Re-engineering the tender process at Tubular Track

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It all starts here ™

Abstract

In any organisation processes can be seen evolving throughout their lifecycle and play a deciding role in the efficiency of organisational activities. Tender processes are no different and with growing competitiveness and globalisation it has become the responsibility of managerial staff to ensure continuous improvement is applied to processes so organisational goals are consistently met and knowledge, talents and other success factors are institutionalised therein.

The objective of this study was to perform an iteration of process re-engineering on the tender process within Tubular Track, so that a tender could be performed more efficiently and more competitively, and be more manageable. The investigation was carried out by means of a literature review and interviews. This was done to establish an accurate baseline from the current process and then re-engineer the system in its entirety. Verification of the investigation method was done through application of the PMBOK proven project management methods, while validation was done by comparison of processes through process improvement methodology principles as relationship.

Process improvement and its management is a continuous procedure but because this study only focuses on the design of a new tender process for Tubular Track the conclusion that was made through literature application and comparison was that the newly designed process is expected to improve efficiency, manageability and time to complete.

In the final conclusion stage recommendations were also made that re-engineering phases be planned and followed with corresponding risk and change management plans. Training needed for personnel so that implementation would be optimally applied and continuous improvement institutionalised would also need inspecting.

Keywords: Tender process; process management; process representation; process verification; process validation; process re-engineering; process improvement

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- Jaco Kotze: “As jy nie verbeter nie, stagneer jy.” I miss you, my friend.

  To all the people who said I would not amount to much. You were my motivation. Thank you all,

  Cassie

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Abbreviations

BEE	-	Black economic empowerment
CMMI	-	Capability Maturity Model Integration
CTS	-	Cost to serve
CV	-	Curriculum Vitae
INCOSE	-	International Council on Systems Engineering
ITT	-	Invitation to tender
PMBOK	-	Project management body of knowledge
TCB	-	Total combined bid
TOC	-	Time to complete
TQM	-	Total quality management
TT	-	Tubular Track
VAT	-	value-added tax
Vs	-	versus

1. Nature and scope of study

1.1. Introduction

In a world with growing globalization and competitiveness of tenders, the need to submit repetitively accurate tenders in a short time frame has forced small businesses to improve and properly manage their tender processes. In this competitive era an increasing number of potential projects are put out for tender, which means many companies will have the opportunity to bid for the scope of work. (Center, 2014)

"A major portion of every organization's operating cost is spent on outside goods and services. Based on this fact, executive management everywhere is determining that Managing Tenders, Specifications, and Contracts must emerge as a critical core competency if organizations are to increase revenue" (Consultants, 2014). The goal within any organization is to make money (Goldratt, 1986), and thus any expenditure or activity that deters an organisation from reaching the goal needs to be investigated and minimized. The same principle goes for any tender. The process and factors relating to it need to be improved to give the best possible chance of achieving the goal which is to make money and receive work.

Today's more globalised markets have become more competitive and have forced enterprises to seek methods of managing their supply chains more efficiently and cost-effectively (C.OU-YANG, 2007). International trading has made it possible for a firm to compete globally with its services and products, so bids and tenders need to be able to be more interchangeable, and need to meet international demands.

Low efficiency and other time-consuming issues are mostly caused by inaccurate and late information and a lack of information systems (MSH.org, 2012). It has been shown that in some countries the cost of a product was reduced through increasing efficiency of tender processes (Health, 2014). Departments need to be integrated and become part of the tender process, and to be adequately managed to achieve the utmost potential and reduce lead times.

Developments globally have changed how businesses approach everyday dealings. They can't merely rely on good-quality products or services to maintain growth anymore, but have to iteratively improve internal operational effectiveness, efficiency and quality to stay competitive (CARPINETTI, 2003). Management of the process itself needs to be streamlined so that the responsible parties know their part and are able to act when the time comes.

“We have the product; all we need now is a proper tender system.” (Peter Kusel, CEO of Tubular Track.)

Organizations such as Tubular Track mostly start a tender process as the need presents itself, with no consideration for the future. The tender is completed separately for each potential job, instead of constructing an interchangeable process or program to simplify the handling of most tenders in a fully structured streamlined system. As time passes, tenders become more complex and the time needed to complete those increases. The knowledge of each tender rests with the responsible person and can thus be easily lost; what is needed is a well-designed process with support structure to be set in place.

In this ever-growing economy businesses will compete against other enterprises that offer the same or even better quality and lower prices. This makes the proper writing and management of a tender a necessary skill in every enterprise (Center, 2014).

1.2. Problem statement

Tubular Track (TT) was founded in 1989 by Mr Peter Gerhardus Kusel, who is also the designer, and specialises in fully supported non-ballast railway track. Management of the company has been the same since its start and, as in most entrepreneurial companies, not much time has been spent on the management and documentation of knowledge.

Over the past twenty years Tubular Track has experienced consistent growth and has relied solely on the knowledge and experience of individuals within the company to handle the tender process. As a result, no actual system is as yet in place to properly coordinate and pass on the accumulated knowledge. With the turn of an era and the phasing-out of old managers, the need to incorporate a system of knowledge management has become more urgent.

At the time of this study, the railway industry in South Africa had allocated an estimated R30 billion for upgrading and development over the next 15 years, which leads one to believe the possible work load could increase dramatically and, hence, so could the number of tenders. This was only in South Africa, but TT also operates in 9 other countries, with all the tendering being done through the Pretoria branch.

The problem that presented itself due to increasing number of tenders and the short time in which accurate tenders had to be prepared on a repetitive basis, **was the need to improve the efficiency of the overall tender process within Tubular Track.**

The aim of this study was then to re-engineer the tender process within Tubular Track.

1.3. Aim and objectives

The long-term aim was to implement a fully self-improving and self-maintaining study at Tubular Track. This aim could however not be fully reached within the time frame set out for this study. The short-term aim of the study then became to perform the first iteration of the tender process re-engineering.

The specific objectives formulated for the purpose were:

1. The process discovery and documentation of the current tender process at the start of this study;
2. A scrutinizing of the tender process by stakeholders and process performers;
3. The design of a new tender process for Tubular Track's specific needs;
4. Measurement of the actual improvement due to the proposed tender process.

1.4. Overview of dissertation

This study is presented in five chapters, with the first chapter consisting of background information on Tubular Track and this study, the problem statement, and a short description of what is to be achieved. Chapter 2 covers a literature review, while chapter 3 documents the planning of the empirical investigation.

Chapter 4 contains the results and their discussion:. Changes to the tender process - with reasons - and measurement of the improvement.

Chapter five presents final conclusions of this study as well as suggestions for further investigation.

2. Literature review

2.1. Introduction

Consistent sales and cash flow are the lifeline of any company. Tubular Track is no exception and as in many other companies the main source of work obtained is through tenders. The need for research on this topic was recognised previously to this study and has been documented before. The aim of this chapter is to gather and review existing literature so that what was learned previously can be applied in this study to optimize the efficiency of the tender process within Tubular Track.

2.2. What is a tender?

A tender according to the small business toolkit is: "The process of making an offer, bid or proposal, or expressing interest in response to an invitation or request for tender. Organisations will seek other businesses to respond to a particular need, such as the supply of goods and services, and will select an offer or tender that meets their needs and provides the best value for money." (Connect, n.d.)

Another definition is "the invitation to bid for a project or acceptance of a formal offer (ex. takeover bid). The word tender usually refers to a process where institutions ask for bids for supply of services and so on, with both the work and tender process to be completed in a certain time frame." (Investopedia, 2014)

Lastly a bid can also be defined as "approaching a client to obtain significant new or continuous business". (Nickson, 2003)

The definition that was adapted from the above definitions for use in this study is: The process of making an offer to show interest in supplying either service or product that will fulfil the needs of the client within the time frame specified. This definition in the case of Tubular Track embodies the traits of a tender that normally consists of supply and installation activities, but could also be the supply of specialised equipment.

2.3. What is tender management?

In our competitive world a lot of tenders are put out every day. There are more and more potential jobs, and even more companies that want to offer a tender proposal for the work at hand. They will need to describe a solution to the specific problem, supply the service or products required and all at a competitive price. Designing and writing tender proposals and all other influencing factors, such as costing and cost-effective sourcing, is known as tender management or bid management. (Center, 2014)

Tender management processes entail the documentation formulation of project details (Madison, 2007) and the statement of all other necessary aspects to offer a competitive tender document within a predetermined time frame.

Managing a tender is much like the management of a small project in the sense that it has:

- A deadline;
- A scope that needs understanding;
- The management of resources;
- A process that needs to be followed.

Thus, the parties involved need to be informed by use of a planning document (Business, 2012) or a start-up meeting or any form of process initiation.

Other inclusions within the management of tenders are shown in this section for further clarification. These tasks according to the Purchasing and Procurement Center are (Center, 2014):

- Analysing the requirements within the ITT;
- Designing of a solution that meets the requirements stated in the ITT;
- Management of staff responsible for writing the tender or role assignment;
- Development of a proposal that will stand out from the rest and meet requirements of the clients;
- Producing profit but still winning tender through proper pricing structure;
- Creating optimum impact of tender, but still mitigating risk;
- Setting and maintaining deadlines.

There exist management processes to run similar activities, but this by no way means that tender management is as formalized as project management. Computer systems can also be used to assist in the management of the tender process, but an experienced proposal writer with a history of writing winning tenders and with the knowledge thus gained remains highly sought after. To a company that is competing against many other companies for work and that has to rely on winning bids, the management of a tender must be considered a desirable art. People who know how to write a good tender document and make it stand out from competitors are highly sought after (Center, 2014).The responsibilities of the bid manager can be summarized in the following (Nickson, 2003):

- Logistical
- Administration
- Management

- Communication
- Sales
- Quality

Tender management systems are either manual or electronic, but all serve the same objective, namely making sure an optimally run process is obtained for both the buyer and supplier. Tender management is very time-consuming and involves a lot of paper work. This is especially true with manual systems. They are more prone to errors and often cannot cope with the increasing volumes of work. On the other hand, software or automated systems are expensive to purchase and complex and difficult to use. A simplified management system that serves as storage of key information and can report is often more than enough (Center, 2014). A cost-versus-efficiency analysis needs to be performed to see what is needed for a specific case. This is what will be done in the present study, to determine that the appropriate system is implemented.

The benefits of tender management for the buyers are (Center, 2014):

- Reduces time and effort needed from procurement professionals by streamlining and minimising administrative tasks.
- Helps securely manage tenders error-free and on time.
- Sourcing master templates can be available for activities to reduce drafting time.
- Full audit trail is kept, pertaining to all changes, updates, questions and actions.
- Tenders can be sent and received online.
- Cost reduction in distribution and preparation of documents.
- The chances of poor submissions and costly delays like suppliers not being in possession of latest documents are minimized.
- Security is increased through passwords and process flow

The benefits for the bidder are (Center, 2014) :

- Tenders can be analysed early through a subscription to tender companies and adding a method of early warning.
- A database of key information is created (Photos, text, graphs etc.).
- Databases of previous bids are kept in one place for reference.
- Detailed records of wins and losses, with the dates of submission and other statistics.
- Less time is necessary for the search for relevant information, forms and attachments.
- Storage of best practices for re-use in other tenders.

Other features that could benefit a tender management system and were considered in this study were given by the Procurement Center as:

- the ability to manage the entire process from issue of tender to contract awarding;
- issuing of tender requests online;
- automatic notification of any participating parties of changes;
- and storage capacity for historical tenders.

The opinion created through this literature is that each individual case of an organisation should be interpreted on its own with a solution for every "set" of variations. To further optimise the effectiveness of this study, an adaptable management technique would be considered.

Management of tenders comprises the management of all factors that influence the outcome of a tender or bidding process. Factors could include the actual tender system such as computer programs, sourcing process and management methods and personalities. The management of tenders can be further refined to management and documenting of the tender process.

2.4. Standard phases in a tender cycle

As with any thing in life, there are two sides to any story. In the case of tendering, there is a company or entity that opens the tender and is in need of something, be it product or services, and then there is the possible supplier seeking to supply the need. Both these aspects have a basic structure in their process. As we are looking to create a competitive tender process both sides of this process need to be inspected to ensure that all influencing factors are known. General steps in a tender process on the side of the person or entity in need are (Health, 2014) and (Madison, 2007):

- Choose tender format;
- Define requirements;
- Select suppliers to participate;
- Prepare and send tender documents;
- Receive and open offers;
- Offer adjudication;
- Adjudicate tender;
- Issue contracts to winning bidder;
- Performance and quality have to be monitored;
- Enforce contract terms;

A short discussion of some of the above topics follows:

Choosing of tender format

In some countries procurement regulations are developed to such a point that a tender format is specified. In situations where this is not the case options like the following have to be considered (Health, 2014):

- Restricted versus open tender;
- Local or international scope;
- Estimated or fixed quantities for tender;
- Split or single tender awards;
- Primary/secondary contracts or rebids;
- Optional or required use of local suppliers;
- Annual or biannual tenders vs. multiple yearly tender.

Defining the needs

Limiting and determining the exact needs that are tendered for can increase effectiveness of procurement. A balance needs to be reached between centralized and decentralized bidding (Health, 2014). Furthermore, a knowledge of exact summations can assist in a better budget determination and also ensure that quantities and billed items correlate and ensure value for money.

Selecting suppliers for tender participation

As selection of suppliers in its own right has a big effect on overall outcome of the tender, the need to mention it here is well understood (Health, 2014). However there are safeguards that need to be respected when selecting suppliers, or the result could be devastating and could lead to money loss.

Preparation and issuing of tender documents

In the preparation of documents, the assembly of packages that are sent out to possible bidders is the main target. These packages usually contain the following (Health, 2014):

- Invitation to tender;
- Instructions to bidders;
- Conditions of contracts;
- General technical specification;
- Schedule of requirements and possible bill of quantity.

These documents spell out what, how and when. If these instructions are followed and read with care, the three pitfalls (referred to below) will be avoided.

Tender adjudication

When the adjudication phase arrives, the most important aspect that needs to be realised is that it must be an open and transparent process and show all participants that the process was conducted fairly. Steps that are involved in adjudication are (Health, 2014):

- Preparation for adjudication;
- Receive and open bids;
- Collate bids for adjudication;
- Adjudicate and award.

This process is the formal judgement of the tender, so some feedback from it would be expected. In organizational and tender writer situations, this is the area of focus and this is where tenders are won or lost. Great care must be taken to obtain all possible relevant information and to seek feedback for ongoing improvement.

Issuing of contracts to winners

Tender awards to winning bidders, with the establishment of contracts, should be listed for each individual product, each with supplier name, price and value, and be made available to all responsive companies who tendered. If a winning bidder declines a contract, all security precautions are forfeited and either the second bidder should be contacted immediately or a rebid should be started.

To the supplier, the general phases are more indicative of the process in question, and they will be discussed in detail in the following sections. Requesting for tenders will not be implemented in the process designed at this stage as tender requesting has not been necessary as yet by Tubular Track, but future work should definitely be done on this subject.

2.5. When does a tender start

A tender process starts when the invitation to tender (ITT) or the tendering is opened. This could be a formal document that is published by the purchasing company to serve as notification that bids are required. This document normally serves as a method of showing all important information regarding the tender such as the deadline for submission or BEE ratings (Center, 2014). A tender could be utilized whenever a new product is required with a supplier outside the contract (Madison, 2007).

The conclusion that can then be made is that a tender is seen to start as soon as it is opened, the ITT is distributed or as soon as a company is approached, which makes early identification important. The start of the tender process should set a process in motion which ensures optimal use of time and the best possible bid.

2.6. Analysing the tender documents

When a tender is opened, inspection and analysis of the content is one of the first steps.

Documents in need of analysing are the documents that the client released or sent to potential bidders to inform them of instructions on how, what, where and when. It is important to read through these documents thoroughly and use a point-by-point method, making notes (Lewis, 2012). A small checklist could be formed to make identification of the information easier. An example of such a checklist is given in the following figure.

Instructions on bid submissions		Time frame	
Background and objective of contract		Deliverables and outcomes	
Scope and services coverd by contract		Budget and constraints	
Information required in response		Clients responsibilities	
Limits on amount of pages or words		Price information treatment	
Issues and priorities identified		Criteria for evaluating bids	
Factors that influence bid competitiveness		Stages in procurement process	
Emphasis on certain competencies		Clarification procedures	
Acceptability of subcontracting		Contractual matters and condition	
Evidence of predisposition of certain methods or acceptability of alternative solutions		Unusual requirements of work spec or bid style	
Attitude to risk management			

Figure 1: Sample checklist for information during tender perusal (Lewis, 2012).

2.7. Bid or No-bid decision

Some tenders that are opened are not worth tendering on, and this raises a question that needs to be answered as soon as all facts are collected. The process of determining if a tender is worth bidding is called qualifying and involves questions like: Is the tender in line with our strategy and direction we want to move? Do we have the capacity to complete the tender in time? Can we win the tender? Is there a relationship with the client? By answering these questions, a better informed decision can be made (Center, 2014). It is vital to take a cold hard look and be realistic before getting excited (Fagan, 1997).

Another five evaluation criteria are given by Purchase and Procurement Center:

1. Preparation for tender issuing – identify risk and value of contract.
2. Cost vs price – Including more than base costs is important to see if it actually would turn a profit.
3. Quality requirements – Define all non-cost criteria.
4. Criteria weightings.
5. Assessing tender responses.

There are also some questions that need to be answered to help with this decision. The decision should be carefully considered. There should be a systematic approach with comparison matrixes and questions. Some questions that should be asked are (Business, 2012):

- What are the requirements and can we meet them?
- Can we show relevant experience? Have we done this type of work before?
- Who is the competition?
- Is the contracting big enough and will it clash with any existing work?
- What is the profit potential?
- Do we have enough resources to respond professionally within the deadline?

There are questionnaires and other tools available that help analyse whether to bid or not to bid. This aspect will be investigated as it forms an important part of a tender process. Properly determining if we could compete could save a lot of money and thus implementation of a suitable guideline and support structures will be investigated.

2.8. Managing the bid

When the choice is made to compete in a tender, the appropriate processes need to be initiated as soon as possible. There are three guidelines to keep in mind when initiating the tender process. Firstly, one needs a systematic approach that leaves nothing to chance. Secondly, documents need to be brought together as a team. Lastly, deliberate the movement forward in a confident and fully considered direction. This enables optimal usage of resources and improved quality and consistency (Lewis, 2012). The overall management can be divided into the following sections and subsections, according to Harold Lewis (2012):

- Planning and coordination
    - Defining management and writing responsibilities
    - Bid planning meeting
- Document management and version control
- Programming production and delivery
- Check bid quality
- Bring together resources and inputs
- Use bid development worksheet
- Maintaining bid records

There are also some pitfalls to steer clear of(Center, 2014):

- Look out for compulsory briefings
- Failure to comply with tender rules
- Be totally honest

This encompasses the basic needs of managing a bid and shows a basic process structure as supposed to usual unorganised attempts of a company with lower levels of formalised processes. This process has to be considered when looking at improving tendering within Tubular Track.

2.9. Preparing a bid

Before developing tender documents, there are certain steps that can be followed to ensure the best results are achieved (Business, 2012):

1. Create bid team
2. Kick-off meeting
3. Bid plan

These steps will be described shortly in this section.

Creating a bid team

In a tender team a mixture of personalities and expertise often deliver the best solution and proposals. This is because there are certain roles that need to be filled and certain views that best fill these roles. More than one role may be filled by one person if it is felt necessary, and conversely more persons than one are possible per role. The roles that can be filled are (Business, 2012):

- Bid manager - person with tender experience and authority to make decisions.
- Technical experts – technical experts for design and presentation of solution.

- Writers – People who are skilled at writing clear, technically correct sales documentation.
- Contributors – either internal or external people who can offer specialised information and knowledge.
- Administrators – people responsible for formatting and collating the proposal.
- Proofreader – Person to proofread and look after tone, flow and final formatting.
- Fault finder – pessimistic scrutiniser, to judge and find areas for improvement.

Kick-off meeting

The kick-off meeting is an important step as it offers a chance to catch everybody up. The purpose of this meeting can could almost be a check list with the following goals (Business, 2012):

- Brainstorming for solutions
- Identification of all needed documentation and information
- Allocation of different roles
- Creating a proposal schedule

In this phase the team members should try to visualise themselves as the buyer to identify issues according to importance, look at what they can bid vs. that of their competitors and brainstorm points of better delivery. It is important to document all strategy points, find out what questions can only be answered by buyers and review the business's "why us" statements (Business, 2012).

There are twelve steps that in theory should be present or followed for the perfect meeting. These can serve as a guideline to properly plan and improve management. These steps are (Nickson, 2003):

1. Make sure everyone knows when and where the meeting is and that a venue is booked.
2. Have the people there that need to be there.
3. Don't have anyone else there.
4. Have a reason and goals for the meeting.
5. Let the agenda facilitate the goals.
6. Item one is always to agree to the agenda.
7. Have a chairperson to keep flow on track.
8. Take irrelevant things 'off-line'.
9. Take minutes.
10. Summarize actions.

11. Plan follow-up meetings.
12. Issue minutes.

As tendering is all about meetings and proper communication in meetings, this area was added for completeness and because in the writer's opinion this should be implemented through all tender meetings as they were wasteful activities at the start of this study.

Bid plan

The bid plan is created after the kick-off meeting. This plan contains certain key factors to properly plan the approach that will be followed. This plan could also ease decision-making at crossroads. Some of the items that have to be included are (Business, 2012):

- Summary of submission terms;
- Bid team with roles;
- Bid creation schedule;
- Mandatory requirements list;
- Evaluation criteria;
- Winning strategies.

There are tools available to help with structuring and monitoring of an effective bid plan. A form of these tools will have to be looked at for the specific goals of this study and implementation at Tubular Track.

2.10. Benefits of a bid document

If a tender proposal is done correctly it has value for both supplier and buyer. These benefits of and contributing factors to the tender document should be kept in mind at all times when tendering. A few benefits as seen by the client are (Sant, 2012):

- Creates possibility to compare sellers, offers or prices to make an informed decision.
- Gives clarification of complex information.
- Makes buying or procurement more objective.
- Slow down sales process.
- Get creative ideas, become educated and obtain free consulting.

The value to the bidder is (Sant, 2012):

- Creates ability to sell on value instead of price.
- Compete successfully without having contact with every member.
- Show professionalism and competency.
- Offer solutions.

- Sell clever buyer.
- Makes it possible to sell a complex and technical product to nontechnical buyers

2.11. Procurement department workings

The procurement department will play an important role in the efficiency of the tender process by supplying the best possible prices and ensuring that suppliers are of corresponding quality. It was decided to investigate the inner working of the department and its responsibilities, to better understand what could be expected for and incorporated into the proposed tender process, for increased efficiency. Findings of this investigation and the corresponding theory are given in this section.

The procurement office's main function is procurement of required items in the correct quantities, when needed, at the best prices, from a combination of suppliers and products that best satisfies the needs of the organization (Waters, 2002). This office is responsible for the formulation of a list of requirements, possible suppliers, best comparative price and the securing of firm contracts (Health, 2014). In the procurement office, management of information is its most important tool and attribute to tendering. Various types of information management system exist. These systems can be manual, computerised or a combination of both (Health, 2014). If these systems are properly managed and incorporated, reports can be generated automatically and decrease lead times in overall procurement and tender processes.

The tasks of a simple tender management system include (Center, 2014):

- Information content of a tender being issued;
- Admin process of issuing and receiving of tenders;
- Writing of tender (content, structure and production);
- Time and resource management for bidder;
- The trail of records and audit concerning changes;
- The storage of all documentation.

Specialised computer software programs appear to offer the greatest benefits and were to be investigated further in this study; however, off-the-shelf items do exist according to www.msh.org (Activecost, Bloochip, mSupply and Orica). The purpose of these programs is to reduce the time of developing standard bidding documents which in turn reduces the overall tender process time to complete. They consist mostly of spreadsheets that are ordered and updated regularly to accomplish most of the tasks (Health, 2014).

These information systems keep different records, namely (Health, 2014):

- Product records
- Tendering and ordering records
- Supplier and facility monitoring records
- Quality assurance records
- Accounts receivable and payable
- Reporting records

Each of these will be briefly described in the following sections.

Product records

These records comprise standard technical information for each item and supplier and their performances. These records are important because of the ability to check quality instantaneously (Health, 2014).

Tendering and ordering records

Records of each purchase with the quantities, supplier and price allow for estimation of future prices. A continuous record or order status can be kept for outstanding orders and a separate record for products received with their order numbers, date ordered, dates received, days delayed and payment dates that can be organised chronologically for easier reporting (Health, 2014).

Supplier and facility monitoring records

Supplier monitoring has two parts. The first consists of tracking of lead times, compliance with prices, partial shipments, remaining shelf life and packaging and other contract compliances and deviations. The second part includes a file with all suppliers registration papers, references, special correspondence, complaints and other information (Health, 2014).

Selection of suppliers is critical in any tendering activity. Supplier quality needs to be analysed as they will directly influence competitiveness. A simplified selection process for suppliers is as follows (Lu, 2011):

- Set up selection criteria;
- Initial contact;
- Formal evaluation;
- Price quote;
- Financial data;
- Reference checking;
- Supplier visit;
- Audits and assessments;

- Initiation test.

In short, all accreditation needs to be checked, as well as informal interviews with previous buyers from the supplier. There are further tools available for supplier selection that could be of assistance when choices are difficult. The best known methods are the categorical method, cost ratio method and linear-averaging method.

Quality assurance records

Product quality in every organisation is important, thus this file keeps a record of all complaints with the results of follow-up investigations. A link to all quality checks, reasons for the tests and the results should also be added and shared with the supplier (Health, 2014).

Accounts receivable and payable

All orders placed, with their dates and amounts, should be accessible in these records. Amounts outstanding and the total amounts should be monitored and recorded. Order numbers should consistently be referred to when in communication with suppliers (Health, 2014).

2.12. Tender regulations

Regulations form a part of most tenders and also the tender-writing process. Tenders by government, to which Tubular Track regularly responds, are constrained by tender regulations. Any organisation that uses public funds is subject to the strictest tender regulations that need to be fully adhered to or the bid will not be evaluated and no contract will be awarded (Center, 2014). If adequate attention is given to these tender regulations early in the tender process, capital expenditure and other resource applications could be minimised or totally avoided.

Tender regulations are brought in to ensure fairness and so that many different companies can bid. Requirements of tender regulations include the statement that the tender be advertised for a set time, have a defined format so that equality can be reached, and that value for money criteria should be followed. Bribes and other unfair activities are also set out in the regulations. Several reviews of a company’s abilities may be done to protect tendering company. This may also pertain to criminal checks etc. (Center, 2014).

At all stages the decision-making process and criteria must be clear and documented for later referral. There must be no room for discretion or mistakes, especially in the evaluation of tenders (Nations, 2014). Pre-qualification has to be based on competence, for example staff and equipment, experience and integrity to perform the task as these are all quantifiable traits.

As all bidders are expected to produce the same information in the same format to make evaluation faster and more fair, this can be used as an advantage and reduce time and cost of tender compilation. Such regulations and the knowledge how to properly handle them could mean the difference between winning a tender or not.

2.13. Writing a successful tender response

When writing a tender, a few steps may be followed to make sure it becomes a successful attempt. As there are a wide variety of things to keep in mind and a lot of different opinions, this section will seek to show a few and hopefully make a difference when the bid response is planned and documented. As a start-off point, a list of factors set to influence tender success is (Fagan, 1997):

- ✓ Right image
- ✓ Right product or service
- ✓ Right resources
- ✓ Right prices
- ✓ Right documentation
- ✓ Right attitude

Writing skills

The right image can be described in the writing. When writing a tender or bid, there are certain skills involved. A short summary of these skills are briefly discussed in this section. Firstly the basics that need to be noted are (Nickson, 2003):

- ❖ Know the audience – know to whom is written and realise that certain parts will be read by different people with different experiences.
- ❖ Answer the question – as if there were marks for good answers.
- ❖ The structure – the structure of the document and of the sentences.

The next skill needed is presentation of the information. All information must be presented in a fact, feature and benefit form to attract and help the reader take notice of what is said. The writing style itself must be chosen with great care. Some style factors that should be noted are (Nickson, 2003):

- Positive vs. negative – express all answers as positives.
- Active vs. passive – the active voice conveys a more positive image.
- Consistency.
- Vocabulary.
- Avoiding clichés and slang.

- Less is more.

As straight forward as they may sound, it is important to look at these aspects as they could mean the difference between maintaining focus and losing a possible client's interest.

In all tender documents a breakdown of how the tender is to be done is included, but here are some other rules that will help (Center, 2014).

1. Follow the instructions to the letter.
2. Submit all forms and certificates.
3. Submit tender before due date and time.
4. Tender by focusing on evaluation criteria.
5. Differentiate yourself from the competition.

The key principle here then is too keep it simple, but professional (Business, 2012). Further, there should be set sections in the proposal (Nickson, 2003). These include, but are not limited to:

- Executive summary – containing a summary of the tender main points.
- Contents table – included to ease navigation.
- Introduction – explanation of the format and purpose of tender.
- Understanding of the requirements – included to show what is required is understood.
- The approach.
- Pricing.
- Other information.

There is also a tool in the form of a checklist in Kevin Fagan's book *The Bid Manager's Handbook*, to make sure that the necessary documentation and structure are followed.

The approach

In this section the following should be included (Business, 2012):

- ✓ A step-by-step outline of how it is planned to deliver;
- ✓ Who will be involved in the contract and each one's role;
- ✓ Who will be involved in the management;
- ✓ How communication will be managed;
- ✓ How continuity will be ensured.

Pricing

The right prices are one of the most influential factors, though not the only one. Buyers normally set out how they want pricing information and how they want it to be shown. This usually is either a spreadsheet or a table with detailed breakdowns and how they were calculated. It is imperative to state whether the total price includes VAT or not and, when using exchange rates, which rates were used in the calculation.

Other information

In the “other information” area can be added information that is felt to be necessary, for instance (Business, 2012):

- Company introduction;
- Case studies/customer references;
- Staff CVs;
- Added-value statements;
- Alternative offers or solutions;
- Examples of work done previously;
- Standards and policies;
- Commercial sensitivity.

Review and sign-off

“It is vitally important to review your proposal at regular intervals during its preparation for content, sense, readability and flow”. (Business, 2012) Allow for time to properly review and to perform follow-up actions.

Other tender rules toward success

When it is decided to submit a tender on a certain contract it is critical that all information is known, and it always helps to have some guidelines. Five tips according to Purchase and Procurement Center are:

1. Do research and start soon – effort and resources are required, so to best utilise time, get the tender documentation early.
2. Understand what is wanted – thorough understanding of the tender documentation is required, so attend pre-tender briefings and either ask questions or listen to the questions asked.
3. Study evaluation criteria – Note the categories against which a tender will be evaluated and satisfy all of them, paying attention to the criteria that carry the most weight.
4. Make sure the tender is complete – all the requirements and specifications for the goods and services will be in the tender document, so make sure it is possible to deliver.
5. Note date, time and place – a failure to submit or a late tender submission is not accepted and all the resources and time that were spent are immediately wasted.

These guidelines were seen as the basic steps in the bid completion process. They should be kept in mind in discussions with stakeholder, as well as the structuring of the proposed process.

2.14. Persuasion within a bid

In any bid, the aim is to persuade the audience to choose your proposal as the best or most relevant to their needs. Persuasion can be a strong tool if used correctly and could lead to increased success within a bid. Persuasion is a form of communication, and using this form of communication and giving information may be needed to get the wanted decision. As the writing of the tender is also seen as a critical part of tender success, the investigation of what could be done to further increase chances of winning a tender was warranted. In this case there are four maxims for success (Sant, 2012):

1. Maxim of quality – talk the truth and only offer what can be delivered.
2. Maxim of quantity – only offer detail that is needed.
3. Maxim of relation – make relevant statements.
4. Maxim of manner – the way we present should conform to the manner set out.

To further simplify the embodiment of persuasion, the NOSE pattern is briefly mentioned. In his book, *Persuasive Business Proposal*, Tom Sant (2012) states that this is used to "win by a nose".

- Needs – The key needs, problems, issues or pains.
- Outcomes – Positive impact that will come from the fulfilment of these needs.
- Solutions – Recommendations that will deliver outcomes.
- Evidence – Show proof that it is within the organisation's capability to perform the task on time and within budget.

There are other tools in his book that help to properly apply persuasion techniques to a proposal. It is however clear that persuasion and its proper application could lead to successful tenders and definitely needs to be considered when tenders are written.

2.15. Tender strategy

In today's tenders a model that helps asses the best route to take with regards to the tender strategy could be of great benefit and thus warranted an investigation. When considering strategy the ability to assess the best strategy to be taken by bidding firm and to determine influence of the evaluating factors etc. would be of great benefit. This will briefly be discussed in this section.

Bid strategy developments

Regression modelling makes it possible to determine a bidder's optimum mark-up point (Carr, 1982), and further research made it possible to determine the most appropriate mark-up level (Drew, 2001). Drew further stated how the bidding price and the duration of the contract can be assessed by (Herbsman, 1995):

$$TCB = p + (UTV \times t)$$

TCB	- Total combined bid
p	- Price
UTV	- Unit time value specified by client
t	- Time

Figure 2: Total combined bid equation(Drew, 2002).

This equation then has the tender awarded to the bidder with the lowest TCB (Drew, 2002). Further it is accepted that each contracting party has an optimum price-time point for each contract. In the following figure it can be seen that the optimal point is B1, that the best combination of time and price is at point P1, t1, and that the time-value curve is a straight line because it is a fixed value as determined by the client. The point where the contractor is most competitive from the clients' perspective is at point B2 and therefore the best to submit with the tender is point P2, t2 (Drew, 2002).

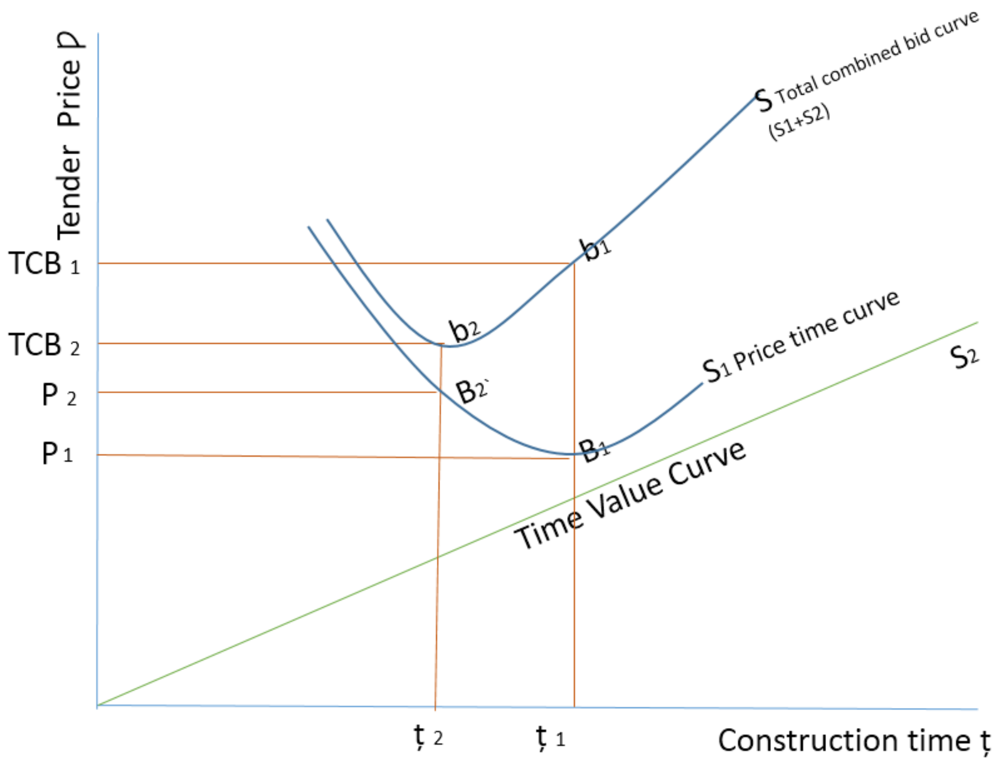


Figure 3: Price-time relationship (Drew, 2002).

In some cases a bidder has to make a trade-off against other criteria (higher/lower tender price, shorter/longer time or higher technical fee) and this need has to be addressed (McClain, 1992). Another problem is that for some bidders the combination of circumstances varies drastically from one tender to the next, so that the only solution is flexibility. Lastly it is stated that decisions are heuristic (Couzens, 1991), which simply means that they are more based on experience and perception (Drew, 2002).

It is then better to aim for a system that supports decisions than a system that replaces judgement. This aspect is important to note: although an ever improving structure should be in place, the strategy used within the tender should also be improved on a regular basis. Knowing that there are models available to assist in this could later be of great value and definitely indicates an area of further investigation.

2.16. Where to find tender leads

Knowing where to look for tenders is half of the battle. Public sector and government tenders are usually advertised, whereas private sector and non-profit organisations follow different channels (Center, 2014). This however should not deter one from continuing the search for other forms of tender identification and thus this aspect will be discussed briefly.

Public-sector tenders can be found by (Center, 2014):

- Tender notices in newspapers, trade magazines etc.;
- Monitoring online government tender bulletins on websites;
- Government offices may be approached directly to ask if tenders are out, or what other media they use to advertise tenders.

Private-sector tenders can be found by (Center, 2014):

- Keeping contact with potential customers to stay informed if new tenders arrive;
- Advertising services or product in trade and professional magazines;
- Researching activities in the organisations area;
- News reports also serve as good source of information;
- Networking within the organisations environment.

Other areas that may be considered are (Fagan, 1997):

- Subscription to the state tender bulletin;
- Subscription to provincial tender bulletin;
- Creation of a target list for possible clients;
- Reading of tender section of local paper;
- Contact tender section of chamber of commerce;
- Regularly visit local tender boards.

Overall tender alert systems are a good source of bid notifications even if it is at a fee, but the most effective method of tender lead obtainment is being proactive. Staying in contact with buying offices etc. will offer up some leads, but leads won't come along by themselves. Work hard and keep a look out.

2.17. Post submission

It is important to understand that after the tender has been submitted, the work is not over yet. Too be honest, one of the most important steps still has to be completed to ensure the best possible bids over and over. This phase consists of five steps (Business, 2012):

- Tender evaluation and feedback – Feedback on why a tender was successful or unsuccessful.
- Internal debriefing meeting – this is to discuss points of possible improvement.
- Presentations/Interviews/site visits – It is possible for buyers to want to do extra activities to decide on a supplier.
- Complaints process – Complaints and grievances are raised at this point.
- Update of bid repository and documentation.

2.18. Measuring process improvement

In every organization, management of processes is important to over-all efficiency, customer service, profit growth and morale within the enterprise, but measuring the effectiveness of processes and whether changes that are made improve them can sometimes be challenging. At this phase in the study the need arose for being able to make measured comparisons between old and new. This section briefly covers the different methodologies that were investigated and their different properties.

Any basic framework for measurement of process improvement consists of the following four steps (Barratt, 2010):

1. Creation of standards and definitions– Before it can be measured, the goals and objectives of the improvement process have to be defined so that a measure can be chosen.
2. Analysing the impact of the improvement – Look at changes that the improvement plan caused and determine if they are good or bad.
3. Measure outcomes – The comparison of the impact to the goals set out to achieve and whether success was obtained.
4. Determine the level of commitment to process improvement – determine the buy-in of stakeholders and employees. If there are issues, address them quickly.

2.19. Picking a process improvement methodology

In any organization the need to improve quality of processes while maintaining quality of performance is a critical factor in the success of any company. That is why a variety of methodologies exist to fit every organisation's needs. Examples of methodologies are (Gershon, 2008):

- Six Sigma
- Lean management
- Lean Six Sigma
- Agile management
- Re-engineering
- Total quality management
- Just-in-time
- Kaizen
- Poka-Yoka
- Process excellence

The purpose of this section will be to briefly describe and compare some of these methodologies for easier choice later in this study.

What is Total Quality Management (TQM)?

The origin of all modern improvement methodologies began with TQM when the quality revolution began with the idea of continuous improvement. This methodology was based on Deming's 14 points and involves 4 major areas in the philosophy, namely (Gershon, 2008):

1. Managerial responsibility to ensure continuous improvement;
2. Focus on work processes for improvement achievement;
3. Use of statistics for performance analysis;
4. Involvement and empowerment of employees.

TQM later evolved into Six Sigma.

What is Six Sigma?

Six Sigma originated in the Motorola Corporation in the mid-to-late 1980s and then later expanded at General Electric and other firms through the 1990s. Six Sigma has become widely recognized as a strong method of business process improvement for any industry (Hayler, 2007).

Even at the time of this study, the benefits to dedicated past users of Six Sigma is still being realized, and it is still an effective tool throughout most industries (Gershon, 2008).

Six Sigma is defined as: "a rigorous, focused and highly effective implementation of proven quality principles and techniques. Incorporating elements from the work of many quality pioneers, Six Sigma aims at virtually error-free business performance." (Pyzdek, 2003)

The measurement of process performance is called capability measurement. There are methods and tools available to determine the current level of capability and to determine what capability needs to be for appropriate Sigma level (Gershon, 2008).

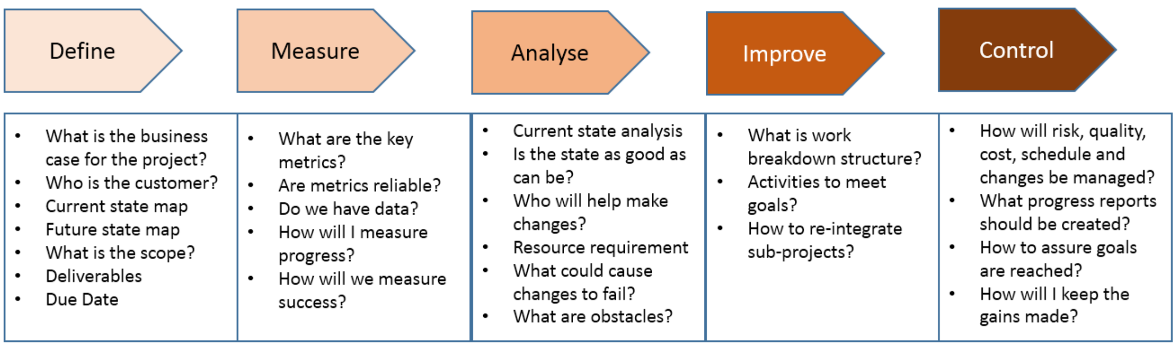


Figure 4: DMAIC Process for Six Sigma (Gershon, 2008).

What is Lean manufacturing?

From 1950 to the end of the 1950s, the Japanese automotive industry was led by Toyota and created a production system that recovered the industry from ruins to the biggest motor exporter in the world (Lu, 2011). The Toyota Production System or Lean Manufacturing will be discussed in this section.

Lean principles

Lean manufacturing usually consists of five main principles, namely (Rowland-Jones, n.d.):

- **Value** - create value from the perspective of the customer.
- **The value stream** – all the steps in the process chain.
- **Flow** - make the value process flow.
- **Pull** - make only what is needed by the customer (short-term response to the customer's rate of demand).
- **Perfection** - strive for perfection by continually attempting to produce exactly what the customer wants.

Waste consists of injuries, defects, inventory, overproduction, lead time, motion, transportation and processing. However, the supply chain has ten principles, namely (Lu, 2011):

1. Supply from smaller supply base.
2. Develop appropriate close partnership.
3. Select supplier based on performance.
4. Single or dual sourcing only.
5. Market price minus rather than market price plus.
6. Early and close engagement.
7. Synchronized flexible capacity.
8. Just-in-time delivery.
9. Incentive and reward alignment.
10. Willingness to share information.

Cost to serve

An idea in Lean can only be accepted if it passes the cost-to-serve test (Lu, 2011). As can be seen from the equation below, the aim is to reduce the cost-to-serve. Thus any activity that lowers the cost-to-serve level will be seen as beneficial.

$$\text{CTS} = \frac{\textit{Total cost involved}}{\textit{Customer perceived value and service}}$$

Lean drivers

There are six drivers of the lean manufacturing system. These were described by Dr. Dawei Lu (Lu, 2011) as:

- Waste reduction;
- Demand management;
- Process standardization;
- Engaging people;
- Collaboration;
- Continuous improvement.

Lean-process mapping tools

To identify the waste in a process, mapping is strongly encouraged. Lean has tools in the system to assist with this. The mapping tools are described in the article 'Going lean' by Peter Hines and David Taylor 2000 (Lu, 2011):

- Value stream mapping;
- Time-based process mapping;
- Process activities mapping;
- Supply chain response matrix;
- Logistics pipeline map;
- Production variety funnel;
- Quality filter mapping.

What is the CMMI framework?

Capability Maturity Model Integration (CMMI) is a method of determining to what extent processes are functioning in accordance with best practices, by supplying a means of assessment to indicate weakness and possible improvement (Sommerville, 2004). Thus the CMMI is an approach for process improvement that can give organisations the essential elements for more effective processes and can help make decisions regarding process improvement (Seeram, 2010).

The goal is continuous improvement, as we can never reach perfection, but we can always strive to do better.

What is Capability Maturity Model Integration?

CMMI focuses on practices, processes and guidelines that are seen as essential and describes proven ways of doing business by implementing effectiveness and common sense. CMM can be seen as the development and motivation of people; it measures the maturity of these aspects on a scale of one to five with maturity or the maturity of the process being defined as a well-defined, repeatable, measured, analysed and continuously improved process (Seeram, 2010).

Mature vs. immature organisation:

To best explain this, examples of each will be given to be defined by association.

Immature (Seeram, 2010):

- Processes are improvised for every project.
- Proven processes are ignored.
- Processes are reactive.
- Budgets and schedules are unrealistic.
- The quality fades to make up for schedule.
- There is no accurate or objective measurement for quality.

Mature:

- Coordination and communication within group.
- Planned work completion.
- Practices are consistent with processes.
- Necessary updates of processes are done.
- Roles and responsibilities are well defined.
- Full commitment by management.

Objective of CMMI

The objectives of CMMI are given as (Seeram, 2010):

- The production and delivery of quality products and services.
- Creation of value for stockholders.
- Customer satisfaction improvement.
- Market share increase.
- Excellence recognition.

The CMMI is structured as followed (Seeram, 2010):

1. Maturity levels in the staged representation or Capability levels by the continuous representation.
2. Process areas.
3. Goals: Generic and specific.
4. Common features.
5. Practices: Generic and specific.

Staged representation

The staged representation is described and analysed by use of Maturity Level models. A maturity level gives the state of refinement and offers a plateau for achieving improved processes (Seeram, 2010). This model measures the driver, which in this case is the maturity of being able to identify instances of possible improvement.

This representation offers a proven sequence for improvement with every level forming the foundation for the next, and can also make it possible to make comparisons across organisational borders. The maturity levels also make it possible to summarize results in a single rating (Seeram, 2010).

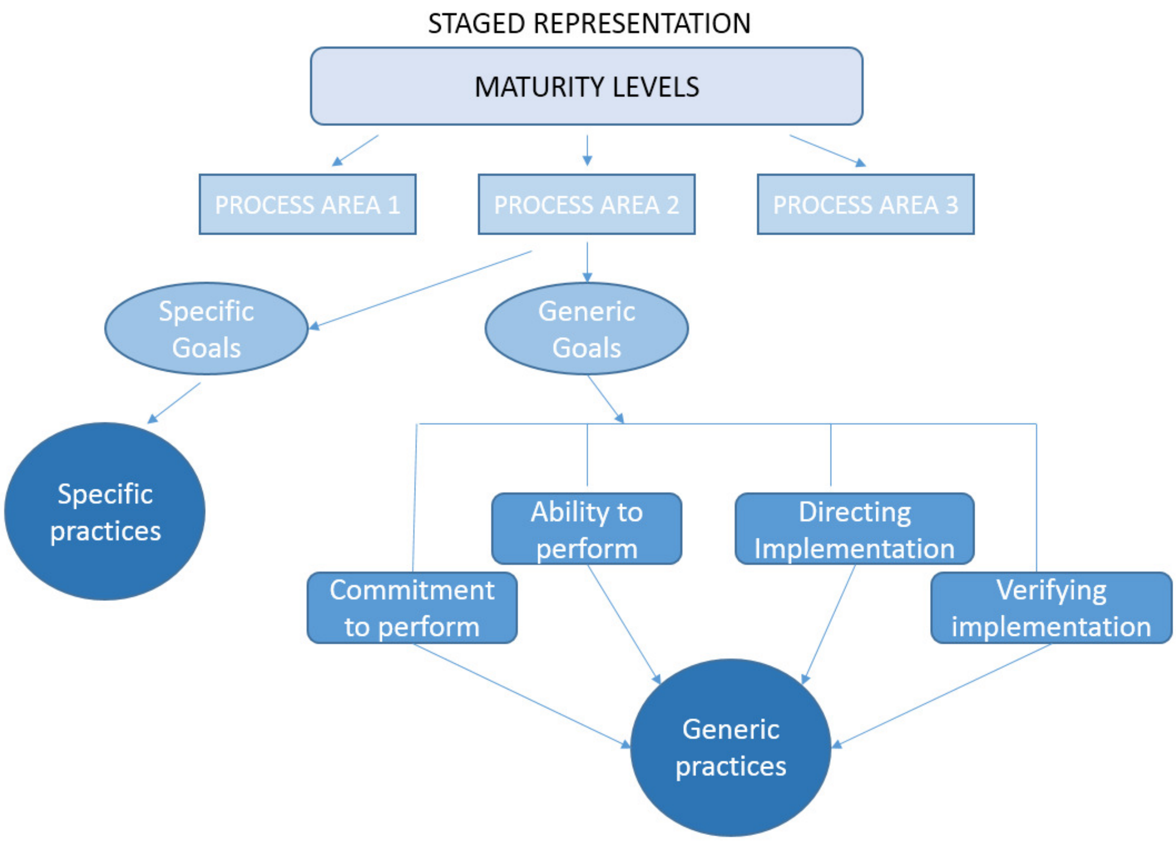


Figure 5: Staged representation of the CMMI (Seeram, 2010).

Continuous representation

This representation has the ability to let an organisation choose the process area with respect to which it wants to improve, and measures the relative process area with Capability levels. This method allows the freedom to choose the order of improvement to meet the needs of the business and reduce risk and allows for comparison over organisational boundaries with a process-area-to-process-area basis (Seeram, 2010).

A process can thus be selected and optimised to a certain point.

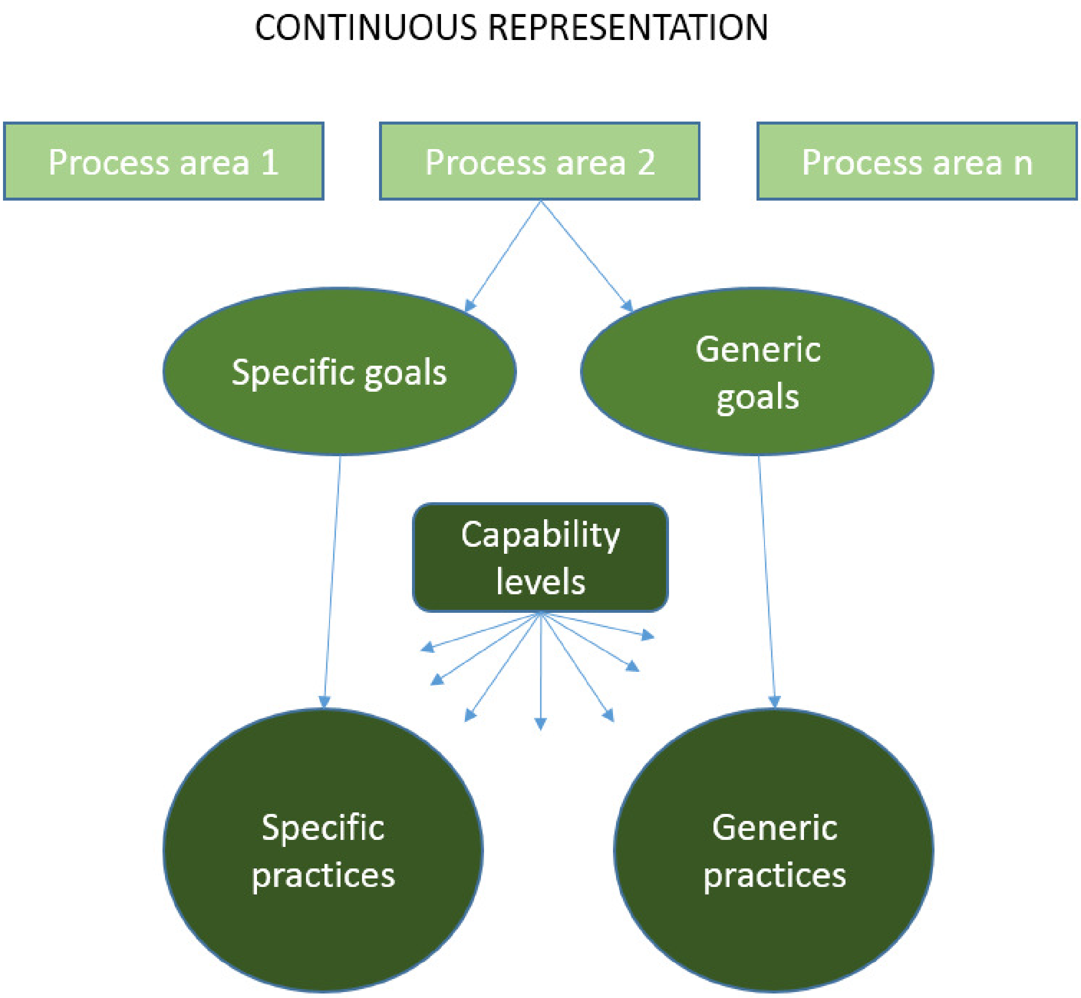


Figure 6: Continuous representation of CMMI (Seeram, 2010).

Continuous vs. Staged

For the case of this study it is only necessary to know that the staged representation focuses on organisational maturity whereas the focus of the continuous representation is focused on a single process area (Seeram, 2010).

As the focus of this study will pertain to assessment of a set of processes within a certain area, the continuous representation would be the most valuable. The capability level describes how the company is able to perform according to a certain process area. If this measurement can be performed, it can be used as a benchmark to possibly measure improvement.

Capability levels

Capability levels are foundations for each other consisting of specific practices that could improve processes in a certain area. There are six capability levels, numbered from 0 to 5 (Seeram, 2010):

0. Incomplete – Process is partially or not performed.
1. Performed – Performance not stable with regard to cost, quality time etc.
2. Managed – Process is planned, performed and monitored.
3. Defined – Process is managed and gives measurements for analysis.
4. Quantitatively managed – Process is controlled through statistical or other techniques.
5. Optimizing – Process is continually improved through innovation and incremental changes.

Generic goals and practices

The generic goals and practices form a critical part of every process area, but only the general goals will be stated here. Further discussion of the general practices of each goal can be found in (Seeram, 2010):

- General Goal 1 - Achieve specific goals.
- General Goal 2 – Institutionalize a managed process.
- General Goal 3 – Institutionalize a defined process.
- General Goal 4 – Institutionalize a quantitatively managed process.
- General Goal 5 – Institutionalize an optimizing process.

Features for proper implementation and institutionalization

There are five features that represent the correct institutionalization and implementation of key processes and the effectiveness, repeatability and endurance; they are (Seeram, 2010):

- Commitment to perform – Usually involves senior management support and policy establishment.
- Ability to perform – Resources, training and structures to help ability to perform.
- Activities performed – Plans and procedures, performing work, tracking it and correcting where needed.

- Measurement and analysis – Sample data that could be collected to analyse status and effectiveness.
- Verifying implementation – Reviews and audits by management.

Process area detail

A process area is seen as a set of processes or practices in an area that if they are performed and implemented correctly will cause a significant improvement in that area (Seeram, 2010). Thus these principles can later be applied to the processes in question to help improve the over-all functionality. These areas are used in both the staged and continuous representations of the CMMI framework and thus need to be inspected further.

An area and the amount of improvement have to be chosen beforehand as they support each other and levels cannot be jumped, as stated earlier. The staged representation urges a user to look at the areas in the context of their maturity level to which they belong. These areas can be divided into four groups, namely (Seeram, 2010):

1. Process management;
2. Project management;
3. Engineering;
4. Support.

Process area goals

There are 22 processes in the CMMI framework according to Seeram (2010). However, they will not be discussed in this study, although the fact that they do exist is worth noting.

Problems with CMMI

Some problems according to Sommerville (2004) are:

- Model level practices – Using different practices from different levels, but if not all of the lower-level practices are used, the organisation cannot move past that level.
- Discrete – did not acknowledge the distinctions between the start and end of models.

Practice orientated – How things were done was more of a focus than the goals themselves.

Alternatives

- Just-in-time (JIT) – This method can be classified as an inventory policy at its most basic level. Under this system, one only orders exactly what is needed, at the exact time it is needed. Nothing needs to be stored because it is received and used (Gershon, 2008).

- ISO 9000 – This is a quality management standard and more of an administrative system than an actual improvement system. Deming's principles actually state that the application of specifications and quotas can in fact work against improvement (Gershon, 2008).
- Theory of constraints (TOC) – This method focuses on the identification of bottlenecks and reducing them. This is more of a process management approach, much like TQM. The key idea is that one bottleneck exposes the next with continuous room for improvement. The only tool in this process is process mapping (Gershon, 2008).

Conclusion of methods of improvement

Six Sigma is the advancement of TQM and thus incorporates all that TQM does, so Six Sigma is definitely the best method overall for this application as its process of optimization directly follows the steps of this study. The other programs are somehow incorporated under the Six Sigma roof, with Lean Manufacturing being the only exception. There are however efforts being made to also merge these programs, and that appears to be the future. All these philosophies share the fact that they state a process will always have room for improvement, measurements and statistical analysis show the course for improvement and that the workers closest to any process have the best insight as to how it should be improved.

2.20. Calculating process efficiency

Lean manufacturing principles can be applied to any process. The identification and characterisation creates the need to use 5S, brainstorming and other tools to reach the realistic goals set out (Muir, 2010).

Process capability

The process capability measurement is involved in Six Sigma. The combination of the process mean and standard deviation are further combined with the upper and lower specification limits and represented on a Gaussian normal distribution as can be seen in the following figure. All products that fall outside the limits are classified as defects (Muir, 2010).

Manufacturing processes mostly produce normal distributions or other processes where time could be seen as the specification. As time is the measurement we hope to improve, this process was noted and researched.

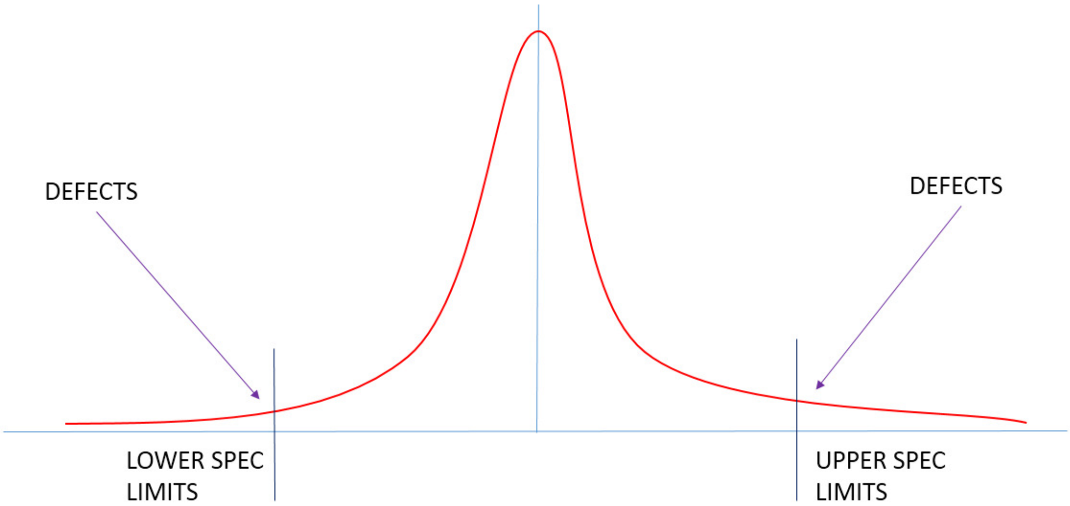


Figure 7: Process capability through Gaussian distribution(Muir, 2010).

Time is money

The main focus of lean manufacturing is execution speed and there is a lot of research to show the benefits of increased speed of execution. Internal measurements, such as reduction of work in progress and of excess inventory, could all show a decrease which could imply a better cash flow (Muir, 2010).

The principles still apply to the tender process as the time allocated to complete a tender is also money in the form of resources etc. Reduction in time to complete is a reduction in resources and money risked.

Lean process capability calculations

In manufacturing, the process pertaining to it is considered lean if the efficiency is calculated to be 25 % or more (Muir, 2010). This means that the value-added activities and their corresponding time need to make up a quarter of the over-all process.

$$Efficiency\ (Manufacturing) = \frac{Value\ added\ Time}{Total\ Time}$$

- Total time includes: Setup Time, Change Over Time, Maintenance and Scheduled Down Time

Figure 8: Efficiency of manufacturing calculation (Muir, 2010).

However, in a transactional activity the equation was adapted by Allastair Muir (2010) to act as the counterpart of the first equation with the same expectations of a process to be declared lean.

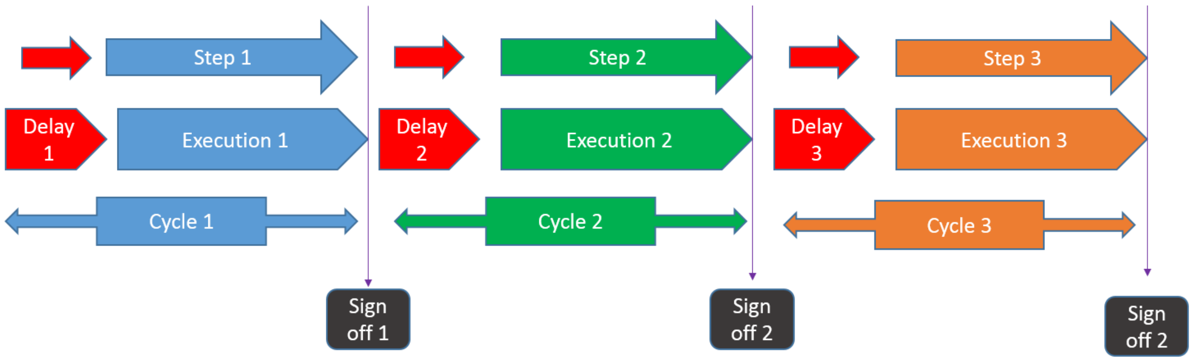
$$Efficiency\,(Transactional) = \frac{Execution\ Time}{Cycle\ Time} = \frac{Execution\ Time}{Execution\ Time + Delay\ Time}$$

Figure 9: Efficiency of transactional process (Muir, 2010).

It is the opinion of the writer that the second equation is much more of important to the tendering process as a reduction in delays will improve the time of execution.

Transaction project environment

If the reduction of cycle time is the main focus, the aim must be to reduce the over-all transaction time. This is because the execution time is the time to the market and delivery time and they are the most important metrics in a transaction project. These metrics are less visible than those of manufacturing and mean that it is important to separate individual cycle time data. As can be seen from the following figure, each cycle time is the combination of the delay as well as the execution time. Sign-off times are mostly the only reference points in information systems, so they can be used as set points (Muir, 2010).



According to Muir, it is better to start with the total cycle time of each step, subdivide into smaller components and from there identify the main causes of variation. It was then decided to apply this principle to this study, by analysing each component that makes up the tender process individually.

Calculation of lean metrics

The calculations that can now be performed are dependent on some values. The values we have for this situation will be the mean cycle time (μ_{cycle}), an estimate of the proportion of steps that occur without any delay or execution time ($P_{execution}$), and the mean execution time ($\mu_{execution}$) (Muir, 2010).

To transition to the point where the mean delay can be determined, the equation for the overall average is given as (Muir, 2010).

$$\mu_{cycle} = (P_{execution})(\mu_{execution}) + (P_{delay})(\mu_{delay})$$

But because the proportion must be equal to 1, the following is true:

$$P_{delay} = 1 - P_{execution}$$

This is substituted into the first equation to give:

$$\mu_{cycle} = (P_{execution})(\mu_{execution}) + (1 - P_{execution})(\mu_{delay})$$

Then the equations are rearranged to give:

$$\mu_{delay} = \frac{\mu_{cycle} - (P_{execution})(\mu_{execution})}{(1 - P_{execution})}$$

This value can then be substituted into the efficiency calculations. If the efficiency is more than 25 % the process will be considered lean. The good news in this situation is that the main goal is to reduce the time of delay, and that is much easier to do than reducing time of execution (Muir, 2010).

2.21. Process improvement

The improvement of the process that forms the tendering structure and its phases are briefly discussed in this section. Understanding the existing process and improving it was the main purpose.

Process improvement stages

The process improvement stages are (Sommerville, 2004):

1. Process measurement;
2. Process analysis;
3. Process change.

Sommerville (2004) stated in his work that to produce a good product, a good service is required. Our product being the tender documents, it is clear from this that the process used to perform tender needs to be inspected. He also stated that a factor that can also influence services or products is the capability of the designers or in the case of this study the writers of the tender documentation.

Process identification

The four types of processes that can be identified are (Sommerville, 2004):

- Informal – No detailed process model
- Managed – Defined process model
- Methodical – Process supported by some development method
- Supported – Process supported by automated CASE tools

Quality factors

The quality factors that play a role according to Sommerville (2004) are:

- For large projects the development process is the main determinant.
- For small projects the main factor is the capability of responsible persons.
- Schedule influences overall quality.

These factors have to be considered when possible improvements of the tender process are being investigated.

Process choices and measurement

When considering the process that should be used to perform a specific task the product or service being delivered should be factored in. Larger systems are management driven and should thus be strictly managed while for smaller system there is more space for informality. There does not exist a universally applicable process that can be applied to an entire organization. If the incorrect process is applied there may be high costs and low-quality repercussions (Sommerville, 2004). Therefore the proper process consideration should be done before any process design or re-design is attempted. The need and deliverables should be measured and planned for accordingly.

Measurements should be taken wherever possible to offer quantitative data. This could become difficult if there are no clearly defined process standards. These measurements should be used in turn to analyse improvements but should not drive the improvements. Some measurable factors are time, resources or number of occurrences per event (Sommerville, 2004).

Process analysis and modelling

When considering the improvement of a process the goal-question-metric paradigm can be used to clarify some aspects beforehand. The goal refers to what is sought to be achieved by the organisation. This is the objective (goal) of the improvement. The question phase concerns any questions of uncertainty relating to the goals. Lastly, the metric step has the purpose of data collection to answer the questions.

The existing processes are studied by this method and their activities are better understood. The process can thereafter be modelled and analysed to determine areas of improvement (Sommerville, 2004). The phases were set out in software engineering by Ian Sommerville as:

1. Process analysis – Study existing processes for better understanding and possible comparison.
2. Process modelling – The documentation of the process.
3. Process models and process standards –Start with an existing process.
4. Questionnaires and interviews – Carefully done to avoid biased answers.
5. Ethnographic analysis – Obtain process knowledge through observation. Best for in-depth process analysis of fragments.

Process change phase

In this phase modifications are made to existing processes with the aim of improving the overall functionality (Sommerville, 2004). This may involve the implementation of new practices or processes, changing order of activities, removing wasteful activities or the introduction of new responsibilities.

Change should always be driven by a measurable. This ensures that the correct measurements are taken and the end goal is achieved. The phases in this improvement step are (Sommerville, 2004):

- Identification of the area of improvement;
- Prioritisation of improvement;
- Introduction of process change;
- Training for process change;
- Fine tuning of change.

Identifying areas of further training

As with any process, being able to determine an area in need of improvement is the first step to continuously improving. Tenders are no different. To consistently win tenders an organisation needs to stay ahead of opposition and at the top of one's own game. For this purpose then there exists a tool in the format of a questionnaire to determine possible areas of further training and the urgency thereof. An example of this questionnaire can be found in *Practical Tendering Skills* page 62 by Kevin Fagan (1997).

2.22. Conclusion

It can be seen that there are an abundance of things to consider when writing a tender document or proposal and that the optimal usage of the tender processes is dependent on external factors such as proper planning, document storage, communication and management. These factors could all have an effect and should be considered when the improvement of the overall tendering process is being considered and planned.

Not all the available information was dealt with in this section, but the source literature was referred to for further reading and possible expansion in subsequent phases or iterations of the improvement process. The information obtained can now be applied to the specific problem that was faced at Tubular Track, and its application is described in the following chapters.

3. Experimental design

3.1. Introduction

This chapter describes the phases that were followed to design the experiment conforming to project processes as stated in the systems engineering handbook and the Project management body of knowledge (PMBOK). This was done in phases that were reworked from these manuals to fit the specific needs of this project. The phase structure also makes traceability possible, besides showing the project lifecycle phases and that deliverables were reached for corresponding phase. Showing that deliverables have been reached for each phase and then showing the overall process deliverables completes the process.

As chapter 1 can be seen as the initiating process, this chapter together with chapter 2 will serve as the project planning phase, following project phases as set out in the PMBOK. The phases of this study can be seen as:

1. Documentation of tender process at the start of study;
2. Informal interviews;
3. Formal questionnaire;
4. Design of new process;
5. Determining improvement and validation;
6. Conclusions and recommendations.

These phases are described and planned in the present chapter.

3.2. Documentation of tender process within Tubular Track at start of study – Phase 1

The first phase forms part of the process of defining stakeholder requirements, with the goal of documenting both the process and the requirements as seen by the stakeholders.

The tender process that had become established in Tubular Track (TT) at the start of this study needed to be documented. The purpose of this was to set a base line and to ease the comparison of methods; also, the transition between processes involves change. In many organisations, such as TT, management personnel have been doing things ‘their way’ for the entire existence of the company; this could cause some resistance to change. Again, there were working aspects of this method which could not be neglected altogether. Thus the entire system needed to be investigated so that positive building blocks could be kept and integrated into the newly proposed system. It was also hoped that because some aspects were integrated into the newly designed system the resistance to change would be minimized or removed completely.

Tender process documentation

Recording and documenting the existing process was decided to be the first step of this study. Informal interviews with different personnel involved in the tendering process then at work, albeit un-formalised, were documented and represented. Process representation software could then be used to visually show the organisational flow and other aspects. The goal with this was to make revisions easier through visual aids. The representations could be used in follow-up interviews until they were found to be accurate.

Support structures

Processes and their effectiveness can be increased by the presence of healthy support structures. An investigation and representation of the workings at the start of this study was a goal of this phase, and the documentation of all contributing factors made the inspection of support structures necessary.

Support structures can be anything that is added to increase the efficiency of the process. As informal interviews were already planned, the investigation of those structures that were in place was approached similarly as the tender process documentation.

Management of tender system investigation

In the review of the system as a whole attention needed to be given to its management. Success of a process depends on management of the process as a whole. In this phase of the investigation the management as then implemented at the start of this study had to be documented. This aspect was approached in the same way as the tender process and support structures documentation, through informal interviews. The aim was to identify management structures and to be able to accurately represent or define them.

3.3. Informal interviews for process discovery – Phase 2

The process of defining stakeholder requirements was also incorporated into this phase, with the goal of eliciting and negotiating stakeholder requirements.

In this phase the aim was identification of shortcomings within TT. This was done through informal interviews and a questionnaire structured for critical analysis of important aspects within any process, after which a short discussion was held. Interviews were held with the staff normally responsible for tender duties.

The interviews served as a tool to achieve a three-part goal: Firstly to determine possible shortcomings through insights of personnel that had been performing the tasks up until this point, and secondly to ensure that management felt involved in decision-making, to further reduce resistance to the proposed process and support structures. Lastly, as the process performers did not have systems knowledge concerning processes. It was therefore attempted to have informative discussions and to distribute some knowledge on the subject.

In this section six interviews were conducted and the findings and conclusions are briefly summarized.

Questionnaire structure

Interviews were kept informal to ensure that participants were at ease and honest with the knowledge that they had full anonymity. The questionnaire structure and questions were constructed using knowledge gathered through the literature study, to give the appropriate data and to further increase the accuracy of the representation.

The basic structure, as agreed upon earlier in this study, is only one part of the aspects determining the process situation. Determining key activities, responsibilities, problems and goals form part of thorough process discovery documentation. (ITS, 2010)

For identification of areas of improvement the day-to-day performers of tasks have the best idea of where problems are and how to improve (ITS, 2010). A selection of questions used for business process improvement interviews by the Information and Technology Services was used to make sure that the correct data were gathered and that the questionnaires were structured correctly. The questions can be seen in the following figure.

#	Questions
	Section A
1	What event triggers the process?
2	What happens when the process starts?
3	Can you think of another way the process could start?
4	What are the different parts of the process?
5	How do you know when a certain part is done?
6	Are all parts documented with their changes?
7	Are there governing factors to each parts end?
8	How do you know the process is done?
9	What happens when the process ends?
10	Are there different end results to the process?
11	What alternatives are there for the process end state?
12	Are there parts of the process you would like to eliminate, and why?
13	What part takes up the most time, and why?
14	Where in the process do you repeat work, how often and why?
15	How does management assess the process and its performance?
16	When time is short, what steps are most often left out?
17	What pains does the process cause?
	Section B
18	What is your role in the process?
19	What duties fall to this role?
20	How many people are involved in the process?
21	Where do you see delays?
22	Do handoffs take place and how?
23	What measures are used to manage the process?
24	How does management use theses measures?

Figure 10: Informal questionnaire for process discovery and improvement area determination (ITS, 2010).

The answers by each of the participants can be seen in Appendix B.

Summary of questionnaires used in informal interviews

Questions were structured either for process discovery or for inputs on management, design etc. of aspects that could influence overall process working. In this section the conclusions made by each question, or set of questions as received from managerial staff was discussed briefly with the hope of discovering possible focus areas when improvement was attempted.

Question 1, 2 and 3 conclusions

Questions 1 to 3 were designed to identify when the tender process was perceived to start. The purpose was to survey and document tender response triggers and activities.

Questions 4, 5, 6 and 7 conclusions

Questions 4 to 7 sought explanation and definition of phases within the tender process. These questions were incorporated to improve the accuracy of the representation and define base line measurements.

Questions 8, 9, 10 and 11 conclusions

Questions 8 through 11 were structured around the finalisation of the process and different outcomes and reactions. The aim was process discovery and to determine if follow-ups are done.

Questions 12, 13 and 14

These questions were structured to identify redundant, time-consuming and frustrating tasks. Areas that could need further investigation or support structures can easily be identified through these characteristics.

Questions 15, 16 and 17

Questions to identify what was seen as success or which measurable (outcome) carries most weight. Non-critical steps could be removed and pains and fights that happen because of the process could show areas of concern.

Questions 18, 19 and 20

Questions 18 through 20 determined if the process was formalised, if there was a team dynamic and whether there was a set methodology. A tender process has various co-dependent activities which if structured and formalised correctly could reduce workload and increase efficiency.

Questions 21, 22, 23 and 24

Management is the target of questions 21 through 24. The questions showed whether management was involved and if a measurable value was the driver for success. The overall competency could then be measured by these questions to justify possible implementation of guiding measure.

3.4. Formal questionnaire – Phase 3

The last part of the process of defining stakeholder requirements was performed in phase 3 with the goal of further documenting both requirements and process description.

The formal questionnaire was distributed after feedback from the stakeholders had been gathered and the identification of actual happenings within current tender process at TT was finished. Only personnel that were usually involved in the tendering phase participated. The questionnaire consisted of a total of 16 questions covering 7 aspects. Aspects that were covered as well as the corresponding question numbers can be seen in the following figure.

Process aspects investigated	Corresponding question(s)
Management	1,4,5,6,8,16
Process design	1,2,6,9
Process Moral and culture	2,3,6,7,14
Process planning	4,7,10,12
Roles and responsibilities	5,7,11,12
Support and infra- structure	4,5,9,13
Measurables	3,7,8,15

Figure 11: Process aspects measured in questionnaire and corresponding question numbers.

The questionnaire can be seen in appendix F.

A covering letter explaining the goals of the questionnaire, how to answer different questions and explaining full anonymity accompanied each questionnaire. A sample covering letter can be seen in appendix F.

The structuring of the questions and the criteria involved will be discussed briefly below.

Question 1

The first question shows overall process design and it was formalised within TT. If steps were set out and followed it would show organisation, management and process incorporation.

Question 2

The different phases were asked to be rated according to importance. A process that is not seen as important could be removed or adapted to be less time-consuming. If personnel feel a step was not so important it is more likely to be neglected.

Question 3

The personnel had an opportunity here to show whether they are satisfied with the current process at work. Stakeholders are more likely to support change if it can be seen that there is sufficient support to a cause.

Question 4

Question four refers to expenditure and application of resources on a possibility of winning the work or receiving money for it. Proper analysis of risk versus expenditure is essential and there should be adequate planning.

Question 5

This question was formulated to show the effectiveness of support structures and if they need to upgraded. The replies could also serve as proof that personnel and stakeholders support process development.

Question 6

Question 6 questioned the efficiency of the process at work at the start of this study and was also meant to test the belief of personnel in the functionality of the process.

Question 7

This question was aimed at determining the support behind the tendering process that was in operation at the time of this study. To have a successful tendering system there needs to be support and the belief that the best possible method is being followed. A culture of striving to achieve the best is necessary and this can only be achieved through applying the best practices.

Question 8

A stand-alone process usually shows lack of peer assessment or management. This question aims at further determining management and other shortcomings.

Question 9

Documentation is traceability, and traceability could mean removal of root causes of mistakes. Secondly, consistency is needed and is the effect of a well-designed process.

Question 10

Question ten targeted the planning when it comes to the bid or no-bid decision. This forms a crucial part as it does not help offering a proposal if it is not winnable or not worth the effort. “The objective is to achieve a proper balance between risk and opportunity.” (INCOSE, 2006)

Question 11

All tendering should be team efforts as the combination of ideas and tasks offers the best potential to be competitive and successful.

Question 12

Knowing roles and time frames is the first step to a successful tender. Proper role assignment sets the framework for the rest of the tender, but is also a representation of adequate management principles.

Question 13

Support structures are used to ease distribution of information, reduce delays in costing and make the process easier to manage. This question aims at identifying the degree of implementation of support structures, as most organizations such as TT seldom have structures in place to support the needs of a project (Duncan, 1996).

Question 14

Question 14 aims at showing opinions of the stakeholders regarding the design of the process.

Question 15

Reasons for failure or possible areas of improvement are needed for continuous improvement and are investigated in this question. Reasons for success are as important and should be a part of any process and process improvement.

Question 16

With tenders there is one chance of making an impression. Any form of review or improvement should be used effectively to contribute to a successful tender. Time used should be planned and deadlines should be set.

Interpretation of feedback from questionnaires

The requirement analysis process as stated in INCOSE was implemented in this phase with the goal of reviewing and assessing the priority of the requirements according to stakeholders.

The responses of personnel are inserted into a table and sorted according to the corresponding question. The average of each question is then calculated and used to depict the opinion towards the aspect in question.

The equation for the average calculation was:

$$Average = \frac{\sum_{i=1}^{n} X_i}{n}$$

The aim of this was to identify aspects that could be improved. The average of each answer is a good indication of what is felt regarding the process in place at the start of this study.

3.5. Design of new process – Phase 4

This section seeks to design a new tender system that consists of the new process and support structures. The interpretation of the results as in phase 4 will serve as main indication of what will be done and to what extent. Aspects such as a costing structure and guidelines to perform a bid the best way possible will be aimed to be incorporated. This will be done to create a viable and comparable design that will be presented to managerial staff and all stakeholders.

The architectural design process was incorporated into this phase with the deliverable of a possible solution that satisfies the requirements as stated in phase 4 (INCOSE, 2006).

The design is done by systematically incorporating improvements necessary to make the overall process qualify for a higher level as indicated by the various measurement tools. For this study the different tools used would be the Lean principles, CMMI framework process characteristics and capability measures, Efficiency calculations and time to perform the process.

3.6. Determining actual improvement and validation – Phase 5

G. Langley said that "All improvement will require change, but not all change will result in improvement". As the first iteration of the proposed system design will have been performed at this stage, there arises the need to measure if there was actual improvement because of the changes. This was done to be able to make a compelling argument between the old and new. The different methodologies of process improvement and process measurements, as stated in 3.6, were used to be able to quantify the improvement. This was done to measure all aspects of the process, namely: waste, characteristics, manageability and time to complete.

The verification process was applied in this phase to confirm that the requirements were reached through combining it with the INCOSE.

Lean manufacturing measurement

The first measure would be the Lean manufacturing principles. The basis for the improvement through lean is the application of the lean drivers, to increase efficiency through the reduction of waste, process standardization, engaging with people, collaboration and continuous improvement.

The two processes will be compared in table form with regard to the different principles. The waste will be rated with a "Yes" if it was present in the process and with a "No" if it was improved or reduced. The reason for this is that according to lean there is always room for further improvement and thus there is always a degree of waste present. The last five drivers will be rated according to the presence of the specific attribute with a "Yes" if it was present and a "No" if not.

CMMI framework process improvement measurement

The CMMI as framework has two different possible measures for rating the process improvement. The first measure available is a comparison of the properties of the immature vs. the mature processes. The comparison is done in table form, first stating the immature characteristic and whether it is present in the process and then the same for the mature characteristics. The process at the start of this study and the newly designed process will be written next to each other to make comparison easier to see.

The next measure of the CMMI framework is a capability rating according to the ability of the process in question. The process capability levels as stated in chapter 2.38 will be applied here to the two different processes to compare them according to their encompassing activities and also to see the growth in capability that theoretically was incorporated into the proposed tendering system. The results will be put in table form to ease the comparison.

Efficiency calculation measure

The efficiency calculations focus on the mathematically calculated efficiency of the process according to the time it takes to complete each task, with the delays in between each step and then the combination, or the over-all cycle time. The equation used for this measure is:

$$Efficiency\ (Transactional) = \frac{Execution\ Time}{Cycle\ Time} = \frac{Execution\ Time}{Execution\ Time + Delay\ Time}$$

The aim here's to show how the processes would perform theoretically. Estimations of delays and execution times will have to be made as well as taking structure and infra-structure into account. The two processes will then be compared to each other and a theoretical conclusion will be made.

Management as measure

Management and manageability improvements were attempted to be proven by comparing the two processes to each other with the process maturity assessment ratings. The ratings are given in table form, after which conclusions can be drawn.

3.7. Conclusions and recommendations – Phase 6

Understanding the results and the conclusions made from the previous phases will form the final phase, together with a statement of possible further areas of research or improvement.

The conclusions will be done in list form after which the possible areas for further research will stated. The goal here would be to state the final findings of this study and serve as possible support to continue the improvement culture within TT.

These phases and their results can be seen in detail throughout the following chapters. The planning was performed thoroughly and according to proven methods which justify going ahead to the next step.

4. Presentation and discussion of results

In this chapter results of the experiment are stated and discussed. This chapter presents results obtained through re-engineering of the tender process at Tubular Track.

4.1. Documentation of tender process within Tubular Track at start of study – Phase 1

Documentation of the process at TT took place through two informal interviews and through observation of everyday workings. Different aspects and their discovery will be discussed separately in this section.

Findings in respect of tender process documentation

The documented tender process (Appendix A) shows a basic structure in the practices that TT used at the time the study was started, but no detail in its design, no detail of tasks and no processes for iterative steps. These identified aspects would all be taken into account for improvement of the system, but further discovery would first be performed.

Support structure - documentation storage

Support structures such as a library with repetitively occurring documents, previous tenders etc.was inspected and documented. The following was revealed:

Each tender was done by separate personnel using several methods. The only finding that resulted from this is that each personnel member who prepared a bid had his own copies of the original tender. In cases where documents were shared, the difference in structure made it difficult to understand the logic or follow the cost calculation basic structure or design.

The conclusion from this is then that these support structures would need to be re-designed and formalised into the process with either team responsibility or group training on an agreed method. Storage of all dependent documents such as CV's, product records and supplier reports had to be gathered in an accessible place with company-wide access.

Costing method review

The costing structure is an important section of a tender considering that optimal profit is to be obtained, but the tender still needs to be won. This made structuring of this section a necessity for transferability of skills from one generation to the next.

In this investigation it was found to be a common practice to use a Microsoft Office spreadsheet either in their Excel or Access programs. These programs functioned in a similar way, but the user interfaces differed drastically.

Prices that are used varied which could be a result of the time it takes to gather prices and some might resort to their own contacts, suppliers or instincts to speed up the process.

The conclusion arrived at was to set up a spreadsheet with a combination of various possible tenders that had been used in the past. A summary section would be added so that work may be divided among responsible parties, interlinking the cost to a spreadsheet that can be updated independently and automatically updates all interlinked databases, thus making individuals independent of each other.

Management of tender system

In review of the system as whole and its management, it was found that a single individual was appointed solely responsible for a tender, and the largest percentage of the work rested on his/her shoulders. There was no division of work to optimally use resources or have certain people with a certain skills set concentrate on their area of expertise or interest.

There was also no initiating meeting with a brainstorming session for best quality or lowest value brainstorming. The entire tender document is left to the responsible individual and his/her own intuition.

Furthermore there is was no oversight or editing of the document and the goals that need to be reached are only monitored by the tender writer only.

The conclusion was then that a management structure would need to be defined to ensure document quality, review pre-submission and ensure adequate resource usage. A tender manager with sole purpose of overlooking the system was initially thought to be the solution but with the limited resources within TT the role would have to be shared, though definitely implemented.

4.2. Informal interviews for process discovery – Phase 2

In this section seven interviews were conducted and the findings and conclusions are shortly summarized for clarity.

Summary of findings of questionnaires used in interviews

The questions were structured for process discovery or for inputs on management, design etc. of aspects that could influence the overall process working. In this section the conclusions made by each question, or set of questions with their feedback from managerial staff was discussed to define focus areas when improvement was performed.

Question 1, 2 and 3 conclusions

The answers received for questions 1 to 3 identified that all parties knew when the actual tender process should start, but the second question could lead us to conclude that the tendering process in TT was not managed as a team, but as individuals.

Questions 4, 5, 6 and 7 conclusions

This set of questions focused on structuring of the process representation but also showed that there was no formalised management of the system and that the bid itself functions on lone intuition (instead of group structures and work divisions). Lastly the governing factor for all phases was shown to be time and time-related issues. The questions were formulated to cover what is seen as the middle or body of the tender process.

Questions 8, 9, 10 and 11 conclusions

These questions were structured around the end part of the process and mostly comprised process discovery questions. The replies to these questions show that there was no review structure in place and no reasons for failure were identified, no reports are made to achieve further improvement and there was no formal design or structure that was known to the people performing the process.

Questions 12, 13 and 14

This set of questions focused on identification of improvement areas and structuring issues. The areas that were noted by the participants varied. This could be due to the areas their expertise is focused on or the lack of support structures. The fact that the tasks that are most time consuming correlate with the tasks that an individual wants to be replaced could be seen:

- as due to the time consumed by task being seen as the main reason for the dislike, or
- as due to dislike towards a step leading to increased time delay.

Both of these issues are fairly serious and will have to be incorporated into the system design.

Questions 15, 16 and 17

These questions identify success or what was seen as success and what steps are not as critical as others so that wasteful activities could be removed or improved.

The questions again lead us to the fact that there was no formal process in place, so wasteful activities couldn't be as freely identified. Lastly it was shown that success was seen as on time delivery of a competitive bid.

Questions 18, 19 and 20

These questions were asked to finalise some characteristics of the process. Process formalisation, team dynamic and set methodology were inspected. The resounding conclusion that could be made from the answers received was that none of the above was in place. Things are done by individuals and the load was not distributed across a team.

Questions 20, 22, 23 and 24

Finally the quality of management was investigated. There seemed to be no management or any measure of a controlled environment. Management aspects such as constructive and timeous review of the work and encouragement, motivation or help with certain aspects were non-existent. The delays in prices or information show that there is no support structure and no regular management of reports etc.

4.3. Formal questionnaire and results – Phase 3

Questionnaires distributed and received

Because TT is a relatively small company with regard to managerial staff, the formal questionnaire was distributed amongst all staff that were involved in previous tenders and because of the proximity all questionnaires could be gathered again.

Questionnaires distributed	Questionnaires received	% Respondents
8	8	100

Results of questionnaires

The results of the all the respondents can be seen in appendix G. The averages according to question can be seen in the following figure.

	Question number															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Average	2	0	2	2	2	4	1	4	2	1	1	1	3	1	1	1

Question 1

The fact that there were no set steps that are followed was shown by the process design maturity not being of good quality and thus received an average rating of 2.

Question 2

The inquiry evaluation was rated the lowest activity in the process with an average of 2, which states that it was not seen as important. This could be interpreted to mean that the evaluation step doesn't take place or no real judgement was made regarding the tender itself. The question focused on the bid or no-bid decision that could be vital and spare cost. This aspect shows that planning and management were not properly integrated in the tendering process.

Question 3

Question three directly asks if the personnel are satisfied with the way things were handled. The low rating was interpreted to show that most of the participants know that improvements were drastically needed.

Question 4

This question and the low scoring it got by the stakeholders implied that no planning or proper budget was done, nor was the tender documented throughout.

Question 5

Much needed improvement of support structure was verified through the rating achieved in question 5. Question five showed the need to investigate the structure in place to ease the proposal writing process.

Question 6

Working to the last minute etc., knowing someone or the old-fashioned document assembly was not a competitive method anymore. The rating of 4 here showed that the tendering personnel at TT believe this also to be the case and further inspection was warranted.

Question 7

The rating achieved here shows that the personnel performing the tender did not believe it to be the best it could be and thus the conclusion was that the culture of striving for the best was not obtained.

Question 8

The rating achieved by this question showed that cost expenditure which forms part of the management of the tender lacks planning and budgeting and that overall the proceedings needed to be integrated into one formalised system.

Question 9

Results obtained for this question were interpreted to show no traceability or consistency and thus that the process was not well designed or implemented.

Question 10

This result was interpreted to show either that there was no decision weighing the viability of the bid or that it was not enforced. Both these factors show poor planning and a badly designed process.

Question 11

The rating of this question showed us that there was no team dynamic and that no cooperation between parties was taking place.

Question 12

A rating of 1 was found for this question. This showed that there was no role distribution and no discussion before work was commenced. This leaves all parties unaware of time constraints or support activities needed.

Question 13

Feedback from the personnel was neutral for this question. This could be interpreted to mean that some support structures were in place, or that they didn't know better.. It could also be that it was unknown what a support structure exactly is or that the question was vague and not completely understood.

Question 14

The question results showed that the design of the process was not all it could be and the management also needed to be sharpened up.

Question 15

The conclusion that can be made was that there was no report filed stating reasons for failure or possible areas of improvement.

Question 16

There can be seen from this rating that time was an issue and the review phase was neglected, thus quality was lowered to meet deadlines. This was seen as a characteristic of poor management and an immature process.

4.4. Design of new process – Phase 4

This section describes the design of the proposed new system that consists of the new process and support structure such as costing, and also recommended guidelines to do certain aspects of a bid to the best of the capabilities. The process was further designed to ensure complete traceability.

Proposed tender process design

The tender process was designed around the feedback gathered from the tender personnel at TT. The removal of certain aspects was considered but none could be removed entirely. The idea of designing the process in such a manner that waste activities are minimized and optimal flow is reached was the core principle being applied.

The structure was set up to show all critical activities and serve as a guide to tasks and the order in which they needed to be performed. The flow encompasses most variations of tenders that were experienced within TT. The reasoning and inputs from the interviews with tender staff and stakeholders was followed to reduce resistance against implementation and guideline against applying too big a change too fast.

Continuous process improvement through leaving information to ensure that the each time the process is performed it, in itself, is an ever improving frame that takes into account what was learned from previous executions. This was done by incorporating a step in which the manager of the tender has to write and store a small report regarding the roles that were fulfilled, their effectiveness, and also supplier data etc.

Analysis and evaluation process

The analysis and evaluation process was introduced because one does not have to tender on every occasion. This could be because of lack of resources or possible risks, but any organisation needs to determine whether the resources spent are worth the risk.

The structure of the process states the flow of the inspection of tender documents and making sure all the information needed for an informed decision was obtained. Every end result is also planned for to make sure no question is left to what the next step should be or when to terminate the process.

Bid team selection

A new process was introduced to distribute the work load, but also to ensure that people with certain expertise are responsible for areas where they can make the biggest contribution. This process follows an iterative flow: the more it is performed the more it will be known what person is best suited for what role and whether the best solution will be the sharing of roles.

The roles are set out for easy reference and are self-explanatory in their names, but it is still the work of the bid manager to ensure a full understanding of what is to be undertaken by each role player. For the same reason a small explanation and a set of guidelines for each of the three main roles was written and incorporated into the process. There is also a section stating areas for extra possible reading, either for better understanding of the role to be fulfilled or extra knowledge and training to ensure improvement in the specific role. These guidelines will serve as an iteratively upgraded document through the add-on of knowledge that is obtained through reading and applying the knowledge in them. The guidelines can be seen in Appendix E.

The process also serves as a management support tool as the roles are divided, the follow-ups and progress management can be monitored more easily, and it states areas that need to be focused on when a person is selected to fill the role.

Meeting guidelines

The meeting guidelines were set out to firstly provide for a constructive kick-off meeting as well as set the principle for all other meetings. A meeting without a goal is a source of wasted time, and as time is money, a wasteful meeting is a waste of money.

The flow of the guidelines procedure was formed as can be seen in appendix C, to make sure proper preparation is done before the meeting so that informed decisions can be made in the meeting. The goal is not alone to follow the guidelines in a strict process format, but to create initiative and set the relevant structures in place without further waste.

Enquiry Process

The enquiry process follows a simplified structure and was included mainly for thoroughness and to reduce the chances of any possible uncertainty. The process is only a basic structure and in actuality is only a supporting process that goes hand in hand with the main tender process.

Bid development process

The development process is a management structure as well as a design process for the final product/document. The management of the process was aimed to be simplified by having measurable points that can easily be referred to and makes estimates of time and resources needed to meet deadlines more easily.

The second objective was to guide the process by stating what needs to be done and setting deadlines for achieving it. The guidelines set out are to support and advise in certain instances, but also to make sure that conformance is achieved through a standardised and optimally functioning process by using experience and iterative reviews.

The process follows the flow of proceedings and offers a basic understanding and framework for going about the right steps in the right order. This was incorporated to improve the overall functionality and decrease time in the actual bid compilation.

The costing structure

The costing structure was the most time-consuming to design. The structure itself consists of three aspects, namely:

- The costing spreadsheets and formulae;
- The support documents;
- The ability to interlink contributors.

To fully describe this aspect each part will be discussed separately, after which the system as a whole will be summarized.

The spreadsheets

The spreadsheets were set up to cover a wide variation of possible tender possibilities and still leave room for extension if necessary. The design consisted of ten co-dependently functioning tabs, each with a specific function or cost calculation. These tabs were divided into:

1. Scope of work
2. Price list
3. Module manufacturing
4. Program
5. Grouting
6. Tools and consumables
7. Plant
8. Labour
9. P and G's (Preliminary and general)
10. Summary

Each section has its own calculations concerning that specific area. Thereafter the summary section was created to be able to supply a neat conclusion of all the different components and make an oversight possible of the different contributions of each section. The sections containing calculations on each tab are marked with red text and the sections or values that need to be supplied are marked with blue text to simplify the identification of areas in need of input.

The secondary goal of standardising the costing procedure was that all costing should be done the same way for all tenders. This was aimed for through the assembly of this combined spreadsheet. This makes it possible to apply quantities to different possible projects but still have the same basic structure which in turn makes comparison possible.

There are also drop-down lists that leave non-applicable sections out of calculation and muted. This was done to give further adaptive properties, friendlier user interface and time saving capabilities instead of having to edit an entire document to fit a specific tender or bid profile. This aspect can be seen in the following figure.

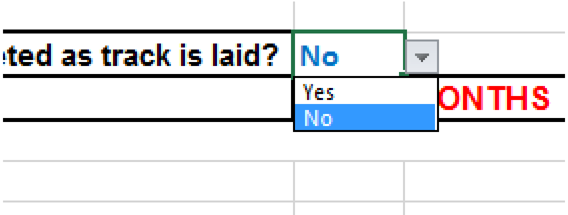


Figure 12: Screenshot of drop-down list to make spreadsheet adaptive.

Support documents

The supporting documents consist of different spreadsheets that can be sent to different suppliers to update their prices. Upon receiving the updated price lists, the interlinking aspect will be utilised as explained in the next section. These spreadsheets are already divided into different supplier categories, to ease the distribution. Each area of procurement can then be handled separately and independently of the others while simultaneously receiving various prices to always be able to submit the most competitive bid.

Interlinking of contributors

The interlinking of contributors was done by the creation of a shared folder on a local network within the Tubular Track organisational structure. This was aimed at giving the ability for all contributions to be shared simultaneously and instantaneously. The costing sheet, the support sheets and all tender documents are freely available and adaptable, and any update automatically updates the prices used in the spreadsheet reducing update times and increasing efficiency.

Summary

In summary, the costing structure functions as an interlinked system between different departments. The costing makes use of a Microsoft Excel interlink function, so when prices are changed within a dependent spreadsheet it is also updated in the linked sheets. This makes it possible for the costing department and the costing itself to function separately even if the final product is dependent on both. The pricing representative needs only update one sheet or even replace it to update to the most current prices, and all this without delaying any other processes.

The aim here was to reduce waste and changing interdependent activities to be less so. The time reduction in the final document assembly should be considerable as there is no more waiting for supplier feedback to be able to complete normally dependent tasks.

Writing skill guidelines

The writing of the document is responsible for giving a good impression and that is why it is important to spend time on both understanding what is needed and how it is stated. Guidelines of how to write a successful tender response are supplied in appendix E to insure optimal resource application. These guidelines will be iteratively improved as more experience is gathered and as it is seen what is efficient and effective. A set structure tender document with titles is a possible solution for further standardization.

The main aim here was standardising the structure so that more time could be spent on the refining of a document etc. and to save time formerly spent on doing unnecessary additives by giving guidelines to ensure time is properly applied.

Library structure

A library structure will be introduced as a support structure for the tendering process. The first goal of this library will be the storage of all additional paperwork regularly used for tenders. This could consist of CV's, BEE certificates, ISO 9000 certificates etc. The main reason for this is the reduction in time to gather the needed information. These documents make up a critical part of the tender evaluation and for that reason it would be of great benefit to have them conveniently stored and accessible when they are needed.

Secondly the library will serve as storage for past tenders to make referrals easier, and in situations where tenders are similar, the tender may be adapted to fully conform to the new requirements and drastically reduce time needed.

Lastly the library will store reports and reviews of previous mistakes, reasons for not winning tenders and possibly a review of certain people's ability to fulfil certain of the management team roles. The reports on suppliers concerning their delivery time, quality and cost will be stored too, with the hope of making future supplier selection easier and more efficient.

The library will be in the form of a folder both on the communal server and a folder in a storage closet. This will make choices of personnel to fulfil roles and bid document assembly easier, more informed and more efficient.

After the completion of all these aspects, the improvement of the process needed to be checked out.

4.5. Determining actual improvement and validation – Phase 5

As the first iteration of the design for the proposed system was performed, the need arose to measure any improvement, to be able to make a comparison between the old and the new. Different methodologies of process improvement measurements were used to give results that were supported by various theories. These different applications of methodologies and their results will be discussed in this section.

Lean manufacturing measurement

The first methodology applied was that of Lean manufacturing, by use of its principles. The basis for the improvement through lean is the application of the lean drivers. This was done to increase efficiency through waste reduction, process standardization, engaging with people, collaboration and continuous improvement.

The two processes were compared in this regard and the results can be seen in the figure below.

	Current Tender Process	**Proposed tender process**
Waste reduction:	3 of 8	8 of 8
Travel(Moving of product or information)	Yes	No
Inventory(Storing info ahead of required)	No	No
Motion(Unnecessary activity)	No	No
Waiting (for info)	Yes	No
Over processing (Higher quality than needed)	Yes	No
Over production(more than required)	No	No
Defects(Rework)	Yes	No
Skills(Under utilisation)	Yes	No
Demand management	No	Yes
Process standardization	No	Yes
Engaging people(People monitored and managed)	No	Yes
Collaboration(Work together)	No	Yes
Continuous improvement	No	Yes

Figure 13: Comparison of tendering processes with Lean manufacturing as measurement tool.

The conclusion can then be made that by use of the lean principles:

- The value for the stakeholders is a competitive bid in a short time, and the reduction of waste and the management of the process helps attain this, which means this principle is improved.
- The process steps are better monitored and represented in the proposed business process.
- The overall process flow is improved by formalised processes, guidelines and support structures.
- The implementation of documentation analysis assists in not overdesigning and only doing exactly what is asked.

- The aim for perfection is implemented in an iterative report and analysis structure implemented to gain feedback and create an ever evolving process.

Thus, according to Lean manufacturing the proposed tendering system has an increased lean rating and is better adapted for success, thus showing improvement.

CMMI framework process improvement measurement

The first comparison tool was the properties of immature vs mature processes. The comparison according to characteristics can be seen in the following figure.

	Current Tender Process	Proposed tender process
Immature Characteristics:		
Improvised for every project	Yes	No
Processes are ignored	Yes	No
Processes are reactive	Yes	No
Budgets and schedules are unrealistic	Yes	No
Quality fades to meet schedule	Yes	No
No measure for quality	Yes	No
Mature Characteristics:		
Coordination within a group	No	Yes
Planned work completion	No	Yes
Practices are consistent with processes	No	Yes
Processes are updated	No	Yes
Roles and responsibilities are well defined	No	Yes
Management is committed	No	Yes

Figure 14: Comparison using CMMI characteristics of mature vs. immature process.

The next measure of the CMMI framework is the capability rating according to the ability of the process in question. The results were put in table form as shown below.

Capability level	Discription	Current Tender Process	Proposed Tender process
0	Processes partial or not performed	Yes	N/A
1	Processes perform inconsistently	Yes	N/A
2	Processes are planned, performed and monitored	Yes	Yes
2.1	Plan process	Yes	Yes
2.2	Provide resources	**No**	Yes
2.3	Assign responsibility	Yes	Yes
2.4	Train people	**No**	Yes
2.5	Manage configuration	**No**	Yes
2.6	Identify and involve stakeholders	**No**	Yes
2.7	Monitor and control	Yes	Yes
2.8	Evaluate adherence	**No**	Yes
3	Managed and gives measurement	**No**	Yes
3.1	Process defined and established	Yes	Yes
3.2	Collects improvement data	**No**	Yes
4	Quantitively managed	**No**	Yes
4.1	Establish objectives	**No**	Yes
4.2	Stabilize sub-process performance	**No**	Yes
5	Continually improves	**No**	Yes
5.1	Continually improves	**No**	Yes
5.2	Corrects root causes	**No**	Yes

Figure 15: Comparison according to CMMI capability level descriptions.

The conclusion that can be drawn from the above figures is that the current process has all the characteristics of an immature process - a capability level of 2 - while the proposed tender process has a rating of 5 and all of the characteristics of a mature process were incorporated. We can deduce that according to what was learned through the literature study, a mature process is more likely to be more efficient. This means an improvement was made when measured according to the CMMI framework.

Efficiency calculation measure

The efficiency calculations as stated in chapter 2 focus on the mathematically calculated efficiency of the process according to the time it takes to complete each task, with the delays in between each step and then the combination, or the overall cycle time. The equation that is used as a measure is:

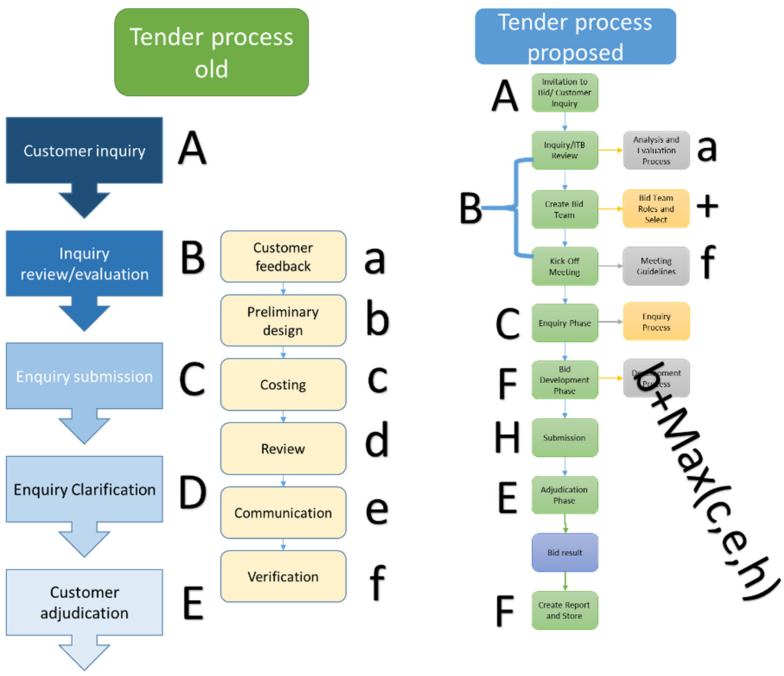
$$Efficiency\ (Transactional) = \frac{Execution\ Time}{Cycle\ Time} = \frac{Execution\ Time}{Execution\ Time + Delay\ Time}$$

According to this calculation it can be seen that to increase efficiency overall, delay time must be reduced. Thus to compare the efficiencies of the proposed tender system against the current process the delays themselves need to be compared.

The process in place at the time of this study was structured in series. This means each task was dependent on the task before it, and because the majority of the process was performed by one person, the lead times were immense. The time it took to gather documents, information or prices all amounted to the delay that is in question here.

The proposed process however is designed to distribute the work among different contributors which should reduce time overall. Further the costing sheets and the interlinking ability of the costing sheets have made it possible to start costing while waiting for updated prices and the library structure should in itself reduce time of document assembly.

Firstly the fact that overall time used to complete the process is reduced was proven by mathematically representing the processes. Each process variable was given a name and calculated accordingly.



The influence on time saved by use of formulated guidelines and questionnaires were left out of calculation for this phase. The equations were then constructed as follows:

$$TTC_{old} = A + B + C + D + E$$

$$TTC_{Proposed} = A + B + C + E + F + G + H$$

$$But: A + E \text{ are customer activities and cant change.}$$

$$TTC_{old} = B + C + D$$

$$TTC_{Proposed} = B + C + F + G + H$$

$$But: G \text{ is after process and won't affect deadline}$$
And H is submission that is done by a driver or electronically.

$$TTC_{Proposed} = B + C + F$$

But: B_{old} and $B_{proposed}$ are different.

B_{old} consists of 5 dependent variables.

$$B_{old} = \text{a+b+c+d+e}$$

$B_{proposed}$ only consists of a fraction of B_{old} .

$$B_{Proposed} = B_{old} \text{ - b – c – d – e + f}$$

$F_{Proposed}$ comprises of the rest of B_{old} variables but they can be performed simultaneosly.

$$F_{Proposed} = b + Max(c, e, h)$$

$$\therefore B_{old} > B_{Proposed} + F_{Proposed}$$

$$\therefore B_{old} + C + D > B_{proposed} + C + F_{proposed}$$

$$\therefore B_{old} + C + D > B_{old} + C$$

$$\therefore TTC_{old} > TTC_{Proposed}$$

With TTC meaning the Time to complete, this proves that over-all time used in performing the process should be reduced for the proposed newly designed process.

The conclusion can then be drawn that the total delay should theoretically be less for the proposed process than that of the process that was in place at the time of this study and the goal of constructing and proposing a time-improved system was achieved.

Management as measure

The second aspect for which we needed to show an improvement in the functioning of the tendering process was the management and manageability. To prove this the two processes were compared to each other by means of the process maturity assessment ratings (ITS, 2010). The result can be seen in the following figure.

#	Name	Description	Current As-is Process	Proposed new process
Level 1	Initial (Chaotic)	Undocumented processes are used for dynamic change and driven in an ad-hoc and reactive manner. These processes are dependent on individuals and is not repeatable.	✓	✓
Level 2	Repeatable	Processes at this stage are repeatable with possible consistent results and does have process discipline in areas.	✓	✓
Level 3	Defined	At stage three processes are defined and documented standard processes. The processes do experience some degree om improvement but are As-is processes.	✓	✓
Level 4	Managed	A process at this maturity uses metrics to manage or help to manage the project. Processes are able to adapt and adjust for specific project without measurable loss of quality.	✗	✓
Level 5	Optimized	Processes, when at level 5, continually improve through incremental changes or innovative technology changes.	✗	✓

Figure 16: Comparison of process maturity and manageability (Adapted from (ITS, 2010)).

It can be seen that the rating of management was improved by the introduction of support structures such as the costing spreadsheet and the responsibility matrix. The process for continuous report-writing improvement helped the process maturity transition to level five.

The conclusions possible from this investigation are stated in the following chapter. The experiment was performed within the guidelines set out beforehand and the data gathered are subsequently ready for the interpretation and concluding remarks in the following phase.

5. Conclusions and recommendations

Through the literature and own investigation it was learned that processes are a part of management and are dependent on the support of managerial staff and their acceptance. Support structures put in place and the environment in which they function also play a big role. This makes process thinking difficult to understand and even more difficult to sustain and for that reason this study was performed to serve as the first step towards tender process formalisation and it's continuous improvement. This chapter encompasses the closing process with the aim of bringing the project to a defined end.

This study focused on the inspection and improvement of the tender process within Tubular Track through the application of known process improvement methodologies. The conclusions of these results are stated in this section.

5.1. Process discovery

Process discovery was done in three sections (observation, informal discussion and questionnaires). This was done in iteration as to ensure the most accurate representation possible of the happenings within TT as the representation would later serve as a base line against which progress could be measured. The inclusion of stakeholders this early in this process was done to reduce the risk of resistance to change while also making sure that ill-informed choices due to lack of knowledge and experience were minimized.

The conclusion from the process discovery is that widely different views of the process at hand existed, but the issues that were noted could all be traced back to certain aspects of process maturity. These aspects could then be sorted according to importance and be further investigated. The representation was seen as accurate by the parties included in the discovery and could thus be considered adequate for the purposes of this study, thus reaching the objective of recording the current situation at TT at the time of this study, as set out in chapter 1.

Process discovery confirmed the need for an improved tender process at Tubular Track, hence confirming the merit of the research.

5.2. Scrutiny of tender process

The scrutinizing of the tender process was done through informal discussion and formal questionnaire. This gave the opportunity to discuss views on the process in both an informal manner and full anonymity.

Stakeholder opinions were used as a measure for areas of improvement, thus showing that the expertise of these personnel was appreciated and taken into account for the new process.

The conclusion after considering all the feedback from the stakeholders and performers was that the overall perception of the process and the positivity towards it was not positive and thus confirmed the need for improvement within the tender process.

5.3. New process design

The new process design was done by applying what had been learned through the literature review and aspects of the process in need of improvement, as identified by the formal questionnaires.

The process was designed to address the specific needs of TT at the time of this study thus reaching the objective of investigating and identifying possible areas of improvement in the current process of TT. Three of the most notable changes that were made were the redefining and restructuring of the tender process, the incorporation of an interlinked and interchangeable costing structure, and the design of the necessary support structures.

5.4. Process improvement measurement and validation

Process improvement was performed through comparing the representation of the situation at TT at the time of this study to the newly engineered tender process.

Following the arguments made earlier in the study it was concluded that there is definitive improvement in the new process structure with regards to management and wasted time reduction. The proven principles such as Lean manufacturing show reduced waste and the CMMI shows that the characteristics of a mature process were captured and that the process is much more capable of leading to success. This shows that the objective of re-engineering the tender process for TT, and of providing for its future needs, was achieved.

5.5. Summative Conclusion

This study is performed as part of an ongoing process improvement process within TT where the long term goal is the implementation of a self-improving and self-maintaining tender process. This long-term goal, which could not be satisfied in the time frame of this study, was divided into smaller steps (short-term goals) of which this study is the first. The goal for this study was then the successful application of process re-engineering to the tender process at Tubular Track. The objectives for this study were discussed from point 5.1 to 5.3.

The overall conclusion is that the work and the objectives as set out in chapter 1 have been performed and reached.

5.6. Recommendations

As the work performed in this study forms part of a long-term plan within TT, the recommendations for further work will follow the process re-engineering phases: Personnel training, change management, implementation and continuous improvement.

The application of the new process together with the necessary risk and change management will need to be planned with great detail to ensure the transition is as effective and efficient as possible. The needed training and assistance need also be inspected. It is recommended that the newly designed process be implemented at Tubular Track following these investigations.

Other processes within TT need to be further inspected and continuously measured as the improvement of processes and their working is iterative and ever evolving.

Formalising and implementing measures to ensure continuous process improvement should also be considered for all processes within TT to ensure optimal functionality.

The steps are formally set out within the process re-engineering methodologies and should be followed to ensure that the re-engineering is applied correctly at TT.

At the time of this study, Tubular Track was approached by the Passenger Rail Agency for South Africa (PRASA) to serve as consulting engineers. This means that TT will need to release tenders and manage them. This creates the need to investigate the process of tender invitation compilation.

Lastly, it should be noted that work performed in this study could also be adapted and applied to other organizations with similar structure or areas in need of improvement. Although the application was specifically aimed at Tubular Track, I believe other organisations could also benefit from this application.

Appendix A

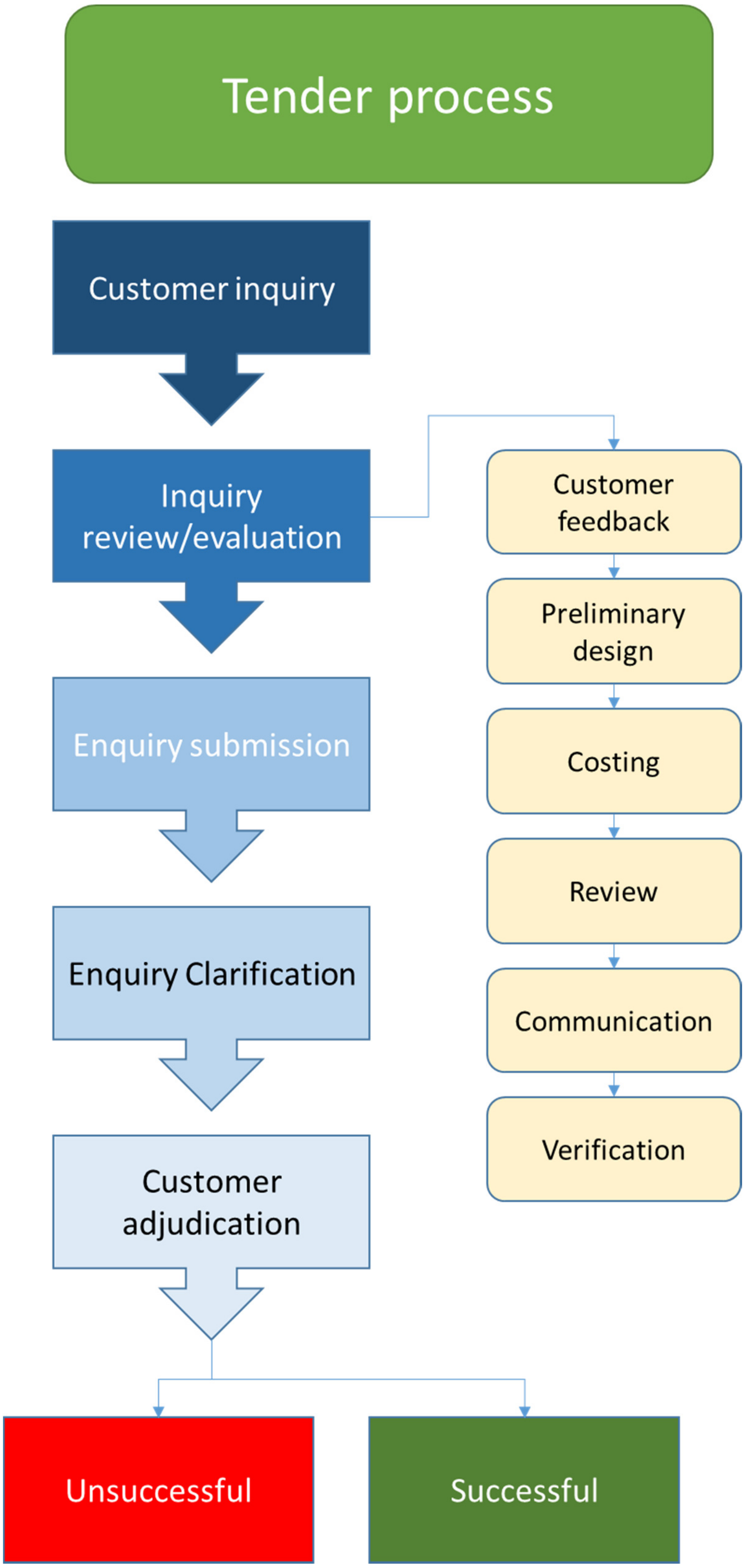


Figure 17: Tender process as at start of study. (Adapted from (Maree, 2013)

Appendix B

#	Questions	Answers:
	Section A	**a**
1	What event triggers the process?	A tender opening or the approach of a possible customer
2	What happens when the process starts?	Someone is allocated to go to the briefing or read through tender documents and basically manage the tender
3	Can you think of another way the process could start?	One of our existing jobs could be extended or an existing client could ask us to perform work
4	What are the different parts of the process?	Documentation analysis, client feedback, costing, writing of document, approval and submission
5	How do you know when a certain part is done?	When you have information to move forward.
6	Are all parts documented with their changes?	No, why should it be?
7	Are there governing factors to each parts end?	Yes, mostly time limits the amount of work on a part.
8	How do you know the process is done?	The tender is submitted to the client
9	What happens when the process ends?	Tender awarding
10	Are there different end results to the process?	Yes,
11	What alternatives are there for the process end state?	Win on loose tender
12	Are there parts of the process you would like to eliminate, and why?	In the overall process I would like to remove the writing of the description and so in the writing of the tender document because tenders should purely be based on price.
13	What part takes up the most time, and why?	Writing the document
14	Where in the process do you repeat work, how often and why?	Most of the work is a repetition.
15	How does management assess the process and its performance?	By means of winning the tender or the time it takes to complete a tender
16	When time is short, what steps are most often left out?	No step is left out, but less attention is given to the actual writing of the document
17	What pains does the process cause?	Everyone always wants me to help them with something.
	Section B	
18	What is your role in the process?	Mostly buying department things, but has done a complete tender alone.
19	What duties fall to this role?	Prices, rates, time for delivery and availability
20	How many people are involved in the process?	2
21	Where do you see delays?	Getting prices from suppliers
22	Do handoffs take place and how?	No
23	What measures are used to manage the process?	Check in every now and then
24	How does management use theses measures?	To keep me on my toes

Figure 18: Correspondent A answers to first questionnaire.

#	Questions	
	Section A	**b**
1	What event triggers the process?	News of a possible tender
2	What happens when the process starts?	Someone is given the tender documents to study and run the tender
3	Can you think of another way the process could start?	Someone could approach us
4	What are the different parts of the process?	Document reading, question phase, proposal design, costing and approval.
5	How do you know when a certain part is done?	When you have done all you can on that section.
6	Are all parts documented with their changes?	Yes, in the tender document. But not all changes are documented separately.
7	Are there governing factors to each parts end?	Yes, time and money
8	How do you know the process is done?	The letter of submission is signed
9	What happens when the process ends?	We keep following up to find out who won the tender
10	Are there different end results to the process?	Yes
11	What alternatives are there for the process end state?	Well, there is possible re-tender if prices aren't what was expected or so, but mostly it is the awarding of tender which could be successful or not
12	Are there parts of the process you would like to eliminate, and why?	I would like to remove the exchange and wait between the asking of prices and actually receiving them. This takes way to long and could drastically decrease actual time of doing the thing.
13	What part takes up the most time, and why?	Getting prices and other information
14	Where in the process do you repeat work, how often and why?	The costing and approval are repetition orientated.
15	How does management assess the process and its performance?	I think the performance is mostly shown through time to complete.
16	When time is short, what steps are most often left out?	The approval stage
17	What pains does the process cause?	Disagreements over solutions and methods of doing work
	Section B	
18	What is your role in the process?	Entire tenders and site visits
19	What duties fall to this role?	Everything
20	How many people are involved in the process?	3
21	Where do you see delays?	Prices and design information
22	Do handoffs take place and how?	No
23	What measures are used to manage the process?	One on one meetings
24	How does management use theses measures?	Too make sure that we are on time

Figure 19: Correspondent B answers to first questionnaire.

#	Questions	
	Section A	**C**
1	What event triggers the process?	First tender briefing
2	What happens when the process starts?	Someone is put in charge of the tender and given all the documents or if documents have not been received told to go to briefing and receive get them
3	Can you think of another way the process could start?	we could be approached by someone or we could do an extension of contract
4	What are the different parts of the process?	Enquiry from client, feedback, solution design, costing, tender document compilation and submission.
5	How do you know when a certain part is done?	When you run out of time and there are more important sections
6	Are all parts documented with their changes?	No, each tender will have its own changes and basic structure.
7	Are there governing factors to each parts end?	Yes, time
8	How do you know the process is done?	When we have given the tender to the possible client or consultants
9	What happens when the process ends?	We wait for the tender to be awarded and if possible work through consultants to get piece of job
10	Are there different end results to the process?	Yes
11	What alternatives are there for the process end state?	It could be won or lost with the exceptions of us maybe brought in as consultants.
12	Are there parts of the process you would like to eliminate, and why?	I guess I would just like to remove the lead times between different sections because of the pressure they put on deadlines.
13	What part takes up the most time, and why?	Waiting time
14	Where in the process do you repeat work, how often and why?	Most of the tasks are repetitive with minor differences.
15	How does management assess the process and its performance?	The performance of the process I think is mostly only judged by the end document and whether the bid is won or not.
16	When time is short, what steps are most often left out?	We always make a plan to do all the steps.
17	What pains does the process cause?	Interference with my other obligations
	Section B	
18	What is your role in the process?	Mostly design aspects and document writing
19	What duties fall to this role?	Brainstorming and designing of possible solutions and design of necessary earthworks etc.
20	How many people are involved in the process?	2 or 3
21	Where do you see delays?	The assembly of the entire document
22	Do handoffs take place and how?	No
23	What measures are used to manage the process?	A check in every now and then
24	How does management use theses measures?	To have input

Figure 20: Correspondent C answers to first questionnaire.

#	Questions	
	Section A	**d**
1	What event triggers the process?	A new tender possibility
2	What happens when the process starts?	A person is given responsibility of the tender and the documents so that the tender document can be started immediately
3	Can you think of another way the process could start?	We could initiate a tender for gaps we see or we could be given a possible extension of contract.
4	What are the different parts of the process?	Document and bill of quantities, questions phase, costing phase, tender writing and approval phase and then submission.
5	How do you know when a certain part is done?	when I am satisfied with what is done
6	Are all parts documented with their changes?	Yes, every part is in some format stored somewhere.
7	Are there governing factors to each parts end?	Time
8	How do you know the process is done?	The tender has been awarded
9	What happens when the process ends?	We submit the tender and wait for adjudication
10	Are there different end results to the process?	Yes
11	What alternatives are there for the process end state?	Either tender awarding or a re-tender.
12	Are there parts of the process you would like to eliminate, and why?	The most annoying thing is the finding of documents and looking through tender as to what exactly is necessary. Also the last approval step where the boss changes everything to the way he wants.
13	What part takes up the most time, and why?	Prices and information
14	Where in the process do you repeat work, how often and why?	basically all activities are repeated in all tender
15	How does management assess the process and its performance?	Time is the only actual measurement that matters
16	When time is short, what steps are most often left out?	We don't leave out steps.
17	What pains does the process cause?	Getting annoyed with people not giving information when it is necessary.
	Section B	
18	What is your role in the process?	Whole tender and tender opening finding
19	What duties fall to this role?	All
20	How many people are involved in the process?	2
21	Where do you see delays?	Re-doing costing and everything overtime the boss doesn't understand
22	Do handoffs take place and how?	No
23	What measures are used to manage the process?	A visit too my office
24	How does management use theses measures?	Just to check up

Figure 21: Correspondent D answers to first questionnaire.

#	Questions	
	Section A	**e**
1	What event triggers the process?	A tender opening
2	What happens when the process starts?	The CEO appoints someone to take charge of the tender and manage it accordingly
3	Can you think of another way the process could start?	we could be approached by a 3rd party consultant or someone that wants to use our product in their tender
4	What are the different parts of the process?	Briefing phase from client, question review phase, site visits, tender costing, tender writing and hand in.
5	How do you know when a certain part is done?	Gut feel
6	Are all parts documented with their changes?	Yes, all documents are stored for referral.
7	Are there governing factors to each parts end?	Yes the deadline
8	How do you know the process is done?	When they awarded the tender with confirmation
9	What happens when the process ends?	we wait for next tender
10	Are there different end results to the process?	Yes
11	What alternatives are there for the process end state?	Tender awarding or postponement of tender due to only have limited capital or maybe even tender division.
12	Are there parts of the process you would like to eliminate, and why?	I think the process runs pretty smooth until you need some information from a different person.
13	What part takes up the most time, and why?	Information assembly
14	Where in the process do you repeat work, how often and why?	Yes, costing and writing of document
15	How does management assess the process and its performance?	The performance is measured by handing in a tender on time.
16	When time is short, what steps are most often left out?	The writing of the document is neglected a little.
17	What pains does the process cause?	A fight at every point of discussion.
	Section B	
18	What is your role in the process?	Whole tender
19	What duties fall to this role?	All
20	How many people are involved in the process?	2 or 3
21	Where do you see delays?	Arguments concerning irrelevant things
22	Do handoffs take place and how?	No
23	What measures are used to manage the process?	Help with some aspects of the tender or small meetings
24	How does management use theses measures?	To have a say

Figure 22: Correspondent E answers to first questionnaire.

#	Questions	
	Section A	**f**
1	What event triggers the process?	News of new tender
2	What happens when the process starts?	The tender documents are either received or obtained at first briefing and someone is chosen as responsible person
3	Can you think of another way the process could start?	An extension of contract like Namibia
4	What are the different parts of the process?	Tender clarification phase, tender costing phase, tender writing phase, approval phase and submission phase.
5	How do you know when a certain part is done?	When I say it is done
6	Are all parts documented with their changes?	Yes, I keep all calculations etc. in a tender file if someone questions something.
7	Are there governing factors to each parts end?	Time
8	How do you know the process is done?	The moment the documents are sent
9	What happens when the process ends?	Everything is stored and wait for next tender and tender awarding
10	Are there different end results to the process?	Yes
11	What alternatives are there for the process end state?	Tender awarding, re-tender or tender revision
12	Are there parts of the process you would like to eliminate, and why?	The costing phase needs to be structured so that everyone has the same method, because every time I review them I have to learn someone's spreadsheet to be able to understand how and what and where the person got to his information.
13	What part takes up the most time, and why?	Costing
14	Where in the process do you repeat work, how often and why?	The entire process should be repetitive
15	How does management assess the process and its performance?	A good tender process should complete a tender in time with the lowest cost and maximum profit.
16	When time is short, what steps are most often left out?	We should not leave out any steps. Rather work late.
17	What pains does the process cause?	Time has to be divided between tasks and sometimes late nights cant be avoided.
	Section B	
18	What is your role in the process?	I only want to do oversight at the end, but I do many tenders as a whole.
19	What duties fall to this role?	Approval etc.
20	How many people are involved in the process?	Depends, but entire team should be involved.
21	Where do you see delays?	There are delays everywhere.
22	Do handoffs take place and how?	No
23	What measures are used to manage the process?	The process is managed by following up on everyone and asking how it is going as well as me checking the end result before submission.
24	How does management use theses measures?	This is used to make sure we are not falling behind and that we are moving in the right direction with an acceptable price.

Figure 23: Correspondent F answers to first questionnaire.

Appendix C

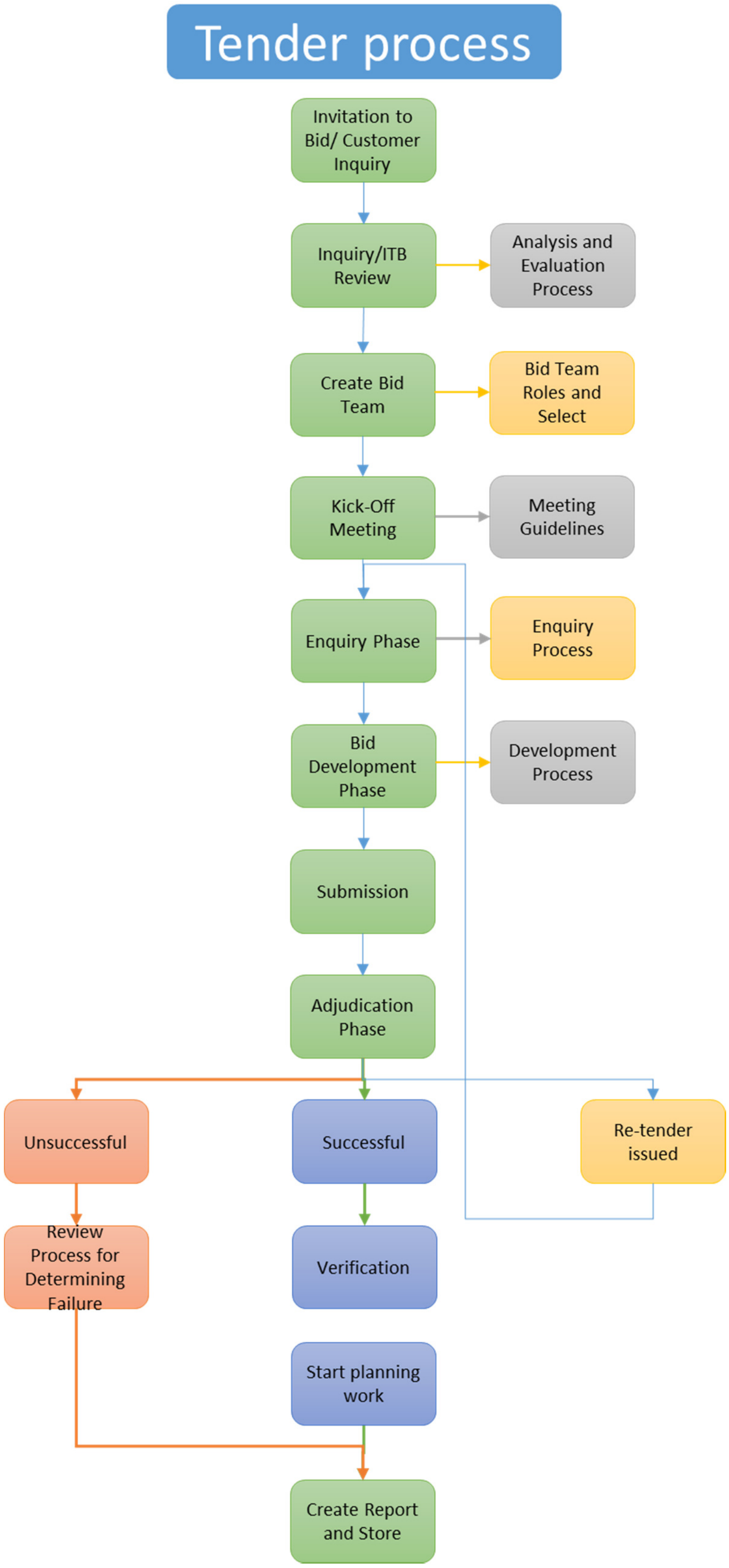


Figure 24: Proposed tender process.

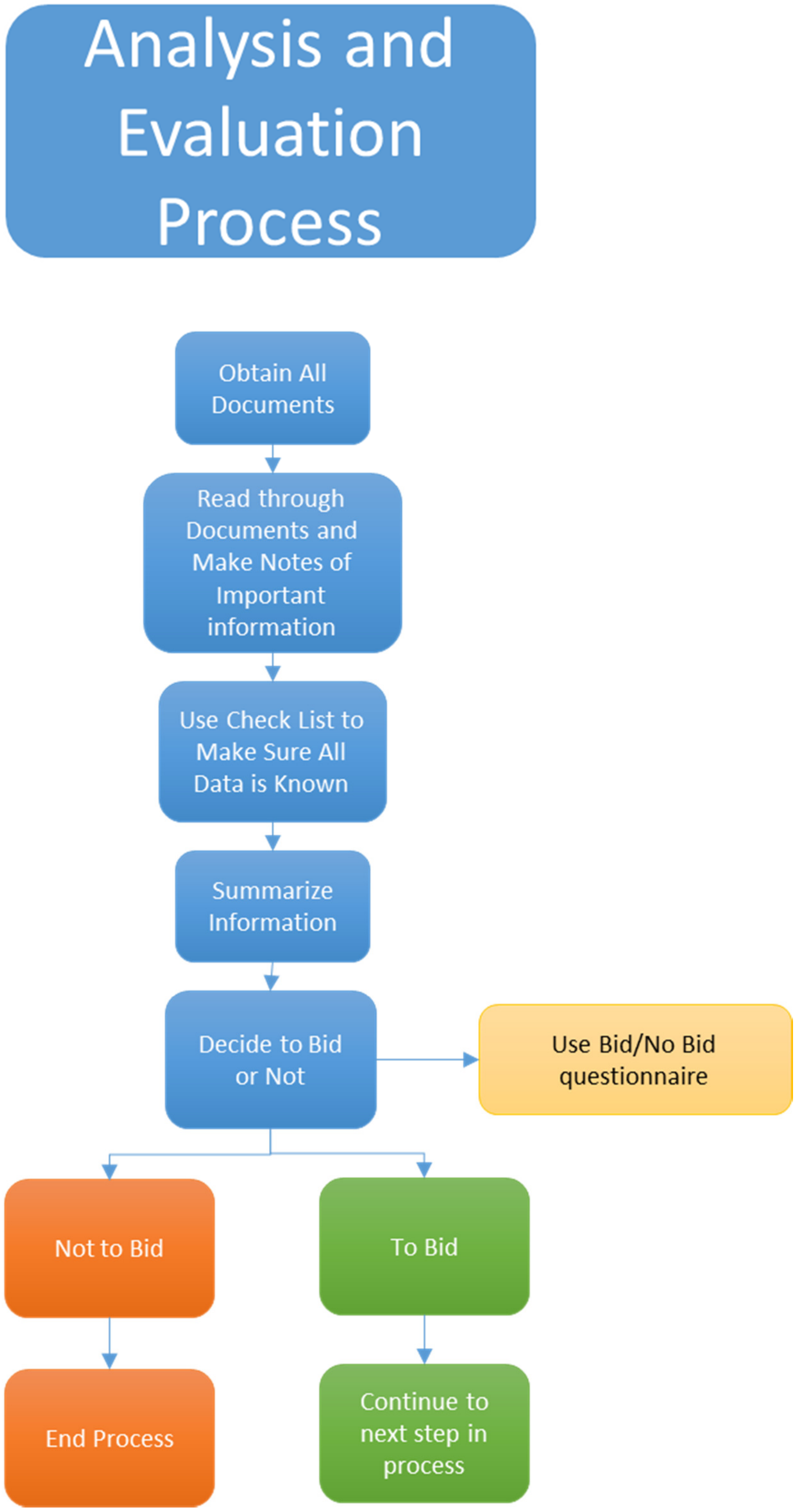


Figure 25: Proposed analysis and evaluation process.

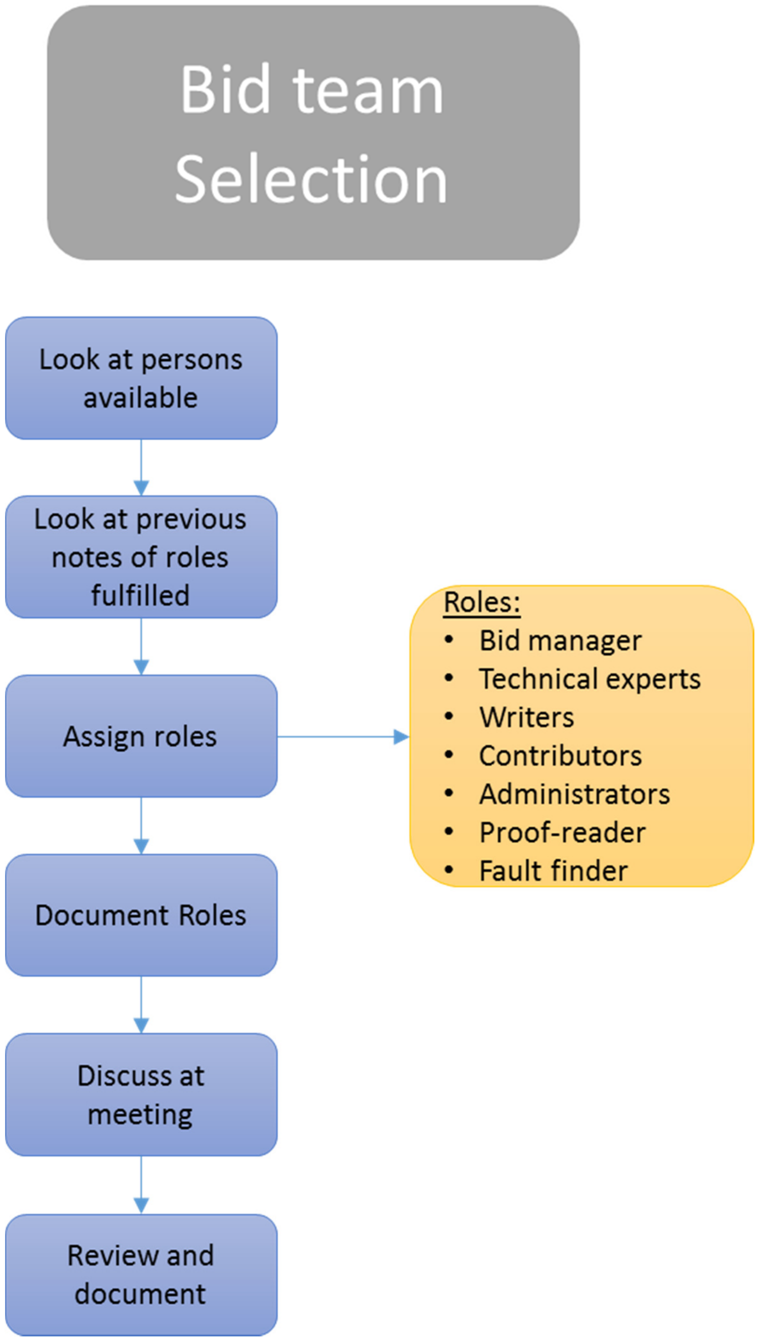


Figure 26: Bid team selection guidelines.

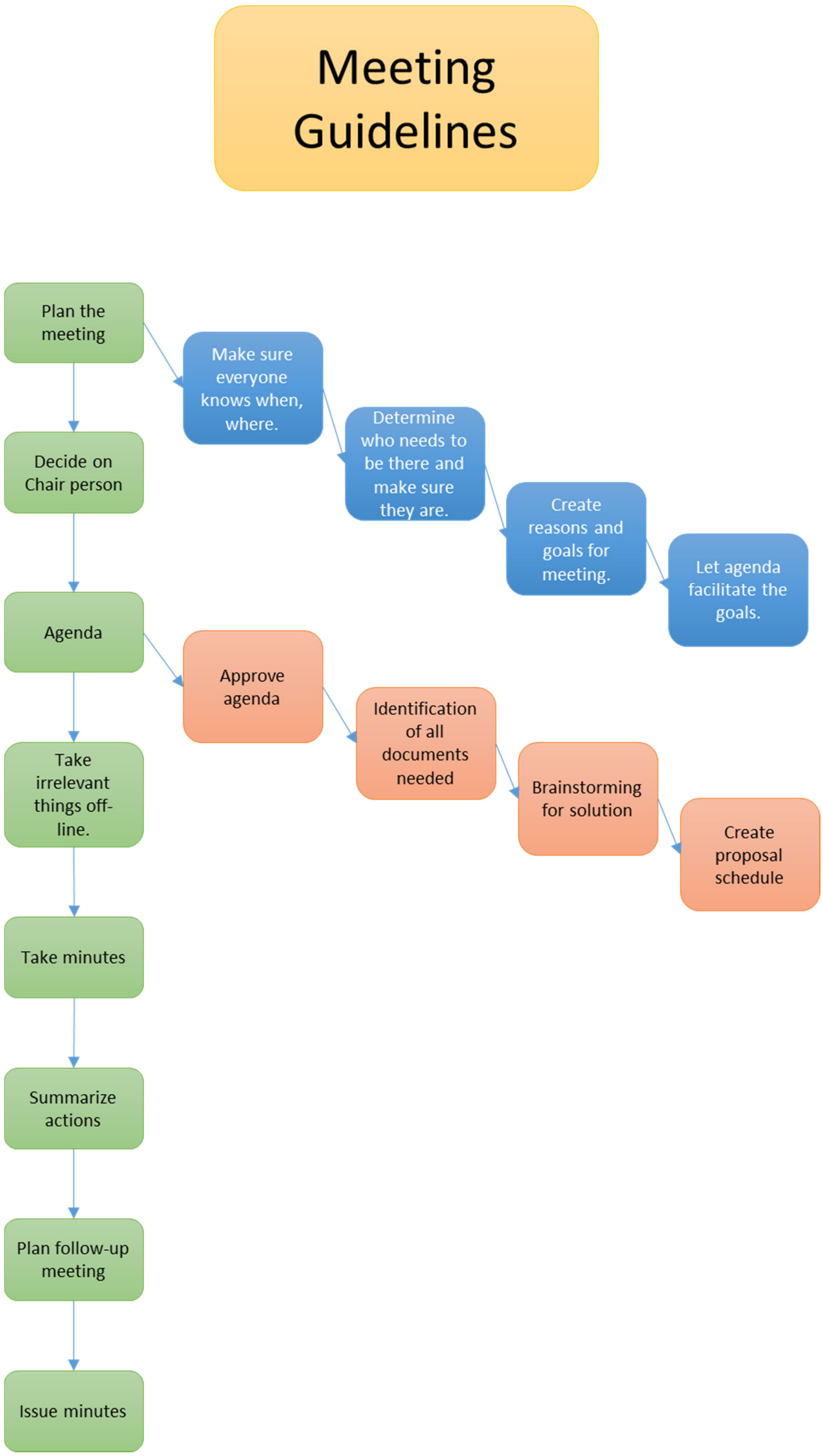


Figure 27: Proposed meeting guidelines

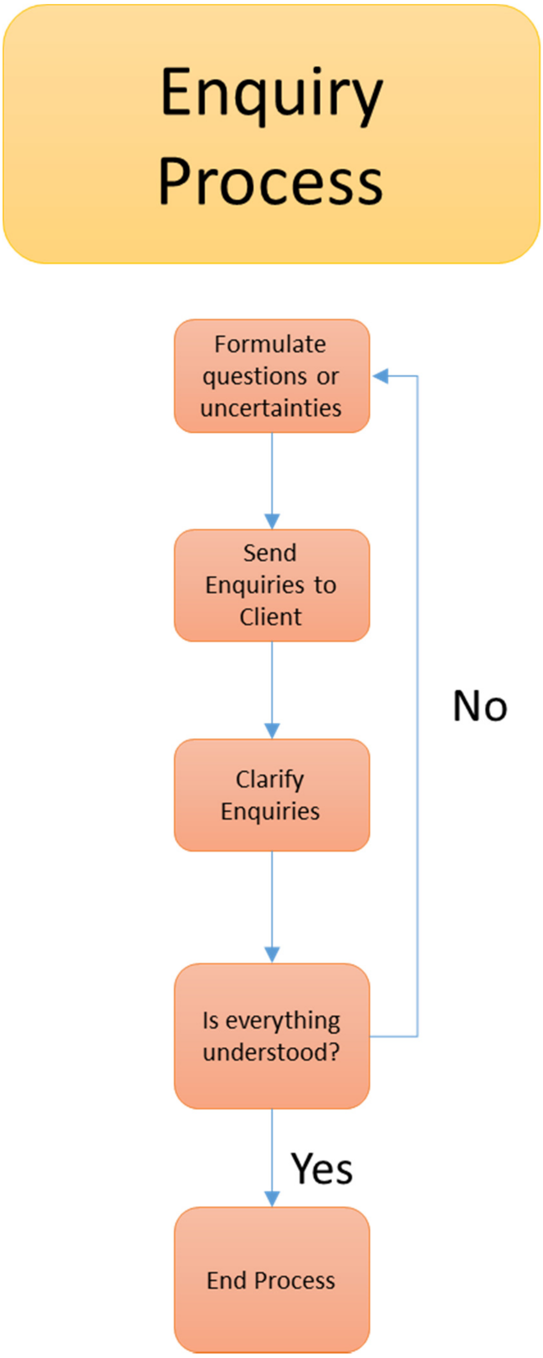


Figure 28: Proposed enquiry process.

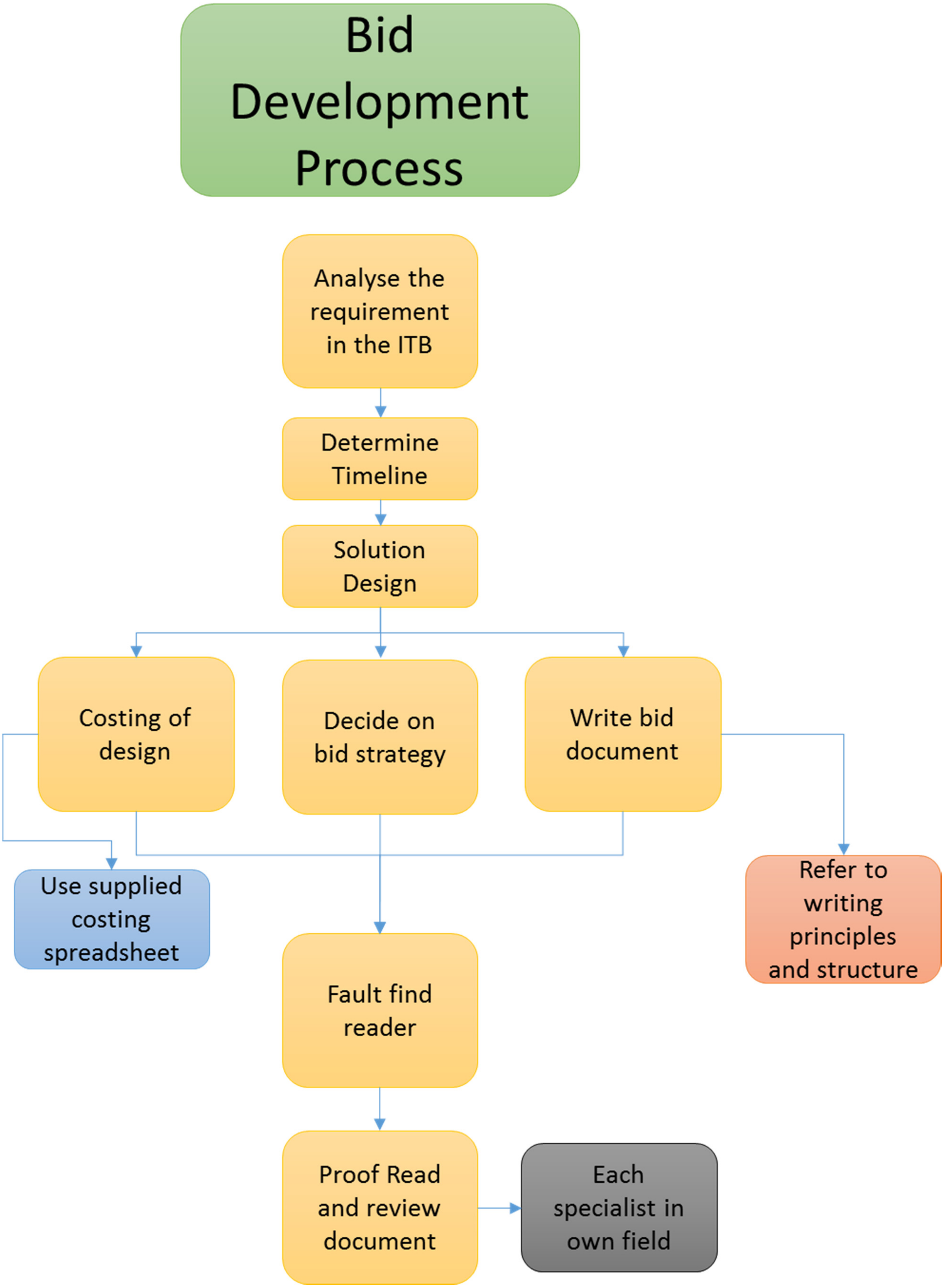


Figure 29: Proposed bid development process.

Appendix D

Issues to note!!!	
	Instructions on bid tenders
	Background and objective of tender
	Scope and services covered by contract
	Information required in response
	Limits on amount of pages or words
	Issues and priorities identified
	Factors that influence bid competitiveness
	Emphasis on certain competencies
	Acceptability of subcontracting
	Evidence of preposition of certain methods or acceptability of alternatives
	Attitude to risk management
	Time frame
	Deliverables and outcomes
	Budget constraints
	Client responsibilities
	Price information treatment
	Criteria for evaluating bids
	Stages in procurement process
	Clarification procedures
	Contractual matters and conditions
	Unusual requirements of work spec or bid style

Figure 30: Issues worth noting when studying tender documents.

Bid/No Bid Assessment and Checklist

[Select a criteria score of 1 to 5.]

5 = Could serve as a strong advantage
3 = Will have no good or bad effect
1 = Will serve as very bad disadvantage
Unk = The effect is unknown

#	Question	Criteria Score (1-5)	Potential Deal Killer? (Y, N)
	Prospect Client Information		
1	Do we know the decision makers and is it possible to influence them?		N
2	Does this project align with the business strategy?		N
3	Is there a budget and has it been approved?		N
4	Do we understand the drivers for this bid?		N
5	Are the requirements defined, and are they feasible?		N
6	Do we know the evaluation criteria?		N
7	Are there any serious business/technical/financial issues we are aware of?		N
8	Do we know the proposal time frame, and is it realistic?		N
9	Has the prospective client already made a "buy or build" decision?		N
10	Is low price a major factor in selecting the winning bid?		N
11	Any penalties for either not delivering on time or not within budget?		N
12	Are the contract terms and conditions acceptable to us?		N
	Internal Information		
13	Does the opportunity align with our own strategic direction?		N
14	Do we have strong management support and sponsorship?		N
15	Do we have the resources and will to win this opportunity?		N
16	Do we have the resources and ability to deliver, if we win?		N
17	Could we manage the risks, if we win?		N
18	Could we get additional resources if we need?		N
19	How known are we with and within this sector?		N
20	Have we had success with similar opportunities?		N
21	Do we have a favourable relationship with this prospect?		N
22	Are partners needed, and if they are, could they complicate our situation?		N
23	Do we have differentiators that improve our odds of winning?		N
24	Can we afford the investment needed to pursue this opportunity?		N
25	Could this project put any of our existing business at risk?		N
26	Can we contractually protect our intellectual property?		N
27	Any consequences to us of losing or not bidding?		N
	Market/Competitive Information		
28	Do we know who the other competitive bidders are?		N
29	Does it pose a threat if a competitor is an incumbent?		N
30	Is a competitor favored by prospect decision makers or influencers?		N
31	Are we at a distinct competitive disadvantage from the start?		N
32	Are new or unproven technologies involved in our solution?		N
33	Is enhancing our reputation and market positioning an effect if we win?		N
34	Will winning open up new market opportunities for us?		N
35	Will winning give us an advantage over our competitors?		N

		# of Y's:
Total Score: (Maximum of 175 points)		0
Total number of scores rated as 1 (Serious competitive disadvantage):	0	
Total number of scores rated as Unknown (Sort before decision is made):	0	

Figure 31: Bid no bid questionnaire. Adapted from (Corporation, 2014).

TUBULAR TRACK (Pty) Ltd.

<Project Name>
Roles and Responsibilities Matrix

Department:

Product/Process:

Document Owner:

Project or Organization Role:

Version	Date	Author	Change Description

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Figure 32: Responsibility matrix pg. 1 for Tubular Track as adapted from (Corporation, 2014).

Roles and Responsibilities Matrix

Roles and responsibilities matrix purpose and goals

The purpose of this matrix is to assign departments or individuals to activity categories, define role responsibilities, and define relationships between groups. This matrix should be completed early in project planning, before detailed resource allocating or scheduling.

The goals of the roles and responsibilities matrix are to:

- Define roles and responsibilities of project stakeholders.
- Improve overall project team and stakeholder communication.
- Proactively identify gaps in assignments, accountability, or resources.
- Clarify cross-functional interactions between project team members.
- Document project interdependencies with other enterprise initiatives.
- Define project team interactions with supporting resources and departments.

KEY:
A – Accountable for successful completion of task.
R – Responsible for completion of task. (Task can be delegated to this person.)
S – Supports task.
C – Requires communication about the task.

Organization Title	Project Activity				
	Requirements	**Design**	**Costing**	**Writing**	**Review**
Project Manager	R	C	S	A/R	S
<Title>	<A/R/S/C>	<A/R/S/C>	<A/R/S/C>	<A/R/S/C>	<A/R/S/C>
<Title>	<A/R/S/C>	<A/R/S/C>	<A/R/S/C>	<A/R/S/C>	<A/R/S/C>
<Title>	<A/R/S/C>	<A/R/S/C>	<A/R/S/C>	<A/R/S/C>	<A/R/S/C>

Title	Role	Responsibilities
Project Manager	The Project Manager is responsible for developing, in conjunction with the Project Sponsor, the project charter. The Project Manager ensures that the project is delivered on time, within budget, and to the required quality standards.	• Manage and lead the project team. • Manage the coordination of the partners and the working groups. • Develop and maintain a detailed project plan.
<Title>	<Role>	• <Responsibility>
<Title>	<Role>	• <Responsibility>
<Title>	<Role>	• <Responsibility>
<Title>	<Role>	• <Responsibility>
<Title>	<Role>	• <Responsibility>

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Figure 33: Responsibility matrix pg.2 for Tubular Track as (Attorneys, 2003)

Project name

SCOPE OF WORK FOR *Project name*	DATE:	11 January 1900

A. TRACK SPECIFICATION:

Length of Track:	1 278	meters
Rail Size:	48	kg/m
Gauge:	1 065	mm
Axle Loads:	22	tons

B. MODULE INFO:

Length of Module:	6.0	meters
Height:	0.300	meters
Width - top:	0.320	meters
Width - bottom:	0.450	meters
Volume of Module:	1.490	m³
Module Qty:	213	each

C. COMPONENT SPACING:

Spacing of components	1000.0	mm

Item	Tangent	Curved	Transition
Gauge Bards	2	3	6
Stirrups	8	6	0

D. REINFORCING:

Module:

Size	Top	Bottom	Unit	Total/module
Y20 - per beam	0	0	each	0
Y16 - per beam	0	3	each	6
Y12 - per beam	2	0	each	4
Y10 - per beam	0	0	each	0
R8 - per beam	1	0	each	2
Shear Links	**Spacing**	**Cut Length**		
12mm	0.15	1.31	m	0
10mm	0.15	1.31	m	80

Joints:

Size	Top	Bottom	Length	Total/module
Y12 - per beam	0	0	1.050	0
Y10 - per beam	0	0	1.050	0

Filler Grout Re-bar:

Type	m²/joint	Joints/module	Mass/m²	Total/module
WG Ref 244	0.4	2	0.244	2

Figure 34: Costing spreadsheet pg.1 of 10, Scope of Work.

Project name

PRICE LIST FOR *Project name*	DATE:	11-Jan-00

LENGTH OF TRACK	1 278	meters
AXLE LOADS	22	Ton/Axle

1.COMPONENTS - EX FACTORY

Item	Description	Unit	Factory Cost	TT Mark Up	Allowable Cost	Remarks	Mass Unit (kg)
a	Gauge Bar	each	633.69	2.20	1 394.12		32
b	Stirrup	each	217.15	2.20	477.73		9
c	Tubular Bag	meter	59.20	2.50	148.00		0.15

2.MOULDS

Item	Description	Unit	Factory Cost	TT Mark Up	Allowable Cost	Remarks	Mass Unit (tons)
1	2014 - 20 Ton 6m	each	100 000.00	2.50	250 000.00		2.2
		Write off %	30.00	%	450 000.00	Carry to Summary	
	Qty of Moulds required	6					

3.FASTENERS

Item	Description	Unit	Supplier Cost	TT Mark Up	Allowable Cost	Remarks
a	e1802 Series Pandrol Spring	each	17.84	1.10	19.62	
b	e2006 Series Pandrol Spring	each	21.75	1.10	23.93	0.8 kg
c	T0	each	9.40	1.10	10.34	
d	T6	each	7.77	1.10	8.55	
e	UIC 6	each	10.87	1.10	11.96	
f	T11	each	8.51	1.10	9.36	13.35kg/200 units
g	T17	each	8.51	1.10	9.36	
h	T23	each	10.84	1.10	11.92	

4.RESILIENT PAD

Item	Description	Unit	Supplier Cost	TT Mark Up	Allowable Cost	Remarks
a	FC5	meter	60.00	2.00	120.00	
b	?	meter	-	1.25	-	
c	?	meter	-	1.25	-	

5.SUPPLIER COST ITEMS

Item	Description	Unit	Supplier Cost	TT Mark Up	Allowable Cost	Remarks
a	Reinforcing	ton	7 800.00	1.15	8 970.00	
b	Cement RHC 42.5MPa	50kg pocket	82.50	1.05	86.63	
c	Cement Standard 32.5MPa	50kg pocket	62.50	1.10	68.75	
d	River Sand	m^3	242.00	1.10	266.20	
e	Plaster Sand	m^3	216.00	1.10	237.60	
f	Circular Spacers	each	0.85	1.10	0.94	40mm cover
g	Binding Wire	kg	12.20	1.10	13.42	
h	Reference Mesh for Module Joints	sheet	217.00	1.10	238.70	Ref WG 244
i	Water	1000L	50.00	1.10	55.00	
j	Poly Proplyne Fiber	910g	62.50	2.00	125.00	
k	PVC 76mm Drain Pipe	each	118.00	2.00	236.00	
l	3mm x 250mm with lugs	each	5.63	1.10	6.19	
m	13mm Stone	m^3	280.00	1.10	308.00	

Figure 35: Costing spreadsheet pg.2 of 10, Price list.

Project name

MODULE MANUFACTURE FOR *Project name*	DATE:	11-Jan-00

Module Details:

Module length	**6**	meters	**Tangent Track**	***636***	**meters**
Tangent Track Modules:	*106*	modules	**Curved Track**	**642**	**meters**
G/Bars	*2*	each	**Transition**	**48**	**meters**
Rail Clips	*8*	each	**Total Track**	**1 278**	**meters**
Curved Track Modules:	*107*	modules	**AXLE LOAD:**	***22***	**Tons**
G/Bars	*3*	each			
Rail Clips	*6*	each			
Transition Track Modules:	*8*	modules			
G/Bars	*6*	each			
Rail Clips	-	each			
Total Modules	**221**				

A	**Module Component Costs**		**Mass**		**Allowable**			
Item	**Description**	**Unit**	**per Unit (kg)**	**Qty**	**Rate**	**Total**	**Rate/meter**	**Tons**
1	Gauge Bars							
		each	32	581	**1 394.12**	809 982.56	**633.79**	***18.59***
2	Stirrups							
		each	9	1 490	**477.73**	711 817.70	**556.98**	***13.41***
3	Tubular Bag							
		meter	0.15	2 812	**148.00**	416 116.80	**325.60**	***0.42***
					TOTAL	**1 937 917.06**	**1 516.37**	***32.42***

B	**Proprietry Items - ex RSA**		**Rate**	**Total**	**Rate/meter**		
Item	**Description**	**Qty**	**SAR**	**SAR**	**SAR**	***Mass/unit (kg)***	***Mass (ton)***
1	Pandrol Springs						
	e2006		***23.93***	-	-	***0.25***	*0.00*
2	Gpi's						
	T6 and T 11 Combination	-	***8.55***	-	-	***0.10***	*0.00*
3	Tiflex pad						
		-	***120.00***	-	-	***0.20***	*0.00*
				-	-		-

C	**Re-inforcing Costs**							
	Type:	**Mass (Kg/m)**	**Rate/ton**	**Length**	**Qty/module**	**Cost/module**	**Rate/meter**	***Mass/unit (kg)***
	MODULE							
	Straight Bars:							
1	Y20	2.470	8 970.00	6.00	0	-	**-**	**-**
2	Y16	1.580	8 970.00	6.00	6	510.21	**85.04**	*12 570.48*
3	Y12	0.888	8 970.00	6.00	4	191.17	**31.86**	*4 709.95*
4	Y10	0.617	8 970.00	6.00	0	-	**-**	*-*
5	R8	0.395	8 970.00	6.00	2	42.52	**7.09**	*1 047.54*
	Shear Links:							
6	12mm	0.888	8 970.00	1.31	0	-	**-**	**-**
7	10mm	0.617	8 970.00	1.31	96	696.02	**116.00**	*17 148.26*
	Spacing 150mm					**Sub Total**	**239.99**	
	Module Joining:							
8	Y12	0.888	8 970.00	1.05	0	-	**-**	
9	Y10	0.617	8 970.00	1.05	0	-	**-**	
10	Steel Cable with lug		11.26		4	45.04	**7.51**	
						Sub Total	**7.51**	
	Filler Grout Reinforcing:	**Mass/m²**	**Rate/sheet**	**m²/joint**	**Rate/joint**	**Joints/module**	**Rate/meter**	
11	Reference Mesh	25.000	238.70	0.40	95	2.00	**31.83**	*4 420.00*
						Sub Total	**31.83**	
	Re-inforcing Consumables:	**Unit**	**Rate/unit**	**Units/module**		**Rate/module**	**Rate/meter**	
12	Circular spacers - cover	each	0.94	24.00		22.44	**3.74**	
13	Binding wire	kg	13.42	0.20		2.68	**0.45**	
14	Welding	kg	***15.00***	1.00		15.00	**2.50**	
15	PVC 76mm Pipe	each	236.00	2.00		472.00	**78.67**	
						Sub Total	**85.35**	
						TOTAL	**364.67**	

Figure 36: Costing spreadsheet pg. 3a of 10, module manufacture.

Item	Description	Unit	Mass per Unit (tons)	Qty	Total Tons	Total	Rate/meter
D	**Mould Costs**					**Total Cost**	**Rate/meter**
1	Carried to summary					450 000.00	352.11
			Rate/ton transport	450.00			
E	**Transport Costs**						
1	Gauge bars	ton	0.032	581.00	18.59		
2	Stirrups	ton	0.009	1 490.00	13.41		
3	Tubular Bag	ton	0.00015	2 811.60	0.42		
4	Fasteners & gpis & Tiflex	ton			0.00	-	
5	Re-inforcing				0.00		
6	Cement for TMT Manufacture	ton			0.00	-	
	Cement for TMT Installation	ton	26	4.00	104.00	46 800.00	
7	Module Transport	ton	2800	221.00	618.80	278 460.00	
8	Transport from PTA to Site Tools And Equipment 3 Loads of 26 Ton	ton	26	3.00	78.00	35 100.00	
		each		5 111	-	360 360.00	281.97

Figure 37: Costing Spreadsheet pg. 3b of 11, module manufacture.

Project name		
PROGRAM FOR *Project name*	Date:	11-Jan-00
A. MODULE MANUFACTURE		
Module Qty:	221	each
No of Moulds:	*6.00*	each
Casting Days:	*36.83*	days
Set up Days:	*3.00*	days
Total Days:	*39.83*	days
Days/Month:	*20.00*	days
Total duration casting	*1.99*	months
Establishment	*0.07*	month
Duration:	2.06	months
B. MODULE INSTALLATION		
Total Meters	1 278	meters
Meters/day	*18.00*	meters
Duration days	*71.00*	days
Days/month	*20.00*	days
Total installation	*3.55*	months
Uplift Track	*0.97*	months / 120m/day
Establishment	*0.23*	month
Duration:	4.75	**months**
C. EARTHWORKS		
Total Meters	1 278	meters
Meters/day	*22.00*	meters
Duration days	*58.09*	month
Days/month	*28.00*	days
Total installation	*2.07*	months
Establishment	*0.15*	month
Duration:	2.22	**months**
Will earthworks be completed as track is laid?	No	
Total Time to completion	6.97	**MONTHS**

Figure 38: Costing spreadsheet pg. 4 of 10, program.

Project name

GROUT COSTS FOR *Project name* | Date: 11-Jan-00

A.Module Manufacture

	Module Length	6	1 278	meters	1.490	Vol/module (m³)	1.490	Wastage	Included
		Qty/m3	Cost/pocket	Cost/m³	Pocket/module	Cost/module	Cost/meter	Mass/unit (kg)	Mass (ton)
a	Cement							894.00	Kg/ Modual
	Pockets/m3	12	86.63	1 039.50	17.88	1 548.86	258.14	190422.00	190.42
b	Sand			Cost/m3					
	Volume of sand per module	1.490		266.20		396.64	66.11		
	Free - handling only								
c	Water		Cost/1000L	Cost/m³					
	Qty of water per m3 grout	750	55.00	41.25		61.46	10.24		
d	Accelerator		Cost/liter	Cost/m³					
	Dose per m3 in liters		55.00	-		-	-		
	XL650 (Chryso) Dosage 1.7% to 2%								
	(25L containers)								
		Totals		1 346.95	427 481.52	2 006.96	334.49		

Installation Grout (Filler Grout)

	Module in-situ length	6	height (m)	Leg Width	length (m)	Volume (m³)	Wastage	1.1	FACTOR
	Filler Grout under beams		0.08	0.7	6	0.672	0.7392	Cant Formation	
	Screed if required		height (m)	width (m)	length (m)				
			0.07	0.8	6	0.336	0.3696	Total Pockets	
			Total Filler Grout: Including Drain			1.109			
								Mass/unit (kg)	Mass (ton)
		Qty/m3	Cost/pocket	Cost/m³	Pocket/module	Cost/module	Cost/meter		
a	Cement							498.96	Kg/ Module (6 meter)
	Pockets/m3	9	86.63	779.63	9.98	864.45	144.07	106278.48	106.28
b	Sand			Cost/m3					
	Volume of sand per module	1.109		266.20		295.16	49.19		
	Free - handling only								
c	Water		Cost/1000L	Cost/m³					
	Qty of water per m3 grout	750	55.00	41.25		45.74	7.62		
d	Accelerator		Cost/liter	Cost/m³					
	Dose per m3 in liters		50.00	-		-	-		
	XL650 (Chryso) Dosage 1.7% to 2%								
e	Fibre	grams/m³	Cost/910g	Cost/m³					
	Dose per m3 in grams	910	125.00	125.00		138.60	23.10		
	CHRYSO FIBRIN (910g sachet)								
		Totals		432.45	286 261.09	479.50	223.99		

ALTERNATIVE

Ready Mix Grout (TMT Turnout Installation Installation only)

		Qty/module		Cost/m³	Total Cost	Cost / Turnout	Cost/meter
a	Ready Mix Grout			975.00	-	-	-

GROUT COSTS - MANUFACTURE	427 481.52	334.49
GROUT COSTS - INSTALLATION	286 261.09	223.99
GROUT COSTS - READY MIX		
TOTAL GROUT COSTS	713 742.61	558.48

Figure 39: Costing spreadsheet pg. 5 of 10, Grout costs.

Project name

TOOLS AND CONSUMABLES FOR *Project name*								Date:	11-Jan-00
Consumables						1 278	**meters**	1.2	Handling
Item	**Description**	**Unit**	**Rate**	**Qty / Meter**	**Qty**	**Cost**	**Cost/meter**		**Base Price**
A	**Manufacture**								
1	Honey Suckle Hose 100mm	m	272.40	450	2.8	773.62	0.61		227.00
2	Honey Suckle Hose 65mm	m	75.60	0		-	-		63.00
3	Honey Suckle Hose 50mm	m	66.80	100	12.8	853.70	0.67		55.67
4	Butterfly Valve 100mm	each	450.00	2000	0.6	287.55	0.23		375.00
5	Quick release connectors 100mm - male & female	each	331.20	2500	0.5	169.31	0.13		276.00
6	Quick release connectors 65mm - male & female	each	237.60	0		-	-		198.00
7	Quick release connectors 50mm - male & female	each	133.20		0.9	113.49	0.09		111.00
8	Glycerine	litre	46.80	0	6.4	299.05	0.23		39.00
9	Steel fixing pliers	each	226.80	850	1.5	341.00	0.27		189.00
10	Nylon sling (1,5m @ 2 Ton)	each	1 032.00	500	2.6	2 637.79	2.06		860.00
11	SPX65 Hose	each	10 800.00	4000	0.3	3 450.60	2.70		9 000.00
12	Round Nose Shovel	each	140.40	800	1.6	224.29	0.18		117.00
13	Builders Wheel barrow	each	674.90	1500	0.9	575.02	0.45		562.42
14	Cube Moulds	each	573.60	1500	0.9	488.71	0.38		478.00
15	Curing Tank	each	9 000.00	1	0.2	1 800.00	1.41		7 500.00
16	Factory Furniture	lot	9 000.00	10000	0.1	1 150.20	0.90		7 500.00
17	PC	each	8 400.00	10000	0.1	1 073.52	0.84		7 000.00
18	Builders Buckets	each	102.00	1000	1.3	130.36	0.10		85.00
19	Dumpy Level	each	6 000.00	10000	0.1	766.80	0.60		5 000.00
20	Chain Blocks	each	3 000.00	5000		-	-		2 500.00
21	Small hand tools	lot	4 800.00	5000	0.3	1 226.88	0.96		4 000.00
22	Overhead Crains	Lot	24 000.00	5000	0.3	6 134.40	4.80		20 000.00
23			-			-	-		
24			-			-	-		
25			-			-	-		
26	Miscellaneous	lot	12 000.00	1	1.0	12 000.00	9.39		10 000.00
MANUFACTURE TOTAL						**34 496.28**	**26.99**		

Figure 40: Costing spreadsheet pg. 6a of 10, Tools and consumables (Manufacture).

B	**Installation**								
1	Honey Suckle Hose 100mm	m	272.40	800	*1.6*	435.16	0.34		*227.00*
2	Honey Suckle Hose 65mm	m	75.60	0	*0.0*	-	-		*63.00*
3	Honey Suckle Hose 50mm	m	66.80	50	*25.6*	1 707.41	1.34		*55.67*
4	Butterfly Valve 100mm	each	450.00	2000	*0.6*	287.55	0.23		*375.00*
5	Quick release connectors 100mm - male & female	each	331.20	2500	*0.5*	169.31	0.13		*276.00*
6	Quick release connectors 65mm - male & female	each	237.60	0	*0.0*	-	-		*198.00*
7	Quick release connectors 50mm - male & female	each	133.20	2500	*1.7*	226.97	0.18		*111.00*
8	Lumber Crayon	box	114.00	100	*3.0*	342.00	0.27		*95.00*
9	Hose pipe 19mm	m	7.92	20	*120.0*	950.40	0.74		*6.60*
10	Plastic Sheeting (6m wide x 100 micron)	m	20.76	1	*100.0*	2 076.00	1.62		*17.30*
11	Dunnage	each	36.00		*50.0*	1 800.00	1.41		*30.00*
12	Wooden Wedges	each	4.20		*2556.0*	10 735.20	8.40		*3.50*
13	Steel shutters (5m x lip channel) - outer	each	500.40		*40.0*	20 016.00	15.66		*417.00*
14	Steel shutters (2.5 x lip channel) - inner	each	250.80		*80.0*	20 064.00	15.70		*209.00*
15	Shutter pins	each	9.36		*600.0*	5 616.00	4.39		*7.80*
16	H/D Hose clamps (50mm)	each	14.16	10	*10.0*	141.60	0.11		*11.80*
17	H/D Hose clamps (65mm)	each	15.30		*0.0*	-	-		*12.75*
18	H/D Hose clamps (100mm)	each	20.04		*2.0*	40.08	0.03		*16.70*
19	Builders wheel barrow	each	674.90	150	*6.0*	4 049.42	3.17		*562.42*
20	Builders bucket	each	102.00	80	*10.0*	1 020.00	0.80		*85.00*
21	Round Nose Shovel	each	140.40	80	*20.0*	2 808.00	2.20		*117.00*
22	SPX50 Pump Hoses	each	10 800.00	1200	*1.0*	10 800.00	8.45		*9 000.00*
23	Cube Moulds	each	573.60	2000	*2.0*	1 147.20	0.90		*478.00*
24	Fuel (30 L x 45 day's) = 1350 L	litre	15.18	1	*800.0*	12 144.00	9.50		*12.65*
25	Gas for cutting	bottle	960.00	1000	*1.0*	960.00	0.75		*800.00*
26	Small Tools	lot	4 800.00	10000	*0.5*	2 400.00	1.88		*4 000.00*
27	Fish Line	roll	14.40	150	*6.0*	86.40	0.07		*12.00*
28	Rail Square	each	1 032.00	1000	*0.5*	516.00	0.40		*860.00*
30	Glycerine	liter	46.80		*20.0*	936.00	0.73		*39.00*
31	Curing Tank	each	9 000.00	2	*0.3*	2 700.00	2.11		*7 500.00*
32	Factory Furniture	lot	9 000.00	10000	*0.0*	-	-		*7 500.00*
33	PC	each	10 200.00	10000	*0.0*	-	-		*8 500.00*
34			-		*0.0*	-	-		*-*
35			-		*0.0*	-	-		*-*
36	Miscellaneous	lot	12 000.00		*1.0*	12 000.00	9.39		*10 000.00*
	INSTALLATION TOTAL					**116 174.70**	**90.90**		

Figure 41: Costing spreadsheet pg. 6b of 10, Tools and consumables (Installation).

Track Tools									Handling
									1.2
Item	Description	Unit	Rate		Qty	Cost	Cost/meter		Base Price
			-			-	-		
1	Pinch bars	each	355.20	250	20.0	7 104.00	5.56		296.00
2	Rail Tongs	each	864.00	250	12.0	10 368.00	8.11		720.00
3	Panpuller	each	1 461.60	550	4.0	5 846.40	4.57		1 218.00
4	Hammer (4 pound)	each	153.60	120	10.0	1 536.00	1.20		128.00
5	Hammer (16 pound)	each	499.20	650	4.0	1 996.80	1.56		416.00
6	Simplex Jack (10 ton)	each	9 000.00	500	2.0	18 000.00	14.08		7 500.00
7	Dumpy Level c/w staff & tripod	each	6 000.00	2000	0.5	3 000.00	2.35		5 000.00
8	Theodolite c/w tripod	each	30 000.00	4000	0.2	6 000.00	4.69		25 000.00
9	Rail bender	each	33 600.00	1300	0.2	6 720.00	5.26		28 000.00
10	Geismar gauge	each	4 320.00	1000	1.0	4 320.00	3.38		3 600.00
11	Spirit level 1200mm	each	180.00	400	6.0	1 080.00	0.85		150.00
12	Joint spanner	each	1 980.00	2000	0.2	396.00	0.31		1 650.00
13	Boning Rods set	set	900.00	500	1.0	900.00	0.70		750.00
14	Rail car(Transporters 3 / 18 meter rail) Hire H/O	each	44 160.00	450	0.2	8 832.00	6.91		36 800.00
15	Welding jigs (thermit welding)	each	4 200.00		0.0	-	-		3 500.00
16	Gas cutting equipment - complete	set	6 600.00		0.0	-	-		5 500.00
17	10T Hydraulic Jacks	each	595.20	1000	8.0	4 761.60	3.73		496.00
18	Spreader beams (lift and align)	each	960.00	2500	2.0	1 920.00	1.50		800.00
19	Disc Cutter	lot	69 145.20	10000	0.2	13 829.04	10.82		57 621.00
20	220V Electric Grinder	each	1 500.00	1200	1.0	1 500.00	1.17		1 250.00
21	5KVA 220V Petrol Generator	each	7 800.00	1000	0.5	3 900.00	3.05		6 500.00
22	Container - storage (tools and material)	each	21 600.00		0.0	-	-		18 000.00
23	Container office	each	25 200.00		0.0	-	-		21 000.00
24									
			-		0.0	-	-		
			-		0.0	-	-		
			-		0.0	-	-		
			-		0.0	-	-		
25			-		0.0	-	-		
26	Miscellaneous	lot	24 000.00		1.0	12 000.00	9.39		20 000.00
	TRACK TOOLS TOTAL					114 009.84	89.21		

Figure 42: Costing spreadsheet pg. 6c of 10, Tools and consumables (Track tools).

Project name

PLANT COSTS FOR *Project name*							Date:	11-Jan-00
	Factory				Meters	1 278		
A	Plant & Equipment Hire				In House Batching			
	Item	Unit	Qty	Cost/month	Duration(mths)	Total	Cost/m	
a	*Factory Rental, cranes, elec, water, etc*	*month*	*1*	*30 000.00*	*2.06*	61 850.00	48.40	
b	*Concrete Mixer*	*month*	*1*	*15 000.00*	2.06	30 925.00	24.20	
c	*Grout Pump*	*month*	*1.5*	*15 000.00*	2.06	46 387.50	36.30	
d	*Agitating Drum*	*month*	*1*	*3 000.00*	2.06	6 185.00	4.84	
e	*Re-bar Jig*	*month*	*2*	*2 000.00*	2.06	8 246.67	6.45	
f	*Welding machine*	*month*	*2*	*1 500.00*	2.06	6 185.00	4.84	
g					2.06	-	-	
h					2.06	-	-	
i					2.06	-	-	
j					2.06	-	-	
k					2.06	-	-	
l					2.06	-	-	
m				-	2.06	-	-	
n	*Miscellaneous Equipment*	*each*	*1*	*10 000.00*	2.06	20 616.67	16.13	
						180 395.83	**141.15**	
B	Capital Items	Unit	Qty	Cost	Mark up	Cost	Cost/m	
a	*SPX80 Pump and Hoses*	*each*	*0*	*130 000.00*	*1.5*	-		
b	*Gantry and Lifting Equipment*	*lot*	*0*	*110 000.00*	*1.5*	-		
c	*Agitating Drum*	*each*	*0*	*15 000.00*	*1.5*	-		
d	*Re-bar fixing jig*	*each*	*0*	*10 000.00*	*1.5*	-		
e	*Turn Table or similar*	*each*	*0*	*35 000.00*	*1.5*	-		
f	*Bulk water tanks, pumps & hoses*	*lot*	*0*	*30 000.00*	*1.5*	-		
g	*Factory Structure (20m x 40m)*	*lot*	*0*	*750 000.00*	*1.5*	-		
h	*Forklift*	*each*	*0*	*250 000.00*	*1.5*	-		
i	*Concrete Mixer - 750L*	*each*	*0*	*135 000.00*	*1.5*	-		
j	*Cube Crushing Machine*	*each*	*0*	*115 000.00*	*1.5*	-		
k	*Assocated civil work - factory*	*lot*	*0*	*200 000.00*	*1.5*	-		
l	*Generator (20KVA)*	*each*	*0*	*95 000.00*	*1.5*	-		
m	*Equip Factory - electric, plumbing, etc*	*lot*	*0*	*50 000.00*	*1.5*	-		
n	*Spreader Beam*	*each*	*0*	*12 000.00*	*1.5*	-		
						-	-	
					Total	180 395.83	141.15	

Figure 43: Costing Spreadsheet pg. 7a of 10, Plant costs (Factory).

Module Installation (Site)

A	Plant Hire											Check
					Duration			INSTALL	EARTHWORKS	PERWAY	TRAINS	
	Item	Unit	Qty	COST / Month	Months	Total	Cost/m	TMT				
a	*"PZ" Philip Zuma*	*with loco*	*1*	*150 000.00*	4.50	675 238.64	528.36	528.36	-	-		528.36
b	*TUBULAR EQUIPMENT including all tools pumps equipment etc)*	*set*	*1*	*100 000.00*	4.50	450 159.09	352.24	352.24				352.24
c	*Dump Trucks*		*2*	*13 500.00*	4.50	121 542.95	95.10		95.10			95.10
d	*10 ton tipper*		*1*	*65 000.00*	4.50	292 603.41	228.95		228.95			228.95
e	*grader / A3 Dozer*		*0.5*	*60 000.00*	4.50	135 047.73	105.67		105.67			105.67
f	*OWN LOCO SMALL*		*0*	*800 000.00*	4.50	-	-	-	-	-		-
g	*LOCO TWO - SHELTRAM (R 5300 for 9 hour shift)*	*Hire*	*1*	*400 000.00*	4.50	1 800 636.36	1 408.95		1 408.95			1 408.95
h	*FLAT WAGONS Hire per day R350*30 days*		*3*	*13 125.00*	4.50	177 250.14	138.69	83.22		55.48		138.69
i	*DZ WAGONS R 230 Hire per day * 30*		*10*	*8 625.00*	4.50	388 262.22	303.80		303.80			303.80
j	*WOODPECKER*	*HOUR*	*400*	*650.00*	-	-	-				-	-
k	*Running Costs of above*	*Fuel*	*1*	*60 000.00*	4.50	270 095.45	211.34	63.40	84.54	63.40		211.34
l	*Bobcats*	*with op.*	*2*	*25 000.00*	4.50	225 079.55	176.12		114.48	61.64		176.12
m	*Roller*	*with op.*	*1*	*20 000.00*	4.50	90 031.82	70.45		70.45			70.45
n	*TLB (4X4)*	*with op.*	*2*	*55 000.00*	4.50	495 175.00	387.46		387.46			387.46
o	*Excavator 12ton:*	*with*	*0.6*	*90 000.00*	4.50	243 085.91	190.21		190.21			190.21
p	*Forklift*	*with op.*	*0*	*10 000.00*	4.50	-	-		-	-		-
q	*Small tools*		*1*	*10 000.00*	4.50	45 015.91	35.22	11.74	11.74	11.74		35.22
r	*Horse& Trailor*	*with op.*	*0.5*	*90 000.00*	4.50	202 571.59	158.51	63.40	31.70	63.40		158.51
s	*Putzmeister*		*0*	*95 000.00*	4.50	-	-	-	-			-
t	*Passenger BUS*		*1*	*50 000.00*	4.50	225 079.55	176.12	58.71	58.71	58.71		176.12
u	*Lighting*	*Buy sets*	*2*	*48 600.00*	1.00	97 200.00	76.06	25.35	25.35	25.35		76.06
v		*each*	*1*		4.50	-	-	-				-
w		*each*	*1*		4.50	-	-	-	-			-
x	*Crane Truck (7m bed, dropside)*	*each*	*1*	*90 000.00*	4.50	405 143.18	317.01	105.67	105.67	105.67		317.01
y		*each*	*1*		4.50	-	-	-	-	-		-
z	*Mobilift*	*each*	*0*	*-*	4.50	-	-					-
aa	*Agitating Drum*	*each*	*1*		4.50	-	-	-				-
ab	*Dyna 3 T*	*each*	*1*	*25 000.00*	4.50	112 539.77	88.06	29.35	29.35	29.35		88.06
ac	*Hyundai*	*each*	*1*	*15 000.00*	4.50	67 523.86	52.84	17.61	17.61	17.61		52.84
ad	*Forklift/Gallion*	*each*	*0*	*35 000.00*	4.50	-	-					-
ae	*Trailor*	*each*	*1*	*4 000.00*	4.50	18 006.36	14.09			14.09		14.09
af	*Fuels and lubricants*	*lot*	*1*	*20 000.00*	4.50	90 031.82	70.45	23.48	23.48	23.48		70.45
ag	*Rail transport*					120 000.00	93.90			93.90		
ah	*QA*					60 000.00	46.95		46.95			5 185.70
						6 807 320.31	5 326.54	1 362.53	3 340.18	623.83	-	5 326.54

B	Capital Items	Unit	Qty	Cost	Mark up	Cost	Cost/m
a	*SPX50 Pump and Hoses*	*each*	*0*	110 000.00	*1.5*	-	-
b	*Agitating Drum*	*each*	*0*	5 000.00	*1.5*	-	-
c	*Concrete Mixer (500L)*	*each*	*0*	110 000.00	*1.5*	-	-
d	*Generator (15KVA)*	*each*	*0*	100 000.00	*1.5*		
e	*Mobilift*	*each*	*0*	2 000 000.00	*1.5*		
f	*Crane Truck*	*each*	*0*	1 500 000.00	*1.5*		
g	*Spreader Beam*	*each*	*0*	12 000.00	*1.5*		
h	*Curng Covers*	*each*	*0*	7 500.00	*1.5*		
i	*Bobcat*	*each*	*0*	350 000.00	*1.5*		
j	*Bulk water tanks, pumps and hoses*	*lot*	*0*	200 000.00	*1.5*		
	4 tonners		*0*	200 000.00	*1.5*		
					1.5	-	-
						-	-
						-	-
					Total	6 807 320.31	5 326.54
				Total Plant Costs		6 987 716.15	5 467.70

Figure 44: Costing spreadsheet pg. 7b of 10, Plant costs (Site).

Project name

LABOUR COSTS FOR *Project name*												Date:	11-Jan-00
						Factory							
1				Cost/	Duration	Sub Total		%	TOTAL				
		Unit	Qty	Month	Months	Cost		Provision	COST	Total Cost/meter	Labour	PPE	Accomm
a	***Factory Supervisor***	each	*0.5*	*50 000.00*	2.00	49 875.00							
b	***Factory Foreman***	each	*1*	*15 000.00*	2.00	29 925.00							
c	***Pump Operator***	each	*1*	*6 000.00*	2.00	11 970.00							
d	***Batch Plant Operator - TT***	each	*1*	*6 000.00*	2.00	11 970.00							
e	***Skilled Labour***	each	*4*	*6 000.00*	2.00	47 880.00							
f	***QA/QC assistant***	each	*0*	*6 000.00*	2.00	-							
g	***Team Leaders***	each	*0*	*6 000.00*	2.00	-							
	Mobilift op	each	*0*	*12 000.00*	2.00	-							
h	***General Labour - local***	each	*8*	*4 000.00*	2.00	63 840.00							
i	PPE	each	15.5	181.15	2.00	5 601.66							
j													
						221 061.66		1.20	265 273.99	207.57	-	-	-
						Module Installation							
2				Cost/	Duration	Sub Total		%	Cost/meter				
		Unit	Qty	Month	Months	Cost		Provision	(incl provision)	Total Cost	Labour	PPE	Accomm
a	***Trackman***	each	*2*	*15 000.00*	8.00	240 000.00		*Added 2 Months for overtime*					
b	***Pump Operator***	each	*1*	*6 000.00*	8.00	48 000.00							
c	***Batch Operator***	each	*1*	*6 000.00*	8.00	48 000.00							
d	***Crane Truck Operator***	each	*2*	*15 000.00*	8.00	240 000.00		Included in crain rental					
e	***OPERATORS***	each	*12*	*12 000.00*	8.00	1 152 000.00							
f	***Mobilift Operator***	each	*1*	*6 500.00*	8.00	52 000.00							
g	***QA/QC assistant***	each	*1*	*6 000.00*	8.00	48 000.00							
h	***Labour Skilled***	each	*6*	*6 000.00*	8.00	288 000.00							
i	***FLAG women***	each	*9*	*7 000.00*	8.00	504 000.00							
j	***Bobcat Operator***	each	*3*	*6 000.00*	8.00	144 000.00							
k	***General Labour***	each	*31*	*6 000.00*	8.00	1 488 000.00							
k	PPE	each	69	*181.15*	8.00	99 995.72							
l	Accomm & Feed (key labour)		16	*720.00*									
	Rtae = R45/day x 30					4 351 995.72		1.20	5 222 394.86	4 086.38	-	-	-
						Up-lift existing track							
3				Cost/	Duration	Sub Total		%	Cost/meter				
		Unit	Qty	Month	Months	Cost		Provision	(incl provision)	Total Cost	Labour	PPE	Accomm
a	***Trackman***	each	*2*	15 000.00	0.72	21 647.73							
b	***Team Leader***	each	*1*	6 000.00	0.72	4 329.55							
c	***Labour***	each	*11*	6 000.00	0.72	47 625.00							
d	***General Labour***	each	*30*	4 250.00	0.72	92 002.84							
e	PPE	each	44	181.15	0.72	5 751.57							
f	Accomm & Feed (key labour)	each		720.00	0.72	-							
						171 356.68		1.20	205 628.01	160.90	-	-	-
						Destress							
4				Cost/	Duration	Sub Total		%	Cost/meter				
		Unit	Qty	Month	Months	Cost		Provision	(incl provision)	Total Cost	Labour	PPE	Accomm
a	***Trackman***	each	*2*	15 000.00	0.00	-		*0.00*					
b	***Team Leader***	each	*2*	6 000.00	0.00	-							
c	***Labour***	each	*6*	6 000.00	0.00	-							
d	***General Labour***	each	*15*	4 000.00	0.00	-							
e	PPE	each	25	181.15	0.00	-							
f								*Factor*					
						-		1.20	-	-	-	-	-

Figure 45: Costing spreadsheet pg. 8 of 10, Labour cost.

Project name

P's & G's FOR *Project name*

Date: 11-Jan-00

A	**P&G Time Related Costs**		Costs per month								
		Qty	Rate/month	Transport Allowance	Fuel	Accomm	Feeding	Cell	Sub Total	Period	Total Cost
1	**Module Manufacture**										
a	*Project Manager*	*1*	*35 000.00*	-	-	-	-	-	35 000.00	2.50	87 500.00
b	*Factory Supervisor*	*0*	*15 000.00*	-	-	-	-	-	-	6.00	-
c	*QA/QC*	*1*	*8 500.00*	-	-	-	-	-	8 500.00	2.50	21 250.00
d	*Driver, admin,etc*	*0.5*	*8 000.00*	-	-	-	-	-	4 000.00	2.50	10 000.00
e	*LDV*	*0.2*	*12 000.00*	-	-	-	-	-	2 400.00	2.50	6 000.00
f				-	-	-	-	-	-	2.50	-
									49 900.00	Sub Total	124 750.00
2	**Module Installation**								Sub Total		Total Cost
a	*Project Manager*	*1*	*55 000.00*	*5 000.00*	-			*3 000.00*	63 000.00	5.00	315 000.00
b	*Site Manage(TBA)*	*1*	*40 000.00*	*3 000.00*	-			*2 000.00*	45 000.00	5.00	225 000.00
c	*Platelayer*	*2*	*40 000.00*	*2 000.00*	-			*2 000.00*	88 000.00	5.00	440 000.00
d	*Mechanic on site*	*1*	*25 000.00*	*3 000.00*	-			*1 000.00*	29 000.00	5.00	145 000.00
e	*Liasion Officer(Mpho)*	*1*	*40 000.00*	*2 000.00*	-			*2 000.00*	44 000.00	5.00	220 000.00
f	*QA/QC*	*1*	*15 000.00*	*1 000.00*	-			*500.00*	16 500.00	5.00	82 500.00
g										5.00	-
h									-	5.00	-
									285 500.00	Sub Total	1 427 500.00
3	**Other P&G**	Qty							Sub Total		Total Cost
a	*Specialist*	*0.2*	*75 000.00*	-	-	-	-	-	15 000.00	5.00	75 000.00
b	*FIELD OFFICES*	*2*	*12 000.00*	-	-	-	-	-	24000	5.00	120 000.00
c	*Field Toilets*	*6*	*1 000.00*	-	-	-	-	-	6 000.00	5.00	30 000.00
d	*Office Labour*	*3*	*5 000.00*						15 000.00	5.00	75 000.00
e	*Train operations(Allow R 46 500 per month for pilot)*	*1*	*60 000.00*						60 000.00	5.00	300 000.00
f	*Medical*	*40*	*850.00*						34 000.00	1.00	34 000.00
				-	-	-	-	-	-	5.00	-
									-	5.00	-
									154 000.00	Sub Total	634 000.00
							TIME RELATED P&G				**2 186 250.00**
										per meter	1 710.68

B	**P&G Fixed Charge Items**					
1	Design	Qty	Unit	Cost	Sub Total	Total Cost
a	*Full System Design (Track asbiuld drawings)*	*1*	*lot*	*35 000.00*	35 000.00	35 000.00
b	*Consulting*	*1*	*lot*	*25 000.00*	25 000.00	25 000.00
c	*Tendering costs*	*1*	*lot*	*10 000.00*	10 000.00	10 000.00
d	*Site Establishment of plant*	*1*	*lot*	*150 000.00*	150 000.00	150 000.00
e	*Site establichment resources*	*1*	*lot*	*60 000.00*	60 000.00	60 000.00
f	*Survay*	*1*	*lot*		-	-
g					-	-
					280 000.00	Sub Total 280 000.00
4	Other Fixed Items	Qty	Unit	Cost	Sub Total	Total Cost
a		*1*	*lot*		-	-
b		*1*	*lot*	-	-	-
c		*1*	*lot*	-	-	-
					-	Sub Total -
				FIXED P&G		**280 000.00**
					per meter	219.09

Figure 46: Costing spreadsheet pg. 9 of 10, P's and G's.

Project name									
SUMMARY OF COSTS FOR *Project name*								Date:	11-Jan-00
		SELLING		TMT	INSTALL	EARTHWORKS	P&G	COST	
Item	Description	SELLING RATE	SELL/Meter					Cost	Rate/meter
1	**Components**	**2 618 806.84**	**2 049.14**	**2 049.14**				1 937 917.06	1 516.37
2	**Moulds**	**608 108.11**	**475.83**	**475.83**				450 000.00	352.11
3	**Proprietry Items**	**-**	**-**	**-**				-	-
3	**Re-inforcing**	**629 801.14**	**492.80**	**492.80**				466 052.84	364.67
4	**Labour**								
	Manufacture	**358 478.37**	**280.50**	**280.50**				265 273.99	207.57
	Installation	**3 806 520.87**	**2 978.50**		**2 978.50**			2 816 825.45	2 204.09
	Earthworks	**3 528 645.18**	**2 761.07**			**2 761.07**		2 611 197.43	2 043.19
5	**Grout**	**-**	**-**						
	Factory	**577 658.35**	**452.00**	**452.00**				427 467.18	334.48
	Installation	**386 839.31**	**302.69**		**302.69**			286 261.09	223.99
	Maintenace	**132 510.53**	**103.69**		**103.69**			98 057.79	76.73
		-	**-**						
6	**Plant**	**-**	**-**						
	Factory	**235 895.27**	**184.58**	**184.58**				174 562.50	136.59
	Installation	**2 353 130.34**	**1 841.26**		**1 841.26**			1 741 316.45	1 362.53
	Earthworks	**5 768 582.39**	**4 513.76**			**4 513.76**		4 268 750.97	3 340.18
	Perway	**1 077 368.78**	**843.01**		**843.01**			797 252.90	623.83
	Train opperations	**-**	**-**				**-**	-	-
7	**Tools and Consumables**								
	Consumables - Manufacture	**124 000.54**	**97.03**	**97.03**				91 760.40	71.80
	Consumables - Installation	**116 747.03**	**91.35**		**91.35**			86 392.80	67.60
	Consumables - Earthworks	**116 747.03**	**91.35**			**91.35**		86 392.80	67.60
	Track Tools (All tools)	**189 593.03**	**148.35**		**148.35**			140 298.84	109.78
	Tools for earthworks	**86 351.35**	**67.57**			**67.57**		63 900.00	50.00
	398.62								
Amount	509 438.43								
8	**Preliminary and General**								
	Time Realted Items	**2 954 391.89**	**2 311.73**	**-**			**2 311.73**	2 186 250.00	1 710.68
	Fixed Charge Items	**378 378.38**	**296.07**	**296.07**				280 000.00	219.09
9	**Preliminary and General camp**								
	Time Related Items	**-**	**-**				**-**	-	-
	Fixed Charge Items	**-**	**-**				**-**	-	-
10	**Transport**								
	General	**487 283.84**	**381.29**				**381.29**	360 590.04	282.15
	TOTALS	**26 535 838.54**	**20 763.57**	**4 327.96**	**6 308.85**	**7 433.74**	**2 693.02**	**19 636 520.52**	**15 365.04**
				296.07	**add :**	**300.00**	**596.07**		
	TT Charges:			Mark up: (in percentage)				%	
	Establishment:	383 400.00		Royalty / SKILLS TRANSFER- Tubular Track				*5.00*	R 663 395.96
	Time Related 6mths	378 378.38		ADMIN				*5.00*	R 1 326 791.93
		761 778.38		Profit %				*12.00*	R 3 184 300.62
				Tender Submission Cost:				*2.00*	R 530 716.77
	Rate in Bill:	3 070.24	3 366.31	QA				*2.00*	R 530 716.77
				Total				*26.00*	***6 235 922.06***
				Mark up factor				**1.35**	20299916.48
	Total:							R 26 535 838.54	R 20 763.57

Figure 47: Costing spreadsheet pg. 10 of 10, summary of costs.

Appendix E

TUBULAR TRACK (Pty) Ltd.

The Role of the bid manager

The role of bid manager is often poorly understood, yet it is crucial to any organisation's success.

Bids are a high-stakes, ultra-competitive business, with no second prizes or chances. Because they are so critical to winning new work, as well as keeping existing contracts, bid managers are vital to a company's continuing existence, and to job security.

Bids are detailed, complex documents that often run to hundreds of pages, outlining how the candidate organisation would meet a contract's requirements. They cover a wide range of issues, from health and safety to customer care and staff issues, and are weighted for quality as well as price.

The role and responsibilities of bid manager jobs vary between organisations. But, essentially, a bid manager is responsible for submitting a completed bid to an existing or prospective client, on time and within budget. They ensure that all the client's questions have been answered as fully as possible, and that the organisation has given itself the best possible chance of success.

Working under the direction of a bid director, the role involves leading all day-to-day aspects of an individual bid. Bid managers are involved in every aspect of the submission and have an excellent appreciation of what the client needs and how best to articulate how their organisation can provide that. They work closely with a core team while bringing in subject matter experts when required.

A bid manager is also the first point of contact for the client, and liaises with estimators who produce the price element of a bid. This is collated with the 'quality' submission, which is what bid managers generally work on (Structure, 2014).

Personal characteristics

The Bid Manager should demonstrate competence in some or all of the following (Gabriel, 2014):

• Behave Ethically: Understand ethical behaviour and business practices, and ensure that own behaviour and the behaviour of others is consistent with these standards and aligns with the values of the organization.

• Communicate Effectively: Speak, listen and write in a clear, thorough and timely manner using appropriate and effective communication tools and techniques.

• Creativity/Innovation: Develop new and unique ways to improve operations of the organization and to create new opportunities.

• Foster Teamwork: Work cooperatively and effectively with others to set goals, resolve problem, and make decisions that enhance organizational effectiveness.

Figure 48: The role of the bid manager pg. 1 of 2.

• Lead: Positively influence others to achieve results that are in the best interest of the organization.

• Assist in Decision making: Assess situations to determine the importance, urgency and risks, and make clear decisions which are timely and in the best interests of the organization.

• Organize: Set priorities, develop a work schedule, and monitor progress towards goals, and track details/data/information/activities.

• Plan: Determine strategies to move the organization forward, set goals, create and implement actions plans, and evaluate the process and results.

• Solve Problems: Assess problem situations to identify causes, gather and process relevant information, generate possible solutions, and make recommendations and/or resolve the problem.

For extra reading please consider:

- The bid managers Handbook by D Nickson
- Bids, tenders and proposals by Harold Lewis

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Regards,

Cassie Maree

Mechanical Engineer

0823838362

Figure 49: The role of the bid manager pg.2 of 2.

TUBULAR TRACK (Pty) Ltd.

The Role of the Bid Writer

A Bid Writer can sometimes be referred to as a Proposal Writer, Document Writer, Proposal Editor, Proposal Author or Bid Author – the job title used can vary according to industry but the role and responsibilities will be similar and all the titles will indicate writing as the main objective of the role.

A Bid Writer will usually work under the supervision of a Bid Manager or Bid Coordinator and will assist them in developing a proposal structure. The role also requires reviewing previously written content to edit where necessary, working with other bid team members to produce written bid responses and presentation collateral in line with deadlines (Bid, 2014).

The role won't only involve writing content for use in the bid, but also presentations and all supporting documentation, ensuring a cohesive and consistent approach.

The person

The ideal candidate for this job should be able to write effective, concise and compelling content while under the pressure sometimes associated with deadlines. The ability to work as a team and to get accurate, high quality information from all bid stakeholders in order to produce bid collateral is essential.

Usually a Bid Writer will have a background or experience in a journalistic environment, be it a past role or a qualification (degree or equivalent). Experience of journalism helps a Bid Writer to construct a bid which pulls together factual information gleaned from a variety of sources in a format which is both interesting and comprehensive.

Not only should a Bid Writer have excellent writing skills, but they should be able to work with other bid team members to help give them the necessary skills and confidence to write and produce materials themselves (Bid, 2014).

Summary of skills

- Excellent communicator
- A high attention to detail with an excellent editing and proofing ability
- Excellent literacy skills, with an extensive vocabulary
- Possibly a journalism background
- Deadline driven with effective time management skills
- Thrive in a busy environment
- Ability to multitask and prioritise workload

Figure 50: The Role of the bid writer pg.1 of 4.

- Experience in the required business sector
- Proven bid team involvement
- Can demonstrate effective bid writing skills

Some wording needs to be much more precise and careful than other text. Health and safety instructions, for instance, or legal documentation: both have to be as unambiguous as possible. Contracts drawn up between business partners, each of whom stands to lose money if there is the slightest doubt about what any clause in the document commits them to, are in there too. So is bid and tender documentation.

What exactly do you want?

It is not only the fact that bids don't always fill the bill. I once attended a question and answer session arranged by a South African ministry to brief consultants on a new training programme being put out for tender. The invitation document was unclear, and the consultants' questions about what the ministry wanted became sharper and more pressing by the minute. The official deployed by the ministry to answer them did as best as he could. Eventually, however, the impatient muttering became too much and his nerve failed. He announced that the invitation was withdrawn. The jeers turned to anger as we filed out (Armstrong, 2014).

Common mistakes in writing bids

As one who has written bids, edited others' bid documents and evaluated yet others submitted by people wanting what I could offer, I have to say that this area of content creation is one of the trickiest you can encounter, from either direction. Writing up bids means avoiding a number of pitfalls, some of which will come as a surprise to the organisation doing the bidding.

The commonest faults, such as failing to respond properly to the formal questions to bidders set out in the Request for Proposals (RFP), or omitting to include vital information decision-makers need, all derive from what might be called the Original Sin of bid writers. This is the failure of the writers to put themselves imaginatively in the shoes of those who would be reading the bid and deciding whether to proceed with it. That failure is usually fatal (Armstrong, 2014).

In its turn, that failure is caused by groupthink, gaps in corporate thinking and misplaced information and data. The good news is that you can put in place comparatively simple measures to make the bidding process more effective, more reliable and more likely to be seriously considered.

Figure 51: The role of the bid writer pg.2 of 4

Getting the relevant material in

Some companies issue six or seven major bids each week. One would think that they are sure they are using the right process already. This is not always the case. During a recent visit to a services company to look at its bid processes, I noticed that the 'boilerplate' – the standard semi-permanent text used generically for most of the company's bids – was out of date because it had not taken account of certain HR legislation recently come into force. An omission like that usually has resources implications for the project being planned and bid for, but it can easily be avoided if the bid managers take care to consider all the angles, including statute law.

Assigning roles

A common error is to delegate the writing of the technical part of the submission to company technicians and technologists, and to assume that it is safe to do so. It is not. Technicians are not always writers, just as writers are usually neither technicians nor other types of applied science specialist. To be sure, the techies are the source of the original information and data needed to underpin the bid, and properly so, but they should not be left with the task of completing the final version of the bid (Armstrong, 2014).

In the worst case, able and highly qualified scientists are capable of writing sentences which, in the most crucial parts of the bid document, are literally incomprehensible. I was recently hired to edit the draft thousand-word text of a multipart bid being put forward to get supply contracts with some English police forces. Most of the many errors in the text were relatively unimportant – spelling, grammar and punctuation – and easily fixed. One in particular, however, was not. It consisted of a single sentence approved by management. It had been inserted in the text to show how the bidding company would respond to an emergency involving the handling of forensic material.
I had to point out that a carefully drafted paragraph on the issue was 'fractured' in the middle by a convoluted sentence which not only didn't mean anything yet was crucial, but also gave the impression that the company was trying to hide something. That is a fatal fault in any bid.
The golden rules
My experience tells me that the process of writing any bid has to make sure that you, the bid writer or bid manager (Armstrong, 2014):

- start with a clear idea of what is required and whether the company can supply it
- list all the angles, implications, risks etc. at a very early stage
- draft the structure of the document(s) at an early stage, identifying the tables etc required
- identify the right human sources for all the information and data involved and contact them well in time

Figure 52: The role of the bid writer pg.3 of 4.

- be prepared to offer human sources a briefing on what you need from them, and why
- make arrangements for sourcing and researching external information (eg relevant legislation)
- set deadlines for the receipt and checking of information
- draft the text of the bid in appropriate style, tone and language (formal, but not too so)
- have the first complete draft scrutinised, corrected and approved as appropriate
- finalise and publish only after all comments and corrections are in

This is no guarantee that any bid written to these standards will be successful, but they represent useful criteria to bear in mind. Keep it simple, comprehensive, level in tone (no flashy ad speak) and as short as you can make it. If there is the slightest need to get clarification or feedback from the organisation putting out the tender, request it? If you have to use boilerplate, check it every time: is it relevant, comprehensible, up to date and reliable?

Above all, put yourself in the position of those who will have to read your bid. Does it offer what they want? Is what you are offering clear? Is there too much jargon or publicity language? Is the bid well set out, comprehensive and easy to read? Does it reflect well on your company? If you can answer these questions in the affirmative, you have a good chance. Good luck.

For extra reading please consider:

- Persuasive business proposals by Tom Sant

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Regards,

Cassie Maree

Mechanical Engineer

0823838362

Figure 53: The role of the bid writer pg.4 of 4

The Role of the Proof reader

Proofreading is the final stage of the editing process. The proof-reader's job is to read a proof copy of a text and detect and mark up any errors or queries regarding grammar, spelling, punctuation, style or accuracy. Proofreading may be done either against an original document or 'blind' (i.e. without checking against another source) (Wordsmith, 2012).

In an ideal world, you should proofread only after all content revisions are completed. It is the copyeditor's job to make sure that the structure and content of the document are as good as they can be. However, things are seldom so clear-cut in reality, and editorial changes are sometimes made right up until the last stage before printing.

Although proofreading and copy editing are two separate processes, each with its own objectives and responsibilities, there is often considerable overlap between the roles. Where this is the case, it is essential for people to know whether they are proofreading or copy editing at each particular stage. It's important to understand that both tasks cannot be done effectively at the same time.

Here are some of the main skills and techniques that proof readers require to do their work. Proof readers need to (Wordsmith, 2012):

- Scrutinise documents in minute detail in order to identify errors
- Identify the common proof errors that are often missed by writers and editors
- Use a structured proofreading process to ensure error-free copy
- Mark up copy using the classic proofreading correction marks
- Proofread long documents patiently and without losing concentration
- Spot and correct mistakes in grammar and punctuation
- Spot and correct errors in capitalisation and hyphenation
- Recognise a wide range of words and identify when they are used or spelled wrongly
- Use agreed (or house) style rules to ensure consistency
- Judge when to change something and when to leave it as it is
- Query decisively and effectively when there may be an ambiguity in the text.

For extra reading please consider:

- http://www.word-smiths.co.uk/books/effective-writing-success.html

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Figure 54: The role of the Proofreader pg.1 of 1

Writing a tender response

When writing a tender, a few steps may be followed to make it a successful attempt. Some critical factors according for success are (Fagan, 1997):

- Right image
- Right Product or service
- Right resources
- Right prices
- Right documentation
- Right attitude

There are three guidelines according to the successful tendering guide:

1. Address exactly what is asked for, nothing more and nothing less
2. Use a formal tone too provide information and a subtle tone for selling, influencing the buyer to pick you.
3. Overall design of the proposal makes an impression. A simple design with a header and a footer will make it memorable

The key principle here then is too keep it simple, but professional (Business, 2012). Further there should be set sections in the proposal (Nickson, 2003). These include, but are not limited to:

- Executive summary – containing a summary of the tender main points
- Contents table – included to ease navigation
- Introduction – explanation of the format and purpose of tender
- Understanding of the requirements – included to show that you do understand what is required
- The approach
- Pricing
- Other information

Figure 55: Writing a Tender response pg.1 of 3

There is also a tool in the form of a checklist in Kevin Fagan's book the Bid mangers handbook to make sure that the necessary documentation and structure is followed.

The approach

In this section the following should be included (Business, 2012):

- ✓ Step-by-step of how you are going to deliver
- ✓ Who will be involved in the contract and each role
- ✓ Who will be involved in the management
- ✓ How communication will be managed
- ✓ How you will ensure continuity

Pricing

Buyers normally set out how they want pricing information and how they want it to be shown. This usually is either a spreadsheet or a table with detailed breakdowns and how they were calculated. It is imperative to state whether the total price includes VAT or not and when using exchange rates, which rates were used in the calculation.

Other information

In the other information area you may put information that you feel is necessary like for instance (Business, 2012):

- Company introduction
- Case studies/customer references
- Staff CV's
- Added value statements
- Alternative offers or solutions
- Examples of work done previously
- Standards and policies
- Commercial sensitivity

Review and sign-off

"It is vitally important to review your proposal at regular intervals during its preparation for content, sense, readability and flow". (Business, 2012) Allow for time too properly review and perform follow-up actions.

Writing Skills

When writing a tender or bid, there are certain skills involved. A short summary of these skills are briefly discussed in this section. Firstly the basics consist of (Nickson, 2003):

Figure 56: Writing a tender response pg.2 of 3

- Know your audience - to who you are writing and the knowledge that certain parts are read by different people
- Answer the question – in much the same way as examination question
- The structure – the structure of the document and of sentencing

The next skill is in the presentation of the information. All information must be presented in a fact, feature and benefit form to attract and help the reader take notice of what is said. The writing style itself is a skill and great care must be taken when choosing a style. Some style factors that should be noted are (Nickson, 2003):

- Positive vs negative – convert all answers to positives
- Active vs passive – active voice conveys more positive image
- Consistency
- Vocabulary
- Cliché and slang
- Less is more

For extra reading please consider:

- Persuasive business proposals by Tom Sant

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Regards,

Cassie Maree

Mechanical Engineer

0823838362

(Wordsmith, 2012)

Figure 57: Writing a tender response pg. 3 of 3

Appendix F

To whom it may concern,

This questionnaire was approved by the managerial staff of Tubular Track Pty. Ltd and is aimed at the gathering of information to possibly improve the tendering process and support structures of the company while simultaneously offering data that will be used in the completion of my master's degree in the study of process driven management of tenders.

The information that is gathered through this questionnaire will be treated with the greatest discretion and full anonymity.

Thank you in advance for your full honesty and participation.

…………………………………………

M.C Maree

082 38 38 362

Instructions for completion:

- *Answer all questions.*
- *Mark appropriate answer in box under desired mark.*
- *Use either a "Cross" or a "tick".*

Figure 58: Questionnaire cover letter.

Years of experience			
0-3 years	4-6 years	7-10 years	11 and above

Rating scale	1	Totally disagree	4	Agree
	2	Disagree	5	Totally agree
	3	Maybe		

		1	2	3	4	5
1	**The company always follows the process and steps as set out to them.**					
2	**Rate the process phase importance according to your opinion.**	**Not important**	**Not very important**	**Neutral**	**Not very important**	**Very Important**
	Inquiry phase					
	Inquiry evaluation					
	Enquiry submission					
	Enquiry clarification					
	Customer adjudication					
3	**The current tender process is adequate and doesn't need to change.**					
4	**Tendering is carried out in a cost effective way in the current tender process**					
5	**There is no need to prescribe guidelines and further process development.**					
6	**The current tendering practices are outdated and inefficient**					
7	**The current tendering practices are in line with the best**					

Figure 59: Formal questionnaire pg.1.

8	Tendering activities are carried out almost as stand alone processes with no regard for budget limits					
9	The current tender processes are consistently well documented					
10	The current tendering process stops tendering if so decided in evaluation phase					
11	The responsibility of a tender proposal is a team effort					
12	Every person knows what is expected of him/her from the start					
13	Proper support structures are in place to ease bid development					
14	The process is well defined and managed					
15	When a tender is adjudicated, the result investigated and reported for future use.					
16	The tender proposal is always on time and has been reviewed for mistakes.					

Figure 60: Formal questionnaire pg.2.

Appendix G

Years of experience			
0-3 years	4-6 years	7-10 years	11 and above
3	1	1	2

Figure 61: Formal question amount of years' experience ratings.

2	**Rate the process phase importance according to your opinion.**	**Not important**	**Not very important**	**Neutral**	**Not very important**	**Very Important**
	Inquiry phase				2	5
	Inquiry evaluation	2	4	1		
	Enquiry submission			1	5	1
	Enquiry clarification				1	6
	Customer adjudication		2	3	2	

Figure 62: Formal question 2 score breakdown.

Figure 63: Formal questionnaire feedback results.

	Question number															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Correspondent 1	1	-	2	2	2	5	1	4	3	1	1	1	2	1	1	1
Correspondent 2	1	-	2	3	2	3	1	3	1	1	1	1	2	1	1	1
Correspondent 3	3	-	1	2	2	4	1	4	1	1	2	2	3	2	2	1
Correspondent 4	2	-	1	1	1	4	2	4	1	1	1	1	3	2	2	1
Correspondent 5	2	-	2	2	2	5	1	5	2	1	1	1	3	1	1	1
Correspondent 6	2	-	2	2	2	5	1	4	2	1	1	1	3	1	2	1
Correspondent 7	3	-	1	3	2	5	2	5	2	1	1	1	2	1	1	1
Average	2		2	2	2	4	1	4	2	1	1	1	3	1	1	1

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