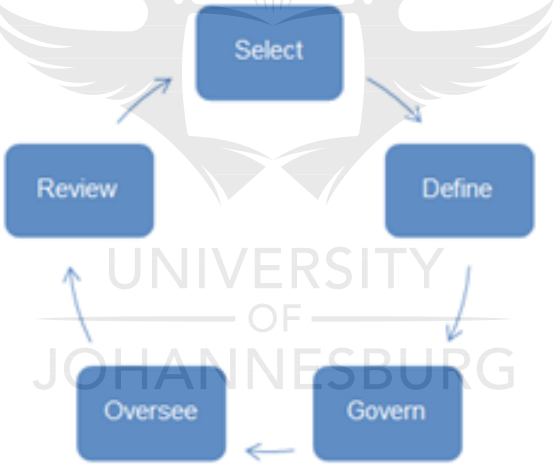

Figure 4: Fast tracking project life cycle adopted from http://www.fasttrackmanage.com/fast-track-concepts.html.

Figure 3 shows the normal project life cycle and Figure 4 illustrates the fast tracking process.

Before a project is been fast tracked, the following should to be done;

- The conditions of the project are been evaluated,
- Check whether fast tracking is possible,
- Analyse project's priorities,
- Plan the negotiations,

- Define the project in simple terms (so that other stakeholders understand the main goal of the project),
- Improve the variables (such as risk, confidence level, impact, constraints, assumptions, priority),
- Do governance planning,
- Do a fast track charter, and
- Setting review standards.

In normal project, the engineer will design plans and specifications. The design engineer will then investigate the project manager's requirements and starts designing.

The design engineer will do the development and drawings. When all the drawings have been evaluated and approved by the technical forums, then the project is presented for bids. The contractors will start preparing the bid proposal, based on the bid solicitation material. The project manager will sign a contract with the contractor based on the acceptable price, and construction can then start.

This scenario is different, with fast track construction, the contractor is chosen in the early stages of the project, before the plans, specifications and design drawings are issued. The contractor helps with design development and issues a price proposal before the drawings are finished. The contractor will submit the maximum costs which include the contractor's fee, contingencies and allowances. The construction phase begins before the drawings are completed. The designer engineers will focus on the site work.

When the construction has started, the design engineers will start preparing the construction drawings for the entire project. It is a challenge for the design engineer to be ahead of the contractor. In an ideal world, the fast tracked project will be completed prior to the normal project.

The main advantage of fast track construction is the reduced time taken to finish the project. The project starts before the design phase, and can be completed before the last final construction drawings are issued

Urgent projects can come up because of a couple of reasons; for instance a new business opportunity, safety against sudden threats, or to replace severely damaged equipment. In these cases, fast tracking is an option.

Fast tracking also permits the contractor an opportunity to supply design input. Fast tracking is costly compared to the normal process and has major risks. There are new revisions of drawings that arrive on site, at the end of the day the contractor will work on the as build drawing. If the contractor is the one changing the drawings, then the drawings will have to undergo approvals.

2.2 Fast tracking Challenges

There are various challenges, some of which are discussed below.

The first concern that has risen is whether the fast track construction needs a construction manager and the exclusion of the general contractor. However, the majority of people view that the fast track construction procedures can be used through either the construction manager, general manager, or both. (Squires and Murphy, 1983) believe that the true fast track construction requires the construction manager and should not include the general manager.

The second concern relates to the fast track procedure is the "completeness" of the planning and specifications. The project is considered to be a fast track project if some of the stages of projects are skipped. The general contractor may submit his proposal knowing that the plans and specifications are incomplete. Under the fast track approach, all subcontracts work over-time. The relevant issue to a subcontractor is the relative completeness of plans and specifications for *its* phase of a particular project at the time its subcontract is being negotiated or bid (Mora and Park, 2001).

2.3 Impact on Subcontractors

The relevant stakeholders of the project feel the pressure during the fast track process. The contractors end up working on the preliminary designs than the final complete designs due to lack of time. This creates a number of modifications and scope change in the designs. This in turn has the major effect on the schedule, and the budget increases due to claims for damages and delay. Sometimes the subcontractor can do some work that was not specified in the scope of work but believes that it was mistakenly left out and was supposed to be there. As a result there are change orders and disagreements in terms of who authorised that specific job that was not mentioned in the scope of work.

In some cases, the subcontractor does not complete the job under the impression that it is other subcontractor’s responsibility. It is not advisable that during the fast tracking process,

the construction phase is broken down into smaller and individual packages. This creates omission of work by other subcontractors, confusion, and blaming situations.

The chances of change orders and disputes are greater if the plans and specifications are incomplete. There are some cases where the company and the subcontractors take each other to court. If the change orders are many from the original plan under the fast track projects, the court usually concludes that the original plan was discarded and awards the subcontractor on the basis of quantum meriut (reasonable value of service) (Squires III and Murphy, 1983).

In cases where there are many change orders due to incomplete scope of work, the project manager and the subcontractor will then decide to carry on with the job on site and handle the change order procedure informally during the fast track process in order to avoid the delays of change order procedures. If the subcontractor fails to follow the procedure stipulated in the contract, the subcontractor will lose its right to recover the added compensation for change orders. On the other hand, the subcontractor can recover even though they did not follow the procedure stipulated in the contract, if they can determine that the project manager did not follow the contract of the change order provision. But it is up to the court to decide whether the project manager did not follow the contract. The subcontractor will lose its time and the amount of work it has done, if the judgement of the court is not in their favour.

It is not advisable to terminate the contract of the existing subcontractors, because it is more costly as the costs of breach of contract and finding the new subcontract to finish the work are also included. This will affect the schedule in a negative manner because the new subcontractor will require a new schedule.

The other impact is based on the additional work performed by the subcontractor. The project manager should authorise the addendum. If the contractor performs the additional work believing that it was supposed to be added on the scope of work, but fails to prove an authorisation, then he will lose the case.

In a fast track process, the plans, specifications and resources should be stipulated clearly to avoid other activities without resources. Even though the general contractor can control and maintain this challenge, the risk will not disappear.

These challenges arise more often because when the project starts, subcontractors are not informed. They are led as the project progresses. Another challenge is the lack of

coordination of subcontractors. It will be better if these challenges and their risks are foreseeable, so that there can be mitigation strategies.

Another challenge is the drafting of contract negotiation, the best thing to do is to comply with the contract law. The contract documents cover the foreseeable and unforeseeable risks for both parties, and the material.

The consequence of the unforeseen variables can be amended, through careful developing of a contract. The subcontractors will follow the contract documents during the fast track project, which covers additional work, scheduling, and change orders.

The contract fast track documents should stipulate the extent to which the designs are complete; this includes for the entire project and the subcontractor volume scope of work packages. The contract should include that all the stakeholders are kept in the loop, and mechanisms that will rectify challenges that the project comes across. It is essential that these mechanisms are communicated and documented clearly with all the stakeholders.

The contractual mechanisms must be useful and practical. If the methods are ignored then the matter will have to be taken to court. If there are changes, or an additional scope; these should be communicated in time because those factors mean costs for both parties. It is advisable that the organisation saves money for risks.

The completion of the design is entirely the project manager's responsibility. The contract should cover the risk of loss. The project manager should not blame the contractor for the loss due to incomplete designs.

A fast track process is very cooperative. The flexibility of the management and the commitment of both parties can make a fast tracked project a success because both parties are working in harmony.

Each stakeholder should be responsible for his particular task, in order to avoid confusion and disputes leading to an incomplete project (Mora and Park, 2001).

The duties of a construction manager and general contractor are to control, monitor, develop, supervise the work performed, and to manage subcontractors. They also need to ensure that the employees;

- adhere to standards,

- comply with the health and safety standard,
- process change orders and progress payments.

The difference between the construction manager and the general manager is that the construction manager is regarded as an agent to the project manager.

It is very important that the contract should stipulate who is in charge, because some contractors or employees will not listen to the commands, telling themselves that they do not report to that particular person (Mora and Park, 2001).

The project manager should be the only one approving and executing the change orders.

It is important that the project manager should have the construction manager. The involvement of the project manager with the project's daily affairs is minimal because the construction manager takes care of that. As a result, the subcontractor may end up trusting the word of the construction manager in all the activities of the project. In cases of disputes, the subcontractor may be forced to depend on the waiver theory. During the change order procedure, the only evidence of the waiver is the actions and words of the construction manager. This situation is very risky for the subcontractors. In fast tracking processes, there are many change orders and informal methods. The subcontractor will find itself loosing so much especially if the construction manager cannot bind the project manager.

The only solution is for the subcontractor not to follow informal methods, but to follow the contract. If there are changes, then the project manager, construction manager, or the general contractor should be all in agreement and support the contract's modifications.

Figure 5 illustrates the multidisciplinary nature of project management (Steyn et al: 2007). All aspects are important especially communication and paying attention to detail.

Figure 5: Multidisciplinary nature of Project Management.

- In order to ensure that any project gets executed effectively, the team should be multidisciplinary orientated and well structured.
- In Modern projects it is sometimes a struggle to align all stakeholders but it should be done to keep the team happy and the project running smoothly.
- It is of utmost importance to focus on challenges that might occur during the project. These challenges are time, budget as well as the people.

2.4 Project Schedule

Project Management always has a three-dimensional goal:

- Delivering the correct project **deliverable** and the **qualities** should be met.
- The approved **budget** should not be exceeded.
- Delivering on time as stipulated in an approved **schedule**.

These three dimensions or **three primary constraints** are applied in all projects. However there are other constraints; on construction projects such as, safety, health and environmental factors.

Management is defined as planning, organizing, leading and control. Project Management mainly concentrates on schedule, budget and quality. A significant role of a project

management is that it has definite start and well defined end. The Project Management Institute (PMI) in the USA (Trevor, 1998) defines the process of project management as follows:

- Initiating
- Planning
- Executing
- Monitoring and controlling
- Closing

According to Steyn et al. (2007), Functional managers have a number of responsibilities such as planning and control of marketing, human resource management, finances, information technology, engineering, manufacturing and logistics. Project managers are accountable for project deliverables, cost and schedule. It is a requirement that they gather and develop the high developed interpersonal skills, because they negotiate and influence people rather than provide instructions.

General Manager versus Project Manager

- *Manages the status quo - Oversees change*
- *Consistent set of tasks - Ever-changing tasks*
- *Limited set of variables - Contains uncertainties*

2.5 Eskom project life cycle

All projects in Eskom follow the approved standard Eskom project life cycle model in order to manage and standardise project approval, management, and the investment procedure. Figure 6 below illustrates the standard Eskom project life cycle.

Figure 6: Standard Eskom project life cycle model adopted from (Eskom Standard: Wires Business Project Life Cycle Governance Guideline, 2013).

Eskom has seen the need to differentiate projects based on their risk, complexity, technology, and influence on resources.

There are four phases of the standard Eskom project life cycle, and they are as follows:

- Concept phase
- Definition phase
- Execution phase
- Finalisation phase

There are five gates of the standard Eskom project life cycle (Eskom Standard: Wires Business Project Life Cycle Governance Guideline, 2013):

- Concept release approval (CRA)
- Definition release approval (DRA)
- Execution release approval (ERA)
- Handover approval (HOA)
- Finalisation release approval (FRA)

A post-project phase follows after project completion.

The confidence level is a statistical measurement signifying the number of instances which would fall within a selected band width. The following are the confidence levels for the forms;

- Concept release approval (CRA): 65%
- Definition release approval (DRA): 85%
- Execution release approval (ERA): 95%
- Handover approval (HOA): 100%
- Finalisation release approval (FRA):100%

There are times where the project needs to be cancelled or terminated. There is a process named project cancellation approval (PCA), and It should be followed. It should be presented to the Investment Committee. All relevant stakeholders are informed in time about the project cancellation, and any data made with regard to the cancelled project must be saved and archived for project history.

Direct customer projects will not be cancelled by Eskom, only the customer may give an instruction to cancel it.

The detail regarding each project phase follows.

2.6 Pre-project-planning phase and concept release approval (CRA)

The Planning Manager is responsible for *initiating, within the different disciplines, planning of business priorities, constraints, risks, and required performances.*

a) Pre-project-planning phase objective

The main purpose of the pre-project-planning phase is to gather all the organisation needs and to find the optimum planning solution that will accommodate and satisfy both the customer and business needs, while supplying for the sustainability of Eskom. The projects are then placed in a six-year rolling plan.

The projects will undergo the first phase of the project life cycle and the release of concept release approval (CRA). The resources have been assigned, working on the project and the start of the project begins.

b) Technical pre-project-planning phase deliverable – development plan/planning report

The investment process begins with determining the needs. The project triggers are from; *demographics, refurbishment, new loads, or power supply quality, Customer Service, Field Services, Plant, Network, or Grid Delivery processes, compliance with the Network or Grid Code, customer complaints, general load growth, etc.*(Eskom Standard: Wires Business Project Life Cycle Governance Guideline, 2013).

The customer or fast tracked projects can be released directly as a planning report or can be incorporated in the development plans. The development plan is concise on a development plan approval (DPA) form, which is presented to the Planning Review Forum (PRF) to be approved.

The output will be a needs declaration of the first stage of the pre-project-planning phase and prioritised within the operating unit.

c) Customer-related pre-project-planning phase deliverable – cost estimate

Planning will give the customer an estimation of the total project cost and use the standard cost at module level, this is beneficial to Eskom so that it can know whether the customer will be able to commit or not on his request.

The budget quotation is issued after the customer has paid the quotation fee; this follows the up-front payment policy. The fee is utilised to accommodate the cost of the following (Eskom Standard: Wires Business Project Life Cycle Governance Guideline, 2013).

- *Any environmental reports that will be required,*
- *The cost of preparing the concept design options, which will be based on the recommendations given in the environmental report,*
- *The cost of preparing a concept design and getting it approved by the operating unit's Design Review Teams or Technical Evaluation Forum (TEF), and*
- *The cost of preparing the basic design.*

The cost estimate letter must stipulate the following (Eskom Standard: Wires Business Project Life Cycle Governance Guideline, 2013).

- *The quotation must clearly state that the figures are only an estimate based on current planning information of the customer's needs and the current network situation depicted in the most recent network or grid development plan. The*

assumptions made must be included in the cost estimate for each alternative offered. No confidence level will be stated.

- *It must be made quite clear that Eskom will only start to prepare a budget quotation when instructed to do so and once the quotation fee requested (in the cost estimate) has been paid to Eskom.*
- *The quotation fee must cover any costs that Eskom will incur in the process of preparing a quotation (environmental costs and concept and basic design costs required by all disciplines).*
- *Only where specifically requested by the customer can long lead time material (LLTM) costs be requested on the CRA form, and the customer will be asked to pay a percentage of this value up front in addition to the quotation fee.*
- *Where an applicant cannot specify his/her requirements accurately, either the application must be stopped, or the most likely scenario must be selected, and the customer must be quoted on it accordingly, with all assumptions recorded.*

The approved CRA form is only registered into the three-year portfolio plan if a signed copy of the customer's proof of payment and instruction has been received. The cost estimate is not legally binding to Eskom and is only proposed as an indication of the specific application costs to the customer.

d) **Concept release approval content**

The following aspects should be captured on the CRA form for approval (Eskom Standard: Wires Business Project Life Cycle Governance Guideline, 2013).

- *The CRA form project identity, classification, scope of work description, and assumption list when detailing the scope. The geographical location of the project needs to be indicated.*
- *Projects quantity.*
- *The estimated total project costs, costs to cover concept and basic design, total environmental costs, land valuation cost, land acquisition baseline cost, servitude registration cost, cadastral survey cost, initial survey costs, and geotechnical studies.*
- *Delivery dates: DRA form approval date; required completion date.*
- *Resource allocations should be considered and be included.*
- *Long lead time material funds can also be requested for approval, but only in exceptional cases where timelines are critical.*

- *Estimated costs to complete the project must be indicated.*

2.7 Concept phase and definition release approval (DRA)

a) Concept phase objective

The concept design phase makes sure that an optimal design option has been supported before the concept design starts and the project is placed in a 3 year rolling plan. The planning alternatives are scrutinised at PRF and best option based on the design, cost, and accommodation of future load growth criteria is supported and approved.

b) Technical concept phase deliverable – concept and basic design

The design team is dependent on the output of the environmental report (Basic assessment report (BAR) / Environmental impact assessment (EIA)). They will assist on the completion of the concept design, basic design, and definition release approval (DRA), and will give the schedule dates. The targets dates are issued after environmental report (BAR/EIA) has been received.

The BAR/EIA report recommends the site and route (for the lines) of the concept design. The concept design details are recorded in a report referred to as the concept design report.

The concept design consists of the following (Eskom Standard: Wires Business Project Life Cycle Governance Guideline, 2013):

- *Reference to the relevant development plan (DPA form) or planning report,*
- *Full motivation for the projects, which will be summarised for the executive summary on the parent project initiation form,*
- *Detailed technical evaluation of design options,*
- *Alternative design costs estimated, and*
- *Reason for the alternative design selected and the comments from the Design Review Team (Technical Evaluation Forum for Distribution), if appropriate.*

The basic design follows the concept design, and includes the following (Eskom Standard: Wires Business Project Life Cycle Governance Guideline, 2013):

- *Specifications ready for contracting to do detail design,*
- *Pro formas listing equipment to be procured,*
- *"What if" business impact if we do not proceed with the project, and*

- *The definitive scope for the project, considering all elements of the asset being created or refurbished.*

c) Customer-related concept phase deliverable – budget quotation

The budget quotation is created after the basic design has been approved. The confidence level of the project cost and scope on the basic design phase is 85% accurate. The budget quotation may consist of a list of exclusions and should not affect the confidence level. *The list of exclusions may typically be linked to costs of changes in forex and commodities, CPI, force majeure, changes due to environmental authorisation, servitudes, government approval delays, changes in law etc;* (Eskom Standard: Wires Business Project Life Cycle Governance Guideline, 2013).

If the customer is accepting the quotation, then Eskom is committed to provide the customer in accordance with the terms stipulated in the quotation.

The project proceeds once the customer has paid. The original budget quotation may be modified if an important scope of work was needed.

d) Definition release approval content

The DRA form includes the following (Eskom Standard: Wires Business Project Life Cycle Governance Guideline, 2013):

- *Costs to cover the detail design*
- *Estimated costs to complete the project*
- *All additional environmental costs not already addressed in the previous phase*
- *Final survey costs*
- *Detail for total land and acquisition cost (premiums, etc.)*
- *Delivery dates: ERA form approval date; construction start date; completion (Hand Over Approval) date.*
- *The release of funds for long lead time material may be requested on the DRA form(s) if deemed necessary to meet project need dates.*
- *For customer-related projects, the budget quotation, budget quotation acceptance, proof of up-front or phased payments, and the signed agreements will serve as input for definition release approval.*

2.8 Definition phase and execution release approval (ERA)

a) Definition phase objective

The definition phase changes the approved basic design into a detailed design, and it includes working drawings, specifications, and bills of material etc; to enable an appropriate qualified contractor to submit a quotation for carrying out the construction of the needed asset. This design package is known as the detail design report.

The detail design report is then placed into a tender document and will be released to the relevant market after ERA (Rev. 0) approval. The successful tender values will be utilised for a new ERA form (Rev. 1).

b) Technical definition phase deliverable – detail design report

The detail design report must include of the following (Eskom Standard: Wires Business Project Life Cycle Governance Guideline, 2013):

- *The approved DRA form and basic design.*
- *Any environmental approvals must have been received and advertised for public comment. The detail design report must be based on the outcome of this environmental process.*
- *Project evaluation model (PEM) and FEM results will not need to be updated.*
- *The complete detail design report, including specifications, bills of material, drawings, and any other documentation that would be required to enable a qualified contractor to quote on the supply, delivery, and erection of the required asset.*

c) Execution release approval content

During this sub-phase, the following activities take place (Eskom Standard: Wires Business Project Life Cycle Governance Guideline, 2013):

- *Costs are captured as per bill of quantities values plus contingencies.*
- *Checks are done to explain any significant variances from the DRA approved amount and official market benchmark costs.*
- *Ensure that the correct IDC and overheads have been applied to the specific project and business category.*
- *Scheduled dates are confirmed with the project construction team before capturing onto the ERA form. It is, however; only on the ERA form that the project team will commit to the date when an asset will be available for commercial operation.*

The projects are released into the execution phase, once the ERA forms have been supported, approved and the funds released.

2.9 Execution phase and handover approval

a) Execution phase objective

The main purpose of this phase is to execute the defined assets that were needed. This phase also covers *commissioning and/or decommissioning before energising and placing the asset into, or removing it from, commercial operation* (Eskom Standard: Wires Business Project Life Cycle Governance Guideline, 2013).

b) Execution phase deliverable – constructed, tested, and energised asset

The resources are allocated in order to implement the approved project. The construction plan is compulsory and must cover the provision for the necessary environmental requirements as stated in the environmental management plan. The prearranged quality check point must be completed, agreed to, seen, and supported with a signature only by Eskom Project Management. The Eskom Project Manager must also organise for the testing of the constructed asset, and accept the constructed assets with their applicable documentations. The new assets are handed over to the commissioning members for testing and energising. The test results must be carefully recorded to the design base.

c) Handover approval

Final handover documents are signed by the asset project managers who are responsible for operating and maintaining the new constructed asset. Outages are arranged during the concept and definition phases, and are finalised when final handover documents have been signed.

d) Customer-related execution phase deliverable – first bill

The Customer Executives are responsible for informing the customer when the point of connection will be available and to start the first bill. They also make sure that all customer information carefully documented in the different systems. The metering data must be correctly recorded and given to the important resources for processing.

2.10 Finalisation phase and finalisation release approval (FRA)

a) Finalisation phase objective

The project close-out is the final stage of the project life cycle. It also denotes the recording of all the relevant costs from registration to accomplishment, as well as the handover of all assets to the asset register.

b) Technical finalisation phase deliverable – project performance evaluation report

All projects must have approved FRA forms and reconciliation report.

The project performance evaluation report needs the following to be covered (Eskom Standard: Wires Business Project Life Cycle Governance Guideline, 2013):

- *Comparison of planned costs, physical volumes, and time with the actual expenditure, physical volumes, time and explanations of variances*
- *A reconciliation of all planned versus actual material costs*
- *A reconciliation of all planned versus actual contractor payments*
- *The number of revisions of each project ERA form*
- *Duration to complete each supported project FRA form, as defined above*
- *Document lessons learnt, and ensure that these lessons are fed back to the relevant resources to analyse and test current policies, procedures, and training material.*

Any important variations in the project reports must be supported by accurate explanations.

c) Customer-related finalisation phase deliverable – final cost reconciliation letter

The customer will then receive the final cost reconciliation letter from Eskom. The actual costs will be verified. If the customer contribution due is above the amount paid by the customer, a reviewed account must be created for the variance, which must be equal or less than the previous quoted connection fee x 100/confidence level quoted on only the costs as stated in the quotation. The payments to Eskom are within one month of written notice to the customer. The customer is refunded within six months after the project completion date, if the customer contribution due is less than the amount paid.

d) Finalisation release approval content

The Project Manager is responsible for the following (Eskom Standard: Wires Business Project Life Cycle Governance Guideline, 2013):

- *Capture all costs associated with each project, including the reconciliation of all materials issued and returned.*
- *Compile explanations for all variances to the scope, under- or over expenditure, and/or time limits exceeded or improved.*
- *Complete the FRA form.*
- *Submit the FRA form to the relevant managers for acceptance, support, and final approval.*

2.11 Post-project phase – business solution review report

An organisation solution review is checked on a sample of projects yearly. This project organisation solution review report will determine whether the first assumptions created for project investment approval (for example load growth and revenue) has been taken into consideration and whether the accurate network solution was chosen for the original requirement.

Chapter 3 - Research Methodology

3.1 Overview of the Methodology

There are four types of research methodology, namely quantitative, qualitative, correlation/ regression analysis, and meta-analysis based upon the research problem and the ways in which information is gathered. Quantitative method works mainly with numbers, while qualitative method works typically with words or images. Both quantitative and qualitative methods depend on collecting, analysing, interpreting data and then the conclusion (Remenyi, 2002).

Malhotra & Birks (2006) believe quantitative research is used to create generalized results unlike the qualitative research, which tends to create results that are less likely to be generalized.

Correlation/regression analysis involves examining the strength of the relationship between two or more variables.

Meta-Analysis determines the average impact of several dissimilar studies on a hypothesis

The main constituents of the research methodology include sampling, data gathering, and analysis of data. The research methodology utilised in this study was quantitative. The data that was gathered was analysed using statistical analysis tools namely SSPS. The brief definition which is taken from the SPSS Base User's Guide is; "SPSS is a comprehensive system for analysing data. SPSS can take data from almost any type of file and use them to generate tabulated reports, charts, and plots of distributions and trends, descriptive statistics, and complex statistical analysis."

SPSS is the acronym of Statistical Package for the Social Science. SPSS can execute highly complex data manipulation and analysis with simple instructions.

3.2 Questionnaire Survey

A questionnaire survey was utilised to collect data. The questionnaire was designed to gather information about a fast track project implemented by the Eskom respondent's organisation. The questionnaire consisted of three sections, namely background information, research questions, and what measures does Eskom take to categorise the project as a fast track project.

The questionnaire was designed to gather data about the critical factors affecting the performance of the design phase and the project as a whole. It is important to recognize the effect of external factors on the performance of the project. The critical areas on fast track projects, which will have to be carefully scheduled and managed to meet time constraints are as follows:

- Survey, obtaining way-leaves/rights and servitudes (this process takes lengthy and can it can difficult because sometimes you cannot find the owners of the land).
- Environmental impact assessments and approvals (this is a long process, it takes 18 to 24 months, and the results sometimes can be negative for instance you want to construct at that area where you have done the assessment only to find it is the wetland).
- Design (designs taking time because they go through forums to be approved).
- Materials (unavailability of the material. There are some materials that you cannot find on the shelf, you need to order those 9 months earlier (such as the transformers)).
- Resources (unavailability of the resources for instance lack of skills and experience).

Design of the questionnaire can be split in to three elements:

- Define the questions to be asked,
- Choose the question type for each question and specify the wording, and
- Design the question sequence and overall questionnaire layout.

The questionnaires were distributed to stakeholders who are working in a project life cycle departments (namely Planning, Design, Execution) and the ones which are not in those departments (Maintenance and Operations).

The respondents of the questionnaire survey were asked to mention the characteristics of the fast tracked projects. The following characteristics were mentioned:

- A financially viable customer project
- A politically motivated project
- A necessary project to reduce safety risks
- A necessary project for environmental reasons
- A necessary project for statutory reasons

According to Deshpande (2009) the external factors that are a challenge to the design phase are listed below:

- Project Complexity,
- Regulatory Requirements,
- Project Team Experience,
- Project Team Turnover,
- Offshore Engineering,
- Technology Issues,
- Funding / Finance,
- Accidents / Safety, and
- Availability of Accurate Previous As-Built Drawings.

According to Deshpande (2009) the external factors affecting construction, are listed below:

- Weather,
- Labour Skill,
- Labour Availability,
- Unions,
- Material Availability,
- Site Conditions,
- Project Complexity,
- Regulatory Requirements,
- Project Team Experience,
- Project Team Turnover,
- Offshore Engineering,
- Business Market Conditions,
- Coordination with Plant Shutdown,

- Technology Issues,
- Funding / Finance,
- Accidents / Safety, and
- Availability of Accurate Previous As-Built Drawings.

The fast track process may give a solution to urgent projects. The construction manager off loads the project manager and this is beneficial to the project manager to solve other issues. The subcontractor will report to the construction manager. If there are changes in scope, the project manager, construction manager, and the subcontractor should meet, discuss and create a new contract that will suit all parties.

The fast track project can be regarded as 'time saver', but on the other hand, it has its own disadvantages such as incomplete designs, multiple modifications of drawings, and increase in costs and does lead to project delay.

Chapter 4 – Data Analysis

4.1 Data Collection

The main objective of data collection in this study was to identify whether there were existing fast tracking methods. If there were, were they of any better quality? As interviews were conducted, challenges faced in managing the fast track projects were discussed.

In order to reduce sampling error, random sampling was used. The questionnaires were distributed to stakeholders who are working in a project life cycle departments (namely Planning, Design, Execution) and the ones which are not in those departments (Maintenance and Operations). The data collection of this study took place between the 21st of September 2015 and the 3rd of November 2015. A total of 53 questionnaires were distributed, and 30 questionnaires were returned giving a total response rate of 57%.

4.2 Survey Respondents

The majority of the respondents included Eskom employees; from different departments namely and had a year to above experience. The respondents were from Eskom because the research was based on exploring procedures to fast track projects in Eskom Gauteng Operating Unit. The departments were namely;

- Network Planning,
- Network Engineering and Design,
- Project Execution,
- Customer Service,
- Operations and Maintenance, and
- Land Development.

The following chart shows the breakdown of respondents to the survey;

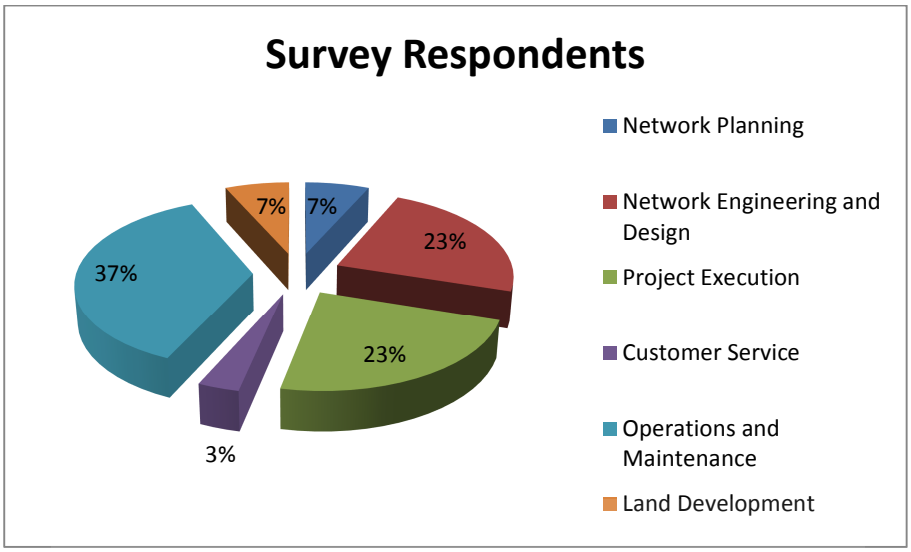

Figure 7: Survey Respondents.

4.3 Demographic Descriptive Analysis

The statistical tools used in this study in order to analyse the data are: custom tables, frequencies, means and standard deviations, and reliability analysis. The analyses were done using IBM (International Business Machines) SPSS (Statistical Package for Social Science) version 22.

Descriptive analysis is used to gain a better understanding of the collected data (Runeson and Host, 2009). This section presents the statistical sample distribution with regard to the variables such as, gender, age, nationality, level of education, and the work department.

As shown in the Gender table below, 70% of the respondents were male and 30% were females. This finding is consistent with the higher number of males population in the engineering industry.

Table 1: Gender.

	Frequency	Percentage
Male	21	70
Female	9	30
Total	**30**	**100**

The population consisted of participants from the African race as shown in the Ethnicity table.

Table 2: Ethnicity.

	Frequency	Percentage
African	30	100

The majority of the population had five or more years of work experience.

Table 3: Work experience.

	Frequency	Percentage
1 year	2	6.7
2 year	5	16.7
3 year	3	10
4 year	4	13.3
5 years and above	16	53.3
Total	30	100

The majority of the population was working at Operations and Maintenance.

Table 4: Departments.

	Frequency	Percentage
Network Planning	2	6.7
Network Engineering and Design	7	23.3
Project Execution	7	23.3
Customer Service	1	3.3
Operations and Maintenance	11	36.7
Land Development	2	6.7
Total	30	100

4.4 Reliability

Cronbach's Alpha (α) is used to check the reliability of the variables; items measuring the same will highly correlate (Hair et al. 2006). Cronbach's Alpha (α) is considered to be the most common measure of reliability (Field, 2006). Most research method guides consider a measure with Cronbach's alpha (α) equal to or greater than 0.7 as reliable (Bland & Altman, 1997). Reliability refers to the correlation on a variable; high correlation means that the results are consistent and therefore they are reliable.

According to http://stats.stackexchange.com/questions/70274/where-do-the-descriptors-for-cronbachs-alpha-values-come-from-e-g-poor-exce, Cronbach's alpha values described as follows:

- $\alpha \geq 0.9$ Excellent
- $0.7 \leq \alpha < 0.9$ Good
- $0.6 \leq \alpha < 0.7$ Acceptable
- $0.5 \leq \alpha < 0.6$ Poor
- $\alpha < 0.5$ Unacceptable

For research question number 1: (Are there any fast tracking urgent project methods that are utilised by Eskom Gauteng Operating Unit on improving the managing skills in project managers?) All variables (11 variables) excluding the demographic variables were tested for the consistency reliability by using Cronbach's Alpha (α), which was 0.783 showing that the questionnaire's variables were correlated and addressing the research problem, as shown in the below table.

Table 5: Reliability Statistics for research question number 1.

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	Number of Items
0.783	0.783	11

For research question number 2: (Are the proposed fast tracking urgent project methods an improvement over the existing methods from the viewpoint of project managers?). All

variables (5 variables) excluding the demographic variables were tested for the consistency reliability by using Cronbach's Alpha (α), which was 0.849 showing that the questionnaire's variables were correlated and addressing the research problem, as shown in the below table.

Table 6: Reliability Statistic research question number 2 .

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	Number of Items
0.849	0.883	5

For research question number 3: (How can the existing fast tracking urgent project methods (if there are any), be of better-quality from a project management viewpoint?). All variables (9 variables) excluding the demographic variables were tested for the consistency reliability by using Cronbach's Alpha (α), which was 0.871 showing that the questionnaire's variables were correlated and addressing the research problem, as shown in the below table.

Table 7: Reliability Statistics research question number 3.

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	Number of Items
0.871	0.867	9

For research question number 4: (What will be the short and long term period solutions on testing the recommended fast tracking urgent project methods before it can be fully applied on the operating unit?). All variables (4 variables) excluding the demographic variables were tested for the consistency reliability by using Cronbach's Alpha (α), which was 0.676 showing that the questionnaire's variables were correlated and addressing the research problem, as shown in the below table.

Table 8: Reliability Statistics research question number 4.

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	Number of Items
0.676	0.687	4

For Section C from the questionnaires, determines what measures the fast track projects: (Characteristics of the fast tracked project). All variables (3 variables) excluding the demographic variables were tested for the consistency reliability by using Cronbach's Alpha (α), which was 0.911 showing that the questionnaire's variables were correlated and addressing the research problem, as shown in the below table.

Table 9: Reliability Statistics for Section C.1.

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	Number of Items
0.911	0.910	3

For Section C from the questionnaires, it determines what measures the fast track projects: (Is a temporary or alternative option available to "buy time" or to prevent the fast track project from materialising?) All variables (4 variables) excluding the demographic variables were tested for the consistency reliability by using Cronbach's Alpha (α), which was 0.871 showing that the questionnaire's variables were correlated and addressing the research problem, as shown in the below table.

Table 10: Reliability Statistics for Section C.2.

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	Number of Items
0.871	0.866	4

For Section C from the questionnaires, it determines what measures the fast track projects: (The time frames of an urgent project.). All variables (4 variables) excluding the demographic variables were tested for the consistency reliability by using Cronbach's Alpha (α), which was 0.871 showing that the questionnaire's variables were correlated and addressing the research problem, as shown in the below table.

Table 11: Reliability Statistics for Section C.3.

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	Number of Items
0.817	0.828	3

4.5 Custom Tables

For research question number 1: (Are there any fast tracking urgent project methods that are utilised by Eskom Gauteng Operating Unit on improving the managing skills in project managers?). From the results, the participants were agreeing, the reason being the majority were from Operation and Maintenance as it was shown in the Department Table. Operation and Maintenance department did not follow a normal project life cycle and had its own resource. Hence other departments (such as Network Planning, Network Engineering and Design, and Project Execution) followed the normal project life cycle, disagreed that there were existing fast tracking urgent methods that they know of.

Table 12: Custom table for research question number 1.

Question	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
1	3 10.0%	6 20.0%	8 26.7%	9 30.0%	4 13.3%	30 100.0%
2	1 3.3%	8 26.7%	5 16.7%	15 50.0%	1 3.3%	30 100.0%
3	0 0.0%	6 20.0%	8 26.7%	15 50.0%	1 3.3%	30 100.0%
4	1 3.3%	8 26.7%	10 33.3%	11 36.7%	0 0.0%	30 100.0%
5	0 0.0%	3 10.0%	5 16.7%	7 23.3%	15 50.0%	30 100.0%
6	1 3.3%	4 13.3%	12 40.0%	10 33.3%	3 10.0%	30 100.0%
7	2 6.7%	2 6.7%	5 16.7%	15 50.0%	6 20.0%	30 100.0%
8	1 3.3%	5 16.7%	3 10.0%	17 56.7%	4 13.3%	30 100.0%
9	0 0.0%	0 0.0%	9 30.0%	11 36.7%	10 33.3%	30 100.0%
10	0	0	5	17	8	30

	0.0%	0.0%	16.7%	56.7%	26.7%	100.0%
11	1 3.3%	2 6.7%	12 40.0%	14 46.7%	1 3.3%	30 100.0%
Respondents	*CS*	*NP, NED, PE*	*NP, NED, PE, LD*	*O&M*	*O&M*	

For research question number 2: (Are the proposed fast tracking urgent project methods an improvement over the existing methods from the viewpoint of project managers?). From the results, the participants were in disagreement that the proposed fast tracking urgent project methods were an improvement over the existing methods from the viewpoint of project managers.

Table 13: Custom table for research question number 2.

Question	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
1	2 6.7%	9 30.0%	13 43.3%	5 16.7%	1 3.3%	30 100.0%
2	0 0.0%	2 6.7%	13 43.3%	13 43.3%	2 6.7%	30 100.0%
3	0 0.0%	2 6.7%	9 30.0%	9 30.0%	10 33.3%	30 100.0%
4	0 0.0%	2 6.7%	9 30.0%	12 40.0%	7 23.3%	30 100.0%
5	0 0.0%	1 3.3%	9 30.0%	10 33.3%	10 33.3%	30 100.0%
6	3 10.0%	9 30.0%	14 46.7%	4 13.3%	0 0.0%	30 100.0%
7	5 16.7%	9 30.0%	8 26.7%	3 10.0%	5 16.7%	30 100.0%
Respondents	*CS*	*NP, NED, PE*	*NP, NED, PE, LD*	*O&M*	*O&M*	

For research question number 3: (How can the existing fast tracking urgent project methods (if there are any), be of better-quality from a project management viewpoint?). From the results, the participants were agreeing, the reason being that the majority were from Operation and Maintenance as shown in the Department Table. Operation and Maintenance department did not follow a normal project life cycle and had its own resource. Hence other departments (such as Network Planning, Network Engineering and Design, and Project Execution) followed the normal project life cycle, disagreed that there were existing fast tracking urgent methods that they know of.

Table 14: Custom Table for research question number 3.

Question	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
1	1 3.3%	5 16.7%	15 50.0%	8 26.7%	1 3.3%	30 100.0%
2	0 0.0%	6 20.0%	15 50.0%	8 26.7%	1 3.3%	30 100.0%
3	1 3.3%	12 40.0%	6 20.0%	11 36.7%	0 0.0%	30 100.0%
4	1 3.3%	4 13.3%	13 43.3%	12 40.0%	0 0.0%	30 100.0%
5	0 0.0%	5 16.7%	9 30.0%	13 43.3%	3 10.0%	30 100.0%
6	1 3.3%	5 16.7%	9 30.0%	14 46.7%	1 3.3%	30 100.0%
7	2 6.7%	6 20.0%	13 43.3%	9 30.0%	0 0.0%	30 100.0%
8	1 3.3%	1 3.3%	20 66.7%	8 26.7%	0 0.0%	30 100.0%
9	0 0.0%	1 3.3%	21 70.0%	8 26.7%	0 0.0%	30 100.0%
Respondents	*CS*	*NP, NED, PE*	*NP, NED, PE, LD*	*O&M*	*O&M*	

For research question number 4: (What will be the short and long term period solutions on testing the recommended fast tracking urgent project methods before it can be fully applied on the operating unit?). From the results, the participants answered neutral because they were not sure what were the time frames relating to testing the fast tracking urgent methods. And others disagreed because they did not know whether there are fast tracking methods.

Table 15: Custom Table for research question number 4.

Question	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
1	1 3.3%	7 23.3%	19 63.3%	3 10.0%	0 0.0%	30 100.0%
2	1 3.3%	5 16.7%	20 66.7%	4 13.3%	0 0.0%	30 100.0%
3	2 6.7%	4 13.3%	16 53.3%	7 23.3%	1 3.3%	30 100.0%
4	1 3.3%	1 3.3%	18 60.0%	8 26.7%	2 6.7%	30 100.0%
5	2 6.7%	7 23.3%	17 56.7%	4 13.3%	0 0.0%	30 100.0%
Respondents	*CS*	*NP, NED, PE*	*NP, NED, PE, LD*	*O&M*	*O&M*	

For Section C from the questionnaire, it determines what measures the fast track projects: (Characteristics of the fast tracked project such as;

- A financially viable customer project
- A politically motivated project
- A necessary project to reduce safety risks
- A necessary project for environmental reasons
- A necessary project for statutory reasons

The majority answered yes, and thus showing that there were urgent projects that needed to be fast tracked.

Table 16: Custom Table for Section C.1.

Question	No	Yes	Total
1	5 16.7%	25 83.3%	30 100.0%
2	2 6.7%	28 93.3%	30 100.0%
3	6 20.0%	24 80.0%	30 100.0%
4	8 26.7%	22 73.3%	30 100.0%
5	8 26.7%	22 73.3%	30 100.0%
Respondents	O&M	NP,NED,PE,LD,CS	

Is a temporary or alternative option available to “buy time” or to prevent the fast track project from materialising? The majority answered yes, and there were no other alternatives available to buy time in order to prevent important urgent projects from occurring.

Table 17: Custom Table for Section C.2.

Question	No	Yes	Total
1	8 26.7%	22 73.3%	30 100.0%
2	7 23.3%	23 76.7%	30 100.0%
3	4 13.3%	26 86.7%	30 100.0%
4	16 53.3%	14 46.7%	30 100.0%
Respondents	*O&M*	*NP,NED,PE,LD,CS*	

Chapter 5 – Research Findings

There are fast tracking project methods that are applied in the Operation and Maintenance departments. The Operation and Maintenance departments do not follow the normal project life cycle and they have their own resources (this helps the project to run speedily). Other departments (such as Network Planning, Network Engineering and Design, and Project Execution) followed the normal project life cycle, disagreed that there were existing fast tracking urgent methods that they know of. From the results, the participants were in disagreement that the proposed fast tracking urgent project methods were an improvement over the existing methods from the viewpoint of project managers.

The participants were agreeing that the existing fast tracking methods be of better quality from the project management point of view, the reason being that the majority were from Operation and Maintenance as shown in the Department Table. Operation and Maintenance department did not follow a normal project life cycle and had its own resource. Hence other departments (such as Network Planning, Network Engineering and Design, and Project Execution) followed the normal project life cycle, disagreed that there were existing fast tracking urgent methods that they know of.

The participants were not sure what were the time frames relating to testing the fast tracking urgent methods

Employees did not understand the practical meaning of Fast tracking. The organisation supported fast tracking urgent projects.

Urgent projects that needed to be fast tracked existed in Eskom due to the following reasons:

- A financially viable customer project,
- A politically motivated project,
- A necessary project to reduce safety risks,
- A necessary project for environmental reasons, and
- A necessary project for statutory reasons.

Chapter 6 - Recommendations

6.1 Recommendations

Eskom needs to apply fast tracking by looking at processes of material, internal processes, and recourses because there are projects which need to be executed urgently.

6.1.1 Processes

- A fast track project must be a fast track project from inception (Day 1) and not from mid-stream in order for the process to run quickly.
- The Network Asset Creation Value Chain (NACVC) process is not to be bypassed, because the designs should be evaluated (we cannot risk the safety of personnel because the project is needed urgently). Ad hoc committees may be required to ensure target dates are met.
- There should be an increased cost for a fast track project because sometimes we need external resources or employees to work over time.
- Customer Services, Plant Management, Field Services, Risk Management will be the main initiators for fast track and would submit the Project Registration with a fast track motivation to the Network Service Manager (NSM) for approval as a fast track project. The NSM is to ensure that the Network option is the correct one for the project. Links to network plans are to be identified to ensure Network Development Plans are updated and linked projects identified.
- Should a project be approved as a fast track project no guarantees to be given on completion dates due to the risks in obtaining long lead materials, obtaining servitude's and environmental issues.
- Fast tracking is a call for commitment from all role players; it may also be necessary to have ad-hoc Investment Committee meetings to approve such projects.

6.1.2 Material Processes

- On presentation of the Design Review Approval Form at the Investment Committee for approval. The approved bill of material should clearly specify "Fast Track".
- Logistics to appoint a single person to co-ordinate all the expediting and should liaise with the Project Manager concerning delivery dates of materials.

- The appointed expediter should also attend the various project meetings such as the "Project Kick off meeting", "Design Kick off Meeting" and "Construction Briefing Session."

- The appointed expediter may also be required to attend all project team meetings throughout the project lifecycle until such time as all the materials have been delivered on site.

6.1.3 Allocation of Construction Resources

- Not later than a week (7 working days) after the "Project Kick off meeting" the Project Manager has to hand his first pass of the project scheduled dates to the Resource Programme Manager in order to save time and the project to be executed speedily.
- Resource Programme Manager will meet with local Construction Manager to ascertain resource availability based on "First pass project schedule".
- Should there be sufficient resources during the period both the Resource Programme Manager and Construction Manager must note it. No contract will be fixed as the construction start and end dates may change later in the process to avoid the same contracts being presented again at the Ad hoc committees to seek more money. And this delays the project.
- As soon as final project schedule has been completed the fixed dates will be agreed with construction followed by the necessary documents to compile a tender and contract if necessary.
- Construction to submit tender within 5 working days in order to save time and the project to be executed speedily.
- Contracts Management Section to draw up contract within 1 working day in order to speed up the project.
- Should no Eskom Construction resources be available, then the same process will be followed with Rotek (Eskom Rotek Industries is wholly owned subsidiary of Eskom Enterprises, and forms part of Eskom Holdings, and was established to construct, sustain and transport anything needed to give assistance to Eskom) and any other Eskom subsidiaries.
- Should no resources be available from Rotek or any other Eskom subsidiary the project manager will procure resources externally.

6.1.4 Tender Process

6.1.4.1 Tender Enquiries

- Tender enquiries for fast track projects will take preference over the issuing of tender enquiries for any other project.
- The period allocated to suppliers to respond will be as short as possible within practical considerations. The scope of work should be comprehensive enough to enable the buyer to obtain acceptable tenders.

6.1.4.2 Tender Evaluations

- Tender evaluation will take preference over other non-urgent projects.

6.1.4.3 Tender adjudication

- Prior consent by the chairman of the relevant Tender Committees, to accept hand - circulation or ad-hoc meetings for the purpose of approving fast track projects, is essential.

6.1.4.4 Funding of Fast Track Projects

- On registration of a fast track project (Concept Release Approval Form) the Resource Programme Manager will check projects programme capital requirement versus capital allocated to the Business Unit. If insufficient funds are available, the Regions will advise Corporate Project Services of the project and amount required to fund the Fast track project.
- Should there be insufficient funds Corporate Project Services will be requested to allocate additional funds.

6.1.5 Critical Milestones

Critical areas on fast track projects, which will have to be carefully scheduled and managed to meet time constraints: -

- Survey, obtaining way-leaves/rights and servitudes (this process takes lengthy and can it can difficult because sometimes you cannot find the owners of the land).
- Environmental impact assessments and approvals (this is a long process, it takes 18 to 24 months, and the results sometimes can be negative for instance you want to construct at that area where you have done the assessment only to find it is the wetland).

- Design (designs taking time because they go through forums to be approved).
- Materials (unavailability of the material. There are some materials that you cannot find on the shelf, you need to order those 9 months earlier (such as the transformers)).
- Resources (unavailability of the resources for instance lack of skills and experience).

Chapter 7 - Conclusion

There are fast tracking project methods that are applied in the Operation and Maintenance departments. The Operation and Maintenance departments do not follow the normal project life cycle and they have their own resources (this helps the project to run speedily). Other departments (such as Network Planning, Network Engineering and Design, and Project Execution) followed the normal project life cycle, disagreed that there were existing fast tracking urgent methods that they know of. From the results from Chapter 4, the participants were in disagreement that the proposed fast tracking urgent project methods were an improvement over the existing methods from the viewpoint of project managers.

The participants were agreeing that the existing fast tracking methods be of better quality from the project management point of view, the reason being that the majority were from Operation and Maintenance as shown in the Department Table. Operation and Maintenance department did not follow a normal project life cycle and had its own resource. Hence other departments (such as Network Planning, Network Engineering and Design, and Project Execution) followed the normal project life cycle, disagreed that there were existing fast tracking urgent methods that they know of.

The participants were not sure what were the time frames relating to testing the fast tracking urgent methods

Employees did not understand the practical meaning of Fast tracking. The organisation supported fast tracking urgent projects.

Fast track projects will require a dedicated project engineer and a dedicated Clerk of Works. This must not affect the progress of other projects. Other role-players such as Contracts Section, Logistics Buyers and suppliers must be informed of fast track projects. Tender committee must also be made aware of these projects. All documentation pertaining to a fast track project must clearly state that this is a fast track project. Customer commitment and involvement in negotiating servitude's and environmental impact studies must be agreed with and between Eskom and the Customer. No Eskom procedure, legislation or safety criteria should be violated to fast track projects.

The successful implementation of design procedure in fast track projects is very challenging because the compressed schedule interferes with the inherently iterative nature of design, resulting in sub-optimal design. The typical lack of time for pre-project planning in fast track projects outcomes in insufficient development of project and design scope, causing costly changes during project implementation which result in project cost exceeds and the project is behind schedule and the quality of the final output deteriorates. The fast track project delivery strategy is being utilised in industrial projects to reduce the time to the market (Deshpan, 2009).

Appendices

8.1 Annexure A: Questionnaire cover letter

17 Nerina Street
Noordgesig
P.O Orlando
1804
21 September 2015

Dear Respondent

I am Thandeka Mbundu and currently studying MEng (Masters Degree) in Engineering Management at University of Johannesburg. I am commissioning a research project to find out how to manage urgent projects without compromising their quality, scope of works, costs, and schedules.

To this end I kindly request that you take few moments to complete the attached undersized questionnaire concerning your experiences in your unit, relating to fast tracking urgent projects, their methods, have they improved the managing skills, and have given the organisation a positive growth.

It should take no longer than 20 minutes of your time. There are three sections. Although your response and participation is paramount significance to the completion of this research study and it will enable me to complete my master degree in engineering management. Information provided by you will remain confidential. Thank you in advance for your time, willingness to participate and provide honest answers.

Kindly return completed questionnaires to me as indicated on the questionnaire by not later than 03 November 2015. Should you have any uncertainty or comments concerning this study, do not hesitate to contact me telephonically at 084 511 9314/ 074 625 1514 or e-mail me on mbundut@eskom.co.za

Yours sincerely
Thandeka Mbundu

Annexure B: Research Questionnaires

In this study we are fascinated in your observations on how to manage urgent projects without compromising their quality, scope of works, costs, and schedules.

Please indicate your honest response on how you rate the following questions by crossing (X) on the relevant block. Your feedback will be confidential. Thank you.

Please complete the following questionnaires:

Section A: Background information

1. **Gender**

Male	1
Female	2

2. **Age (in complete years)**

3. **Ethnicity**

African	1
White	2
Coloured	3
Indian	4
Other(Specify)	5

4. Highest Educational Qualification

Certificate	1
Diploma	2
Bachelor's degree(s)	3
Post-graduate degree(s)	4

5. Work Experience

1 year	1
2 years	2
3years	3
4 years	4
5 years and above	5

6. Position or Job Title

Section B: This section contains four research questions and has sub questions in order to assist in answering the research questions. Please score relevant block with (X):

RQ 1: Are there any fast tracking urgent project methods that are utilised by Eskom Gauteng Operating Unit on improving the managing skills in project managers?

No	Questions	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	There are fast tracking urgent methods in the Eskom Operating Unit.	1	2	3	4	5
2	Employees do understand what is fast tracking.	1	2	3	4	5
3	Employees do support and participate in fast tracking urgent projects.	1	2	3	4	5
4	The organisation does support fast tracking urgent projects.	1	2	3	4	5
5	This organisation does make every effort for zero harm.	1	2	3	4	5
6	These methods do have an improvement in management skills.	1	2	3	4	5
7	Fast tracking method does have an effect on the quality of the project.	1	2	3	4	5
8	The organisation does train and develop people in quality philosophy and principles.	1	2	3	4	5
9	Fast tracking method does have an effect on the cost of the project.	1	2	3	4	5
10	Fast tracking method does have an effect on the schedule of the project.	1	2	3	4	5
11	The improvement procedures in the organisation are well-organized.	1	2	3	4	5

RQ 2: Are the proposed fast tracking urgent project methods an improvement over the existing methods from the viewpoint of project managers?

No	Questions	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	The existing fast tracking methods were planned, monitored and evaluated across the organisation's departments.	1	2	3	4	5
2	There were challenges in the existing methods.	1	2	3	4	5
3	The existing methods do need to be improved.	1	2	3	4	5
4	The existing methods have challenges.	1	2	3	4	5
5	The existing methods can be improved.	1	2	3	4	5
6	The existing methods are re-examined on a regular basis.	1	2	3	4	5
7	Fast tracking is better than the Traditional (normal) project life cycle method.	1	2	3	4	5

RQ 3: How can the existing fast tracking urgent project methods (if there are any), be of better-quality from a project management viewpoint?

No.	Questions	Very low	Low	Neutral	High	Very high
1	What are the goals and objectives of quality on the fast tracking methods in this unit?	1	2	3	4	5
2	Are the unit quality goals and objectives for the existing fast tracking methods aligned with the once of the organisation?	1	2	3	4	5
3	Do employees get involved in fast tracking methods quality activities?	1	2	3	4	5
4	To what level does the top management take part and pledges in quality of the fast tracking methods?	1	2	3	4	5
6	Does management shares quality objectives to all employees?	1	2	3	4	5
7	Do employees supply their perspectives on quality management?	1	2	3	4	5
8	Is the system for getting the objectives is structured well?	1	2	3	4	5
11	What measures the fast tracking methods?	1	2	3	4	5
12	Which quality techniques are used in supporting continuous improvement?	1	2	3	4	5

RQ 4: What will be the short and long term period solutions on testing the recommended fast tracking urgent project methods before it can be fully applied on the operating unit?

No	Questions	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	There are new fast tracking methods.	1	2	3	4	5
2	There are recommended fast tracking methods.	1	2	3	4	5
3	It takes a short time to measure or test the fast tracking method before it can be used.	1	2	3	4	5
4	It takes a long time to measure or test the fast tracking method before it can be used.	1	2	3	4	5
5	The organisation continually improves the efficiency and effectiveness of fast tracking method processes.	1	2	3	4	5

Section C: This section contains what measures do Eskom takes to categorise the project as a fast track project

1. Is the requested Fast Track Project possess any of the following characteristics?

i.	A financially viable customer project	Yes	1	No	0
ii.	A politically motivated project	Yes	1	No	0
iii.	A necessary project to reduce safety risks	Yes	1	No	0
iv.	A necessary project for environmental reasons	Yes	1	No	0
v.	A necessary project for statutory reasons	Yes	1	No	0

2. Is a temporary or alternative option available to "buy time" or to prevent the fast track project from materialising?

i.	Will a conventional construction power supply satisfy load requirements in the short term?	Yes	1	No	0
ii.	Will a diesel generator satisfy the full or construction power requirements of the customer in the short term?	Yes	1	No	0
iii.	Will a mobile substation satisfy the full or construction power requirements of the customer in the short term?	Yes	1	No	0
iv.	Are short term mitigations possible e.g. installing temporary intermediate support (for low sag towers), negotiating a temporary unfirm contract with the customer, living with "not the ideal protection" etc.?	Yes	1	No	0

3. In most cases, how soon is the project required?

	<3 months	3-6 months	6-12 months	12-18 months	>18 months
i. Sub-Transmission	1	2	3	4	5
ii. Major Process Reticulation	1	2	3	4	5
iii. Electrification (400V)	1	2	3	4	5

4. In most cases, is the fast track project necessary because of serious safety and environmental reasons?

Safety	**Not at all**	**Once in a while**	**Sometimes**	**Fairly often**	**Frequently, if not always**
i. Public					
a. Risk to life	1	2	3	4	5
b. Serious risk to health	1	2	3	4	5
c. Minor risk to health	1	2	3	4	5
ii. Eskom					
a. Risk to life	1	2	3	4	5
b. Serious risk to health	1	2	3	4	5
c. Minor risk to health	1	2	3	4	5
d. Risk to plant	1	2	3	4	5
iii. Environment					
a. Serious environmental risk- (Contravention of Legislation and impact on operations)	1	2	3	4	5
b. Moderate environmental risk- (Potential to contravene legislation with no impact on operations).	1	2	3	4	5
c. Low environment risk –(Risk in substation in medium term)	1	2	3	4	5

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