

■ Contents

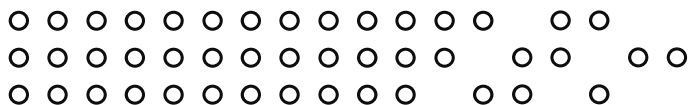
1. Introduction

2. Company Profile

3. Typical Staff

4. Quantity Surveyor's Involvement

5. Schedule of Experience



WHO IS DAVIS LANGDON?

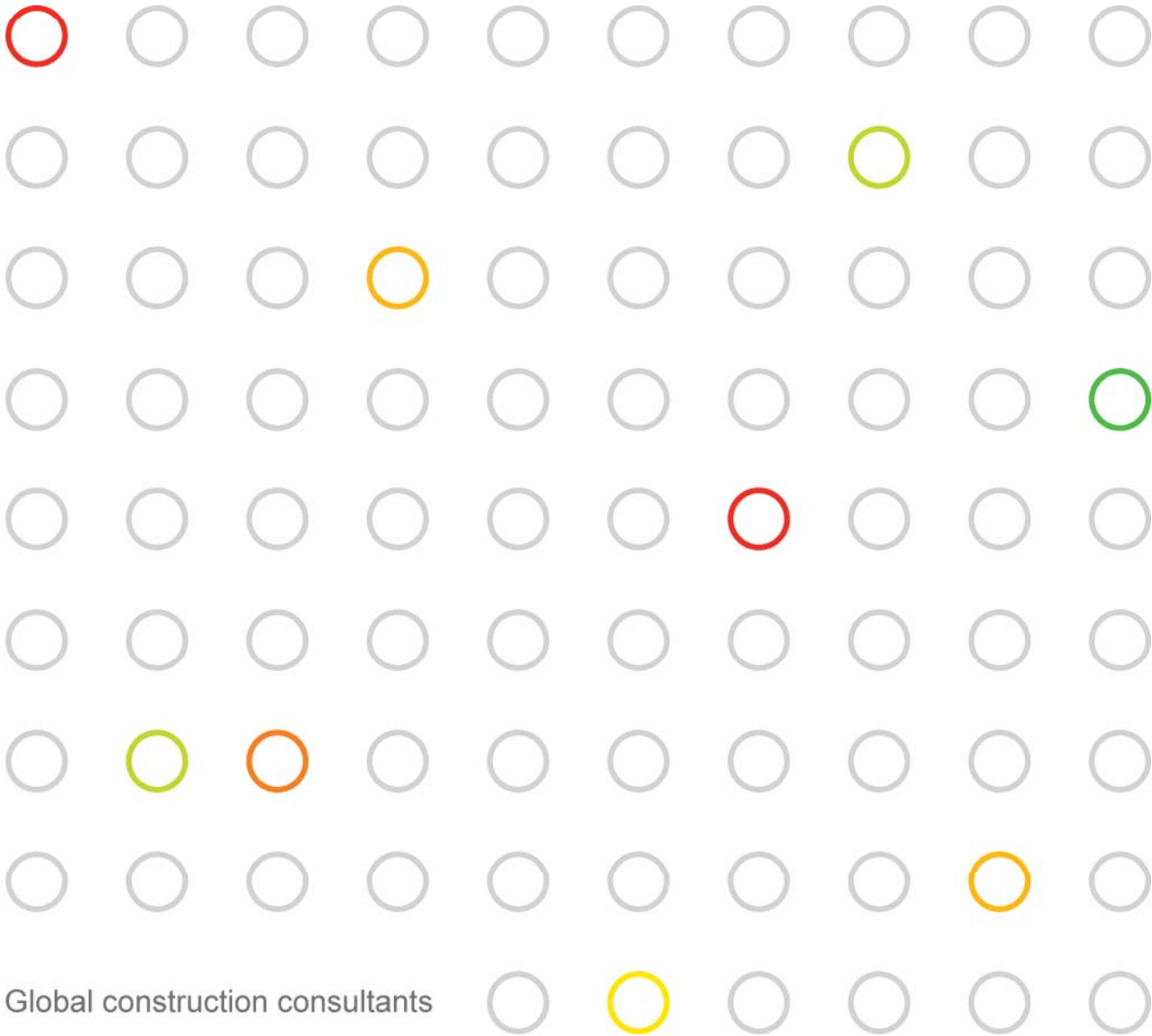
Established in 1922

- Leading Quantity Surveying Practice – Africa based
- Davis Langdon & Seah International – worldwide

Specialist Engineering Division

- 25 year experience in all aspects of Mining, Process and Petroleum Projects
- Black Economic Empowerment (BEE)
- ISO 9001 : 2000 Certified

Company Profile



INDEX

1	INTRODUCTION
2	EXECUTIVE SUMMARY
2.1	Who will use these services?
2.2	The timing of DLE involvement
2.3	Core Competencies
2.4	Representative Project Experience
3	CAPITAL COST MANAGEMENT SERVICES
3.1	Project Inception
3.2	Project Feasibility Study
3.3	Pre Contract Phase
3.4	Construction Phase/Post-Contract Phase
3.5	Other Related Services
4	RISK MANAGEMENT SERVICES
4.1	Value Management
4.2	Quality Management
4.3	Third Party Certification
4.4	Risk Management Workshops
4.5	Project Audits
5	OH & S AND ENVIRONMENTAL MANAGEMENT
5.1	Why Manage OH&S risks?
5.2	Why Manage Environmental Risks?
5.3	Quantification of Risk
5.4	DLSI's OH&S and Environmental Risk Management Services Include
6	CERTIFICATION SERVICES
6.1	Applications of Certification
6.2	Certification is About
6.3	Business Practice (QA) Systems
6.4	Environmental Management Systems
6.5	OH&S Certification

1. Introduction

Formed in 1922, Davis Langdon Engineering (DLE) is a leading Quantity Surveying practice operating throughout Africa.

Recognising the globalisation of its clients, DLE entered into a formalised Verein agreement with other similar minded quantity surveying practices operating in specific continents to create Davis Langdon & Seah International (DLSI). DLSI is a large worldwide independent multi-discipline cost management and project control organisation, comprising a staff complement in excess of 2500 personnel operating from some 80 plus offices located throughout Asia, the United Kingdom, Continental Europe, the United States of America, Africa and the Middle East, Australasia, including New Zealand.

DLE has a specialist Engineering section which has developed specialist skills and applications that enhance the risk management and value techniques required by the mining, minerals, metallurgical and petro-chemical industries. This includes dedicated independent teams specialising in procurement and cost management related responsibilities. DL Engineering is responsible for many diverse projects within the above mentioned industries with principle benefits to our clients being **independence, accountability and evidence of corporate governance.**

In South Africa, DL Engineering operates in Johannesburg and Klerksdorp but also utilises infrastructure support from other local operation offices within the Group located in all major centres in South Africa and Botswana.

Representative offices are also located in Brisbane and Perth to service the Australian market.

The Company employs professional qualified quantity surveyors, cost managers, project managers, construction programmers, cost engineers, accredited lead assessors and building surveyors.

In the mining, minerals, metallurgical and petro-chemical industries, where projects are of a high capital value, it is most beneficial to involve DL Engineering at an early stage in the project evolution. This allows strong financial discipline to be imposed on the project to ensure that the cost implication of design changes are identified in time, recorded, costs to complete accurately maintained and adjusted as the project definition firms. All-important components in managing project risks.

The implementation of these principles of financial management will deliver maximum shareholder value. It is in this area of value adding that the firm strives to significantly influence project outcomes to benefit all stakeholders.



2. Executive Summary

DL Engineering experience and services are focussed upon the requirements associated with Project Delivery.

Who will Use These Services?

We are committed to servicing;

- Operating Companies.
- Stakeholders and Financiers.
- EPCM Contractors.
- Design and Construction Companies.

We do this by tailoring services to meet their individual needs.

The Timing of DL Engineering Involvement

We offer experienced personnel and professional services for all the strategic phases of project development:

- Proving Study and Scoping Estimates.
- Contract Procurement Advice and Facilitation.
- Construction and Post Construction Services.
- Rehabilitation and other Capital Allowance Valuation Services.

During any Project life cycle, DL Engineering provides focussed and timely services.

Project Services

- Cost Management
- Procurement and Award
- Monitoring
- Contract Administration
- Closure.

Risk Management Services

- Feasibility Study Audit and Review.
- Bank or Financier Representation.
- Commercial Evaluation, Adjudication and Recommendation.
- Risk Management Planning, Implementation and Monitoring.

Management System Services

- Systems Development
(to ISO Standards for QA and OH&S).
- System Auditing and Conformance Reporting.
- Conformance and Non Conformance reporting.
- Recommendation for Continuous Improvement.

A matrix of DL Engineering and DLSI skills and competencies has been included, as a quick reference “check list” of the roles and responsibilities that this group seeks to provide to Mining, Minerals, Metallurgical and Petro-Chemical Industries.

Core Competencies

Integrated Construction Management Services	Operating Companies	Stakeholder / financiers	EPCM Contractors	EPC / D&C Contractors
Feasibility Stage				
<ul style="list-style-type: none"> • Capital cost reviews (3rd party) • Work Breakdown Structures • Pricing schedules • Tender documentation • Review and monitoring • Compilation of estimate • Estimated Final Cost 	<ul style="list-style-type: none"> ✓ ✓ ✓ ✓ ✓ ✓ ✓ 	<ul style="list-style-type: none"> ✓ ✓ ✓ ✓ 	<ul style="list-style-type: none"> ✓ ✓ ✓ ✓ ✓ ✓ ✓ 	<ul style="list-style-type: none"> ✓ ✓ ✓ ✓ ✓ ✓
Project Procurement Services				
<ul style="list-style-type: none"> • Pricing schedules, including schedules of quantities • Bid documentation • Procurement review <ul style="list-style-type: none"> - Document format - Schedules - Process review • Pre-draw down services • Tender evaluation and documentation review • Contract documentation 	<ul style="list-style-type: none"> ✓ ✓ ✓ ✓ ✓ ✓ ✓ 	<ul style="list-style-type: none"> ✓ ✓ ✓ ✓ ✓ 	<ul style="list-style-type: none"> ✓ ✓ ✓ ✓ ✓ ✓ ✓ 	<ul style="list-style-type: none"> ✓ ✓ ✓ ✓ ✓ ✓
Project Implementation Services				
<ul style="list-style-type: none"> • Project cost audits • Progress payment certification • Cash Flow Schedules • Contract administration • EFC reporting and monitoring <ul style="list-style-type: none"> - Final versus estimate - Financial reports • Change order management • Project closure services 	<ul style="list-style-type: none"> ✓ ✓ ✓ ✓ ✓ ✓ ✓ 	<ul style="list-style-type: none"> ✓ ✓ ✓ ✓ ✓ ✓ ✓ 	<ul style="list-style-type: none"> ✓ ✓ ✓ ✓ ✓ ✓ ✓ 	<ul style="list-style-type: none"> ✓ ✓ ✓ ✓ ✓ ✓ ✓
Associated Corporate Services				
<ul style="list-style-type: none"> • Quality management services <ul style="list-style-type: none"> - Audit existing systems - Develop and install systems - Preparation for accreditation • Quality training services <ul style="list-style-type: none"> - QMS, EMS, OH & S • Certification services <ul style="list-style-type: none"> - QMS - EMS - OH&S 	<ul style="list-style-type: none"> ✓ ✓ ✓ ✓ ✓ ✓ ✓ 	<ul style="list-style-type: none"> ✓ ✓ ✓ ✓ ✓ ✓ ✓ 	<ul style="list-style-type: none"> ✓ ✓ ✓ ✓ ✓ ✓ ✓ 	<ul style="list-style-type: none"> ✓ ✓ ✓ ✓ ✓ ✓ ✓

2. Representative Project Experience

Client/Employer /Principle	Project/s	Period of Service	Mineral/ Product	Service Rendered	
				Scope	Disciplines
Bombela Consortium Joint Venture	Gautrain Rapid Rail Link	2006 - 2010	n/a (Rail)	Independent Certifier	Civil, steelwork, piping, mechanical, electrical and instrumentation.
Transnet	Coega Terminal Rail work	2008 - 2010	n/a (Rail)	Estimate. Pre and post-contract services. Schedule of quantities basis.	Civil, steelwork, piping, mechanical, electrical and instrumentation.
Anglo American Corporation – AngloGold	Western Holdings Plant Rehabilitation.	1982-1983	Gold	Estimate. Pre and post-contract services. Schedule of quantities basis.	Civil, steelwork, piping, mechanical, electrical and instrumentation.
	Vaal Reefs – 8 shaft extensions.	1983-1985	Gold	Estimate. Pre and post-contract services. Schedule of quantities basis.	Civil, steelwork, piping, mechanical, electrical and instrumentation.
	Vaal Reefs – West CIL plant.	1993-1995	Gold	Estimate. Pre and post-contract services. Schedule of quantities basis.	Civil, steelwork, piping, mechanical, electrical and instrumentation.
	Western Deep Levels – 1 Shaft South, 3 Shaft, treatment plants, shaft extensions and equipping, transfer system, mine upgrades and modifications.	1984-1998	Gold	Estimate. Pre and post-contract services. Schedule of quantities basis.	Civil, steelwork, piping, mechanical, electrical and instrumentation.
	Western Holdings – Cyanidation gravity system.	1985-1986	Gold	Estimate. Pre and post-contract services. Schedule of quantities basis.	Civil, steelwork, piping, mechanical, electrical and instrumentation.
	Vaal Reefs – West CIL plant.	1993-1995	Gold	Estimate. Pre and post-contract services. Schedule of quantities basis.	Civil, steelwork, piping, mechanical, electrical and instrumentation.
	Elandsrand Gold Mine – High speed tunnelling.	1997	Gold	Bid documents for underground development.	Underground development.
	Mponeng Mine (Western Deep Levels No, 1 shaft) underground deepening project.	1999 - present	Gold	Estimate. Pre and post contract services. S/Q, EPCM and lump sum.	Civil, steelwork, piping, mechanical, electrical and instrumentation. Underground development and equipping.
	Tautona Mine (Western Deep Levels No 3 shaft) – Decline extension 94-101 and pillar removal feasibility.	2000-2002	Gold	Estimate. Pre and post contract services. S/Q, EPCM and lump sum.	Underground development and equipping.
Anglo American Corporation – Base Metals	Konkola Expansion Project (Zambia)	2000-2001	Copper	Third party audit.	All disciplines.
Anglo American Corporation – Amcoal	Goedehoop Colliery and subsequent upgrades and expansions	1981-1989	Coal	Pre and post-contract services. Schedule of quantities basis.	Civil, steelwork, piping, mechanical, electrical and instrumentation.
	Landau Replacement Project and Expansion	1986-1994	Coal	Estimate. Pre and post-contract services	Civil, steelwork, piping, mechanical, electrical and instrumentation.
Anglo American Corporation – Amplats	Waterval Smelter – ACP Project Phase A & B	2000-2005	PGM	Pre and post-contract services. Schedule of quantities basis.	Civil, steelwork, piping and mechanical.

Client/Employer /Principle	Project/s	Period of Service	Mineral/ Product	Service Rendered	
				Scope	Disciplines
	Polokwane Smelter	2001	PGM	Third party audit and control budget estimate	All disciplines
	Modikwa Platinum Mine	2001-2003	PGM	Pre and post-contract services. Schedule of quantities basis.	Development, civil, steel-work, piping, mechanical, electrical and instrumentation
Anglovaal	Target Gold Mine	1993-2001	Gold	Feasibility reviews. Estimate. Pre and post-contract services. 3rd Party verification.	Underground development and equipping. Lump-sum Process Plant contract.
	Cato Ridge Smelter	1989-1990	Ferro magnesium	Management overview function	All disciplines.
	Nkomati JV – Shaft sinking	1996	Nickel	Estimate	Underground development and equipping.
Aquarius Platinum	Kroondal Platinum Mine Project and Expansion	1998	PGM	Pre and post-contract services. EPCM and EPC contracts.	Mining, civil, steelwork, piping, mechanical, electrical and instrumentation.
	Kroondal Platinum Mine – Operations underground and process plant	1999-2003	PGM	On-going operational cost services	Underground development and equipping. Operations underground and plant.
Aquarius Platinum	Everest South	2004	PGM	Enquiry advice, tender adjudication, contract documentation.	Underground contract mining. Opencast mining.
Basin Minerals	Douglas Minerals Sands Project	2002	Mineral sands	Pre-qualification and EPCM bid document	EPCM services tenders
BHP (BHP Billiton)	Hartley Platinum Mine, Zimbabwe	1994-1996	PGM	Estimate. Pre and post-contract services. Schedule of quantities basis.	Civil, steelwork, piping, mechanical, electrical and instrumentation.
De Beers Diamond Corporation	Jwaneng Diamond Mine, Botswana	1979-1981	Diamonds	Estimate. Pre and post-contract services. Schedule of quantities basis.	Civil, steelwork, piping, mechanical, electrical and instrumentation.
	Jwaneng Recrush Plant, Botswana	1987-1989	Diamonds	Estimate. Pre and post-contract services. Schedule of quantities basis.	Civil, steelwork, piping, mechanical, electrical and instrumentation.
	Orapa 2000 Project, Botswana	1997-2000	Diamonds	Estimate. Pre and post-contract services. Schedule of quantities basis.	Civil, steelwork, piping, mechanical, electrical and instrumentation.
	Premier Diamond Mine – New recrusher plant	1987-1989	Diamonds	Estimate. Pre and post-contract services. Schedule of quantities basis.	Civil, steelwork, piping, mechanical, electrical and instrumentation.
	Premier Diamond Mine – New sample plant and screening	1989-1991	Diamonds	Estimate. Pre and post-contract services. Schedule of quantities basis.	Civil, steelwork, piping, mechanical, electrical and instrumentation.
	Premier Diamond Mine – C-Cut Project	1999-2002	Diamonds	Estimating.	Shaft sinking, underground development and equipping.
	Finsch Diamond Mine Pre '79 Tailings Retreatment	2003/2004	Diamonds	Third Party audit of Class II and Class III Estimate	All disciplines.
	Finsch Diamond Mine – Waste shaft deepening	1988-1989	Diamonds	Post-contract services.	Underground development and equipping.

Client/Employer /Principle	Project/s	Period of Service	Mineral/ Product	Service Rendered	
				Scope	Disciplines
	Finsch Diamond Mine – Underground development (UG2)	1989	Diamonds	Post-contract services.	Underground development and equipping.
De Beers Diamond Corporation	Finsch Diamond Mine – HMS Upgrade	1991-1992	Diamonds	Pre and post-contract services. Schedule of quantities basis.	Steelwork, piping, mechanical, electrical and instrumentation.
Duke Energy	Various upgrades and expansions in Tasmania	2001-2002	Power	Third party audits of feasibility estimates. Monitoring of site progress.	All disciplines.
Gencor (later Billiton)	Beatrix Mine – Refrigeration plant	1985	Gold	Estimate. Pre and post-contract services. Schedule of quantities basis.	Civil, piping, electrical and instrumentation.
	Winkelhaak, Kinross, Poplar, St Helena, Bafokeng, Beisa Weltevreden Gold Mines – Various projects, upgrades, etc	1984-1996	Gold	Estimate. Pre and post-contract services. Schedule of quantities basis.	Civil, steelwork, piping, mechanical, electrical and instrumentation. Underground development and equipping
	Impala Platinum Refineries – Original project and all subsequent upgrades, expansions, modifications, etc	1984-2000	Platinum	Estimate. Pre and post contract services. Schedule of quantities basis.	Civil, steelwork, piping, mechanical, electrical and instrumentation.
	Richards Bay Minerals – Various projects, expansions, upgrades, etc	1986-1998	Titanium/ Mineral Sands	Estimate. Pre and post contract services. Schedule of quantities basis.	Civil, steelwork, piping, mechanical, electrical and instrumentation.
Isacor Limited	Heavy Minerals Project audit.	1999	Mineral sands	Audit of estimate.	All disciplines.
	Sishen Mine Plant Crushing Upgrade Project	2000	Iron ore	Estimate.	Civil and building work.
JCI	Western Areas Gold Mine – 3 Shaft sinking and equipping.	1984-1986	Gold	Pre and post-contract services. Schedule of quantities basis.	Underground development and equipping.
	Doornkop Gold Mine – Plant, Vent Shaft and 1 Shaft sinking	1984-1988	Gold	Pre and post-contract services. Schedule of quantities basis.	Underground development and equipping.
	H J Joel Gold Mine – Shaft sinking and associated works	1985-1990	Gold	Estimate. Pre and post-contract services. Reimbursable, lump-sum and schedule of quantities contracts.	Civil, steelwork, piping, mechanical, electrical and instrumentation. Underground development and equipping.
Sasol/Krupp Engineering	Various synthetic fuel and chemical projects	1998-present	Petro-chem	Post-contract on-site cost administration services. Cost audit functions.	Civil, steelwork, piping, mechanical, electrical and instrumentation.
	Project Turbo Poly III	2004/5	Petro-chem	Post-contract on-site cost administration services. Cost audit functions.	Civil, steelwork, piping, mechanical, electrical and instrumentation.
Sasol/Fluor	Project Turbo Polly III - OBL	2004/5	Petro-chem	Post-contract on-site cost administration services. Cost audit functions.	Civil, steelwork, piping, mechanical, electrical and instrumentation.
Lonmin plc	Western Platinum – No 4 Shaft and associated works, No 1 Shaft treatment plant extensions, new winder house, new treatment plant, new smelter, CCH plant, UG2 second stream extensions, furnace rehab, slab treatment plant, smelter expansion and various miscellaneous minor projects	1986-1997	PGM	Estimate. Pre and post-contract services. Lump-sum and schedule of quantities contracts.	Civil, steelwork, piping, mechanical, electrical and instrumentation. Mining o/cast, underground and equipping.

Client/Employer /Principle	Project/s	Period of Service	Mineral/ Product	Service Rendered	
				Scope	Disciplines
	Eastern Platinum – New concentrator plant, plant extensions, new fines thickener and various miscellaneous works	1988-1998	PGM	Estimate. Pre and post-contract services. Schedule of quantities contracts.	Civil, steelwork, piping, mechanical, electrical and instrumentation.
	Karee Platinum Mine – Plant extensions, ore transportation, UG2 bulk sample plant, vent shaft, concentrator plant and expansion, shaft equipping and associated works	1991-present	PGM	Estimate. Pre and post-contract services. Lump-sum and schedule of quantities contracts.	Civil, steelwork, piping, mechanical, electrical and instrumentation, underground and equipping.
	Rehabilitation costs of all Lonmin platinum mines, structures, etc	2001-present	PGM	Estimate	All disciplines.
	New EP-C and K4 Concentrator Plants and infrastructure	2002-2003	PGM	Estimate. Pre and post-contract services. Schedule of quantities contracts.	Civil, steelwork, piping, mechanical, electrical and instrumentation.
	Saffy and Hossy Shafts – shaft sinking	2000-present	PGM	Estimate. Pre and post-contract services. Reimbursable Target, lump-sum and schedule of quantities contracts.	Civil, steelwork, piping, mechanical, electrical and instrumentation. Mining, underground and equipping.
	Pandora Platinum Mine JV	2002-present	PGM	Estimate and pre-contract work to date.	Civil, steelwork, piping, mechanical, electrical and instrumentation. Mining, underground and equipping.
	Various open-cast mine operations over lease area	2001-present	PGM	Bid documents for contractor mining.	Open-cast mining operations.
Minorco plc	Lisheen Zinc Lead Mine (Ireland)	1997-2000	Zinc & Lead	Estimate. Pre and post-contract services. Reimbursable, lump-sum and schedule of quantities contracts.	Civil, steelwork, piping, mechanical, electrical and instrumentation. Mining, underground and equipping.
Mossgas Refinery	Mossgas Refinery petro-chemical plant	1988-1992	Petro-chem	Post-contract audit services	Civil, steelwork, piping, mechanical, electrical and instrumentation.
Phelps Dodge	Shashe Gold Mine – Treatment plant, surface works, shaft headgear, roaster plant, etc. Raise bore and associated works	1987-1990	Gold	Pre and post-contract services. EPC, reimbursable and schedule of quantities.	Civil, steelwork, piping, mechanical, electrical and instrumentation. equipping.
Rio Tinto plc	Palabora Mining Company – Copper anode casting plant, instrumentation smelter unit. Underground Mining Project	1993-2004	Copper	Estimate. Pre and post-contract services. Reimbursable, lump-sum and schedule of quantities contracts.	Civil, steelwork, piping, mechanical, electrical and instrumentation. Mining, underground and equipping.
Batemans	Seppon Copper Project (Laos)	July to September 2003	Copper	Feasibility Study (assisted Batemans in the compilation of the Definitive Estimate)	Civil, Structural Steel, Pipework and Mechanical Equipment
Bechtel	Goro Nickel Project (New Caledonia)	October to December 2002 (project suspended)	Nickel	Feasibility Study (assisted Bechtel in the compilation of the Definitive Estimate)	Piping and Electrical
AAS	Aldoga Aluminium Smelter	November 2002 - Present	Aluminium	Third Party review of estimate	All disciplines

3. Capital Cost Management Services

DL Engineering provides a depth of experience, expertise and independence, which will contribute to and complement the client's team. This is critical particularly in the earliest phases of a project when the ability to **add value, recognise and define cost, are established**. Simultaneously the formalisation of project principles is equally critical, through the project, cost management continuing through to the post-contract period and final closeout.

3.1 *Project inception*

- Assistance with pre-qualification and selection of procurement strategies
- Preparation of order of magnitude capital requirements
- Pre-feasibility study capital requirements

3.2 *Project Feasibility Study*

- Preparation of capital cost estimates for detailed feasibility studies
- Compilation of appropriate work breakdown structures
- Review of estimates (if provided by others)
- Provision of contractual advice and procurement methodologies
- Project time scheduling
- Preparation of activity linked cash flows
- Preparation of audit reports for inclusion in bankable documents
- Financial evaluation of trade off studies and alternatives/options
- Evaluation of cost estimates against industry norms
- Risk analysis and contingency calculations

3.3 *Pre Contract Phase*

- Preparation of enquiry / bid documentation
- Negotiation of contract placement
- Facilitation and participation in Value Management reviews
- Cost Management of Design Development
- Preparation of enquiry documentation for construction works
- Preparation of enquiry documentation for capital purchase items
- Audit of enquiry documentation issued by others
- Adjudication and recommendation of tenders received including negotiation of final contract terms and conditions
- Contract documentation preparation
- Preparation of management plans for quality, OH&S and EMS systems

3.4 *Construction Phase/Post-Contract Phase*

- Monitoring and progress reporting including proactive project cost to completion forecasts
- Interim progress valuation of work done for payment certificate purposes
- Change order management including settlement of costs
- Contractual advice and negotiation
- Claim resolution
- Preparation and settlement of final accounts
- Review of construction schedule planned versus actual
- Integration of costs and time for activity costing purposes
- Audit of application of management systems for quality, OH&S and EMS
- Independent audit reviews
- Watching brief roles
- Participation in preparation of project close out reports

3.5 Other Related Services

- Dispute management
- Specification writing
- Insurance replacement assessments
- Asset valuation
- Estimation of mine closure rehabilitation costs

4. Risk Management Services

DL has developed skills that address the management of all four-project imperatives – **Time, Cost, Quality and Safety**. The management of these imperatives is the key to risk management of project delivery and outcome. The DL risk management focus includes **value management, quality management** through quality system development, **auditing and certification, due diligence audits, and formalised risk management workshops**.

4.1 Value Management

- An organised approach for obtaining optimum value for money spent
- A facilitation service built on experience and knowledge gained through our involvement as cost managers and other project participants.

4.2 Quality Management

- Total quality management advice
- System development to ISO 9000 standards
- Auditing and surveillance with lead auditors
- Education and training to ensure maximum value from implementation.

4.3 Third Party Certification

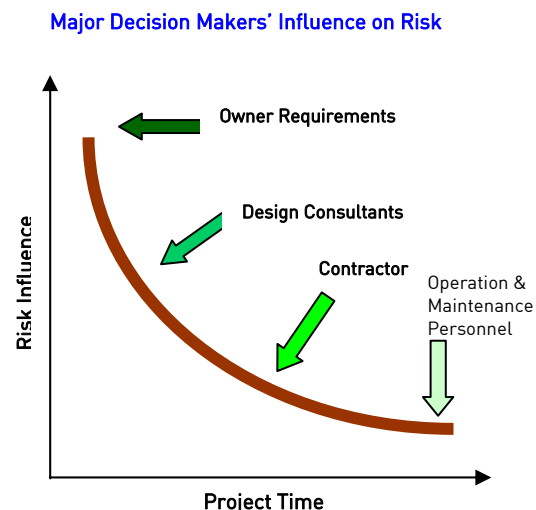
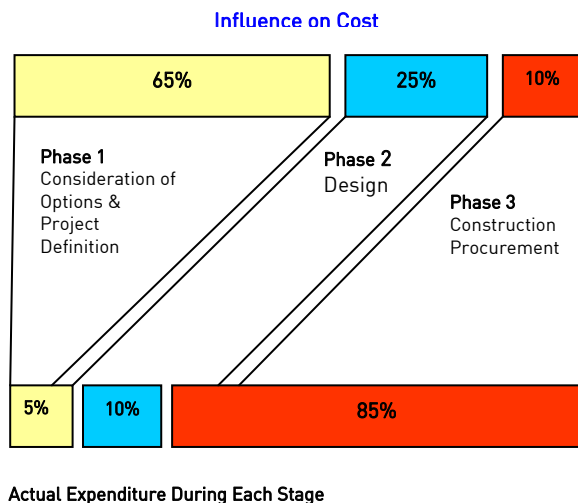
- ISO 9000 certifications
- JAS-ANZ accreditation
- Construction and related industries specific forms

4.4 Risk Management Workshops

- Facilitation within a systematic approach
- Focused on identification and prioritisation of project critical risks
- Clear management strategy outcomes
- Ongoing monitoring of risk profile and strategies.

4.5 Project Audits

- Regulation compliance
- Audit reports that identify and prioritise
- Critical issues and their potential risk over time.



5. OH&S and Environmental Management Services

DL's worldwide associate, Davis Langdon & Seah International, has developed management services that facilitate **Occupational Health & Safety and Environmental Risk Management**. The management of these most important areas is fundamental in avoiding accidents in terms of personal safety and the environment. The Occupational Health & Safety and Environmental Risk Management focuses on minimising risks through systematic but practical and efficient measures which are cost effective.

5.1 *Why manage OH&S risks?*

- Prevent accidents from occurring;
- No system or a deficient system will leave your personnel, management or the business totally exposed;
- Avoid financial losses from increased insurance premiums, personnel off work and rehabilitation costs;
- Minimise legal implications that are uninsurable and involve criminal liability;
- Reduce risks of heavy financial fines or even imprisonment;
- Reduce the liability of Directors, which in some cases includes manslaughter charges.

5.2 *Why manage environmental risks?*

- Prevent environmental accidents (even small operations can cause or set off a chain reaction with major consequences);
- No system or a deficient environmental management system will leave personnel, management or the business totally exposed;
- Avoid financial losses. In environmental accidents the clean up costs can be large;
- Environmental protection laws provide for large fines and at times imprisonment.

5.3 *Quantification of Risk*

- The difference between preventing an accident and managing company legal risks in OH&S;
- The advantages of a risk management system that is certified (OH&S Risks Management Systems are certified under AS 4801 and Environmental Management Systems are certified under ISO 14001);
- It is more cost effective to set up a risk management system certified to AS 4801 or ISO 14001.

5.4 *OH&S and Environmental Risk Management Services include*

- System development to ISO 14001 and AS 4801;
- Auditing and surveillance with lead auditors;
- Education and training to ensure maximum value from implementation;
- OH&S Risk Management Assessments to AS 4801;
- Environmental Risk Assessment to ISO 14001;
- Due Diligence Audits;
- Compliance, Maintenance & Review;
- Third party Certification to AS 4801 and ISO 14001;
- Independent auditing and compliance assessments.



Site of industrial accident with multiple fatalities

6. Certification Services

DLSI's subsidiary **DLIQ Certification Services Pty Ltd** is an internationally (JASANZ) accredited third party Certification body authorised to certify enterprises to International Quality Assurance Standards Best Practice.

This includes:

- Business practices (QA) systems AS/ISO 9001,9002,9003-2000);
- Environmental Management Systems (EMS) AS/ISO 14001;
- Safety (AS 4801 and Safety Map and Safety Australian Standard (AS 4801), and Environmental Management Standards (ISO 14001).

6.1 Applications of Certification:

- Certification is a *distinct advantage* in tendering for all projects;
- Certification achieves business efficiency, focusing on criteria that are what is really important and self-improving.

6.2 Certification is about:

- Probity, auditability and transparency;
- Managing your risks;
- Providing exactly what your client wants;
- Avoiding waste (in time, resources etc.);
- Verification and evidence of compliance.

6.3 Business Practice (QA) Systems:

- Identify what is to be done and verify that specified requirements are met;
- Are an endorsement of your business value and quality.



Occupational Health & Safety



Environmental Management



Quality Endorsed Company

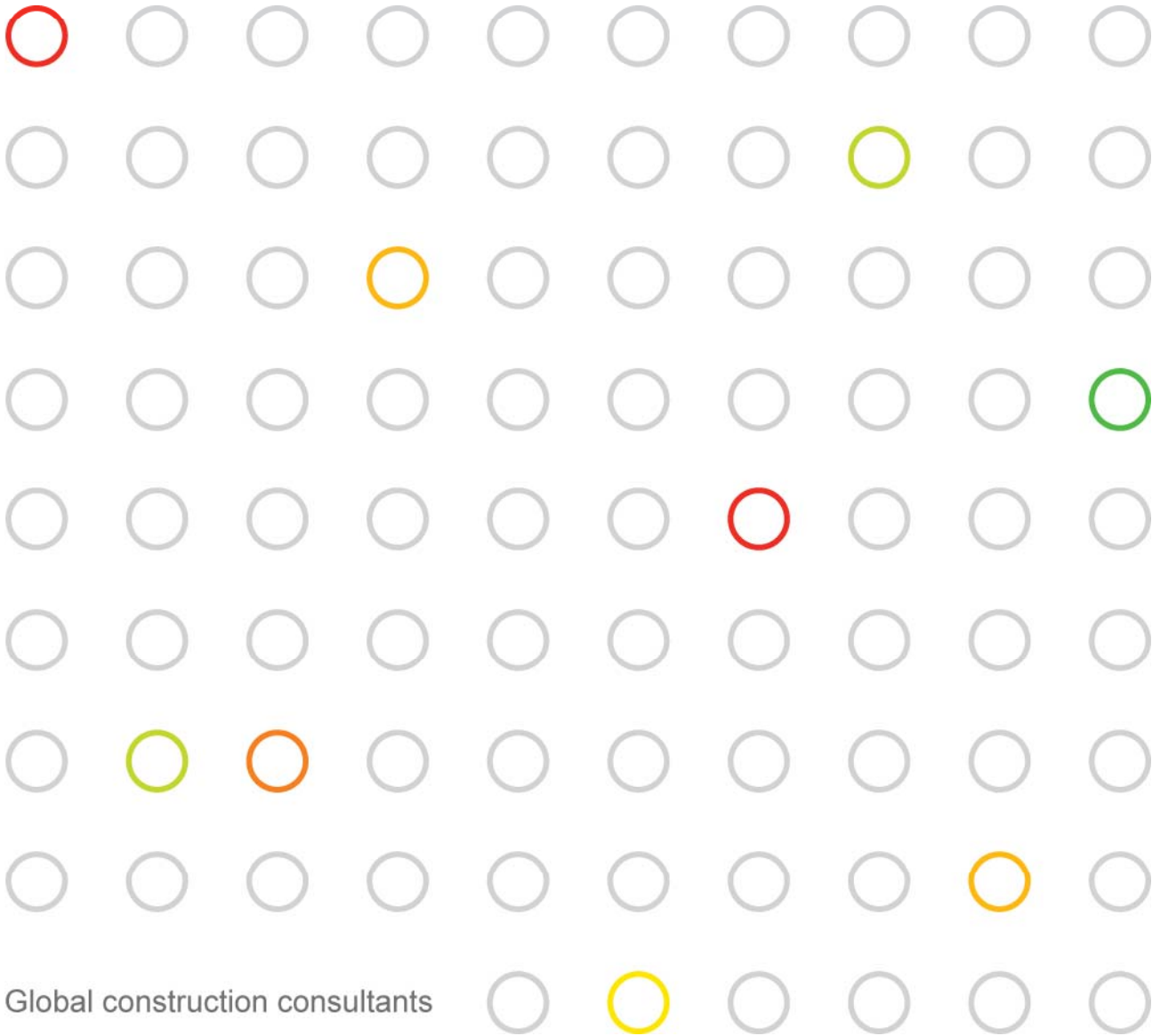
6.4 Environmental Management Systems:

- Provide the key to minimising your risks in environmental accidents;
- Provide peace of mind, responsible management and self-improvement that are fundamental outcomes of EMS certification.

6.5 OH&S Certification:

- Certification to AS 4801 or Safety Map gives peace of mind that you have one of the best management systems of OH&S to avoid injury or accidents;
- Is a key step in minimising your high risks in OH&S;
- Is the assurance that you are focusing on prevention.

Typical Staff



TYPICAL STAFF

- R E Black
- I Z Gildenhuis
- C I Hall
- G Brummer
- J D Steyn
- D R Knowles
- M R Kajee
- O La Grange
- S M Mluzi
- T Mamabolo
- G Woodhead
- S Black
- S Carr
- A Westerman
- J Riem
- Z Kahn
- O Netsianda

QUANTITY SURVEYOR'S INVOLVEMENT

ENGINEERING CONTRACTS

THE QUANTITY SURVEYOR'S INVOLVEMENT

1.0 INTRODUCTION TO DAVIS LANGDON ENGINEERING

Davis Langdon Engineering is a National Quantity Surveying practice comprising sixteen offices throughout Southern Africa

In 1998 Davis Langdon Engineering entered into an international association with Davis Langdon and Seah International, a worldwide cost consultancy and management group. We therefore have access to the tremendous experience and data bank of the DLSI organisation.

As a practice in existence since 1922, Davis Langdon Engineering has undertaken a wide variety of projects in both the traditional Building Industry and also in the mining, engineering and petrochemical industries. The client list of Davis Langdon Engineering is vast and encompasses major South African companies and institutions in both the building and engineering industries.

Davis Langdon Engineering has also worked with the majority of the leading mining houses and related engineering and petro-chemical concerns over the years and continues to enjoy good working relationships with them.

All documentation is generated and processed on computers using current software (Microsoft Windows, Excel, Word, WinQS, KwikFeas, etc.) and Internet connections, e-mail links where required.

Adequate insurance cover is carried by Davis Langdon Engineering Group in respect of professional indemnity.

Davis Langdon Engineering has placed much emphasis on value added services to those of traditional quantity surveying. The Firm promotes timeous cost advice to ensure economy without compromising design and maintains cost control via stringent cost checking and cost monitoring. In addition, the Firm is well versed in assisting to procure capital equipment

2.0 ROLE OF THE QUANTITY SURVEYOR

2.1 What is a Quantity Surveyor?

The quantity surveyor is the financial consultant of the construction industry and his training and experience qualify him to advise on cost and contractual arrangements and to prepare contract documents. He acts in liaison with the client's representatives and the contractor to safeguard the client's interests and his status is that of an independent professional consultant providing expertise in a specialised area of the construction industry.

The title quantity surveyor was reserved under the Quantity Surveyor's Act of 1970 for exclusive use by those who had obtained the necessary professional qualifications and experience prescribed under the Act. In terms of it, such persons must register with the South African Council for Quantity Surveyors before they may offer their services as consultants.

A quantity surveyor is required to comply with a strict code of professional conduct which includes responsibility to his employer or client and to his profession having full regard to the public interest, conducting himself so as to uphold the dignity and reputation of the profession and discharging his duties to his employer or client in an efficient and competent manner with complete fidelity and without undue delay.

2.2 Traditional Role

The quantity surveyor emerged in England at the beginning of the nineteenth century. In those early days the quantity surveyor acted for the master tradesmen, measuring the work after completion and frequently submitting partisan Final Accounts to the building owner. As a direct result of these activities it increasingly became the practice of building owners to have work executed under contract and to call for tenders before any work was undertaken.

The task of arriving at an accurate estimate of cost or tender can be carried out in only one way - that of measuring the quantities of all materials and labour necessary to complete the work, i.e. preparing bills of quantities. As each master builder had to prepare bills of quantities for each project it was realised that it would be more economical for them as a group to employ one surveyor to take out quantities for them all. They would thus share the cost of the surveyor, obtain an identical Bill of Quantities and ensure that they would all be tendering on the same basis.

The building owner subsequently realised that it would be to his advantage to appoint and pay the fees of the quantity surveyor himself.

2.3 New Role

The traditional role of the quantity surveyor has changed dramatically with time.

Today the quantity surveyor's role is much more participative and proactive to the faster construction periods of projects and to the need for accurate budget estimates, early estimated final cost forecasts and ultimately the timely settlement of final accounts.

The quantity surveying fraternity has also expanded from its traditional architectural building clientele into the heavy engineering, mining and petrochemical industries.

It is in this area that David Langdon Engineering saw the necessity to establish a specialised Engineering Services Division to service the different needs of these industries.

2.4 Engineering Services Division

The Engineering Services Division of David Langdon Engineering was constituted formally in 1980 as, after many years of involvement in mining and engineering projects, it became apparent that the knowledge of the construction techniques involved and the type of service required from our clientele required a dedicated team specialising solely in this aspect of construction.

This division has continued to expand both in Johannesburg and into our branch offices throughout the Southern Africa region and has handled many diverse projects within the mining, engineering and petrochemical industries.

It is presently managed by two partners (Rob Black and Ian Gildenhuys) based in Johannesburg who are assisted by an enthusiastic and competent staff of various disciplines. Additional input is provided by a further 6 partners and necessary staff in regional offices on a non-dedicated basis.

3.0 SERVICES PROVIDED

3.1 Quantity Surveying/Cost Consultancy

3.1.1 Estimates and cost advice

Estimates and cost advice during all stages of the development of a project are essential if the correct decisions with full awareness of their financial implications are to be made.

Sophisticated techniques, extensive cost data banks and an intimate knowledge of construction economics enables the quantity surveyor to provide reliable cost advice.

3.1.2 Cost Planning

Value for money, not only with regard to the capital cost but also in respect of the running and maintenance cost of a project are critical to the success of a project and form part of the services that can be offered.

Cost planning enables decisions on various design alternatives or scope changes to be made with actual costs being constantly monitored during construction against the original budget.

3.1.3 Advice on tendering procedures and contractual arrangements

The choice of the appropriate form of contract for any given project will depend on the nature of the project, the circumstances under which it is to be carried out and the particular needs of the client. The quantity surveyor is able to advise his client on the most advantageous enquiry method available, including:

- Contracts incorporating schedules of quantities, provisional schedules of quantities and schedules of rates,
- Negotiated, lump-sum managed and cost plus contracts,
- Package deals, turnkey offers, etc.

While Schedules of Quantities are generally regarded as the most economical and best method of obtaining a competitive price, the alternative methods and types of tender documentation available need to be carefully examined before a final decision is made.

3.1.4 Financial Control of Contracts

Adjudication of tenders received, in conjunction with the engineer's technical adjudication, and thereafter the compilation of the contract document, the valuation of works in progress, regular forecasting of estimated final costs, administration of variations and scope of work changes are the basis of the quantity surveyor's activities.

3.1.5 Final account settlement

The quantity surveyor's duty is essentially one of cost control and he ensures that a fair and equitable settlement of the cost of the project is reached in accordance with the contract conditions. In conjunction with the client's representative and other consultants, the quantity surveyor will ensure that the financial provisions of the contract are properly interpreted and applied.

3.1.6 Dispute Resolution

A quantity surveyor's knowledge and expertise in the fields of costs and contracts equip him to advise in the settlement of disputes and claims and to be called as an expert witness or to act as a mediator or arbitrator of disputes.

3.2 Project Support Services

In addition to the expanded role of the quantity surveyor mentioned previously, quantity surveyors, by their involvement in all aspects of projects are now able to offer services in addition to the normal quantity surveying services.

These extended services encompass the supply of administration personnel and support personnel to the in house project manager for functions such as:

Co-ordination

Scheduling

Time Control

Contract Administration

Asset Evaluations

"Watchdog Role" on management contractors.

4.0 MEASUREMENT PHASES AND MODUS OPERANDI

4.1 Measurement Phases

Normally three to four distinct measurement phases are required during a project cycle, namely :

- a) initial estimate to a required accuracy level;
- b) measurement for enquiry documentation if a) above is not definitive;
- c) check measurement as G A's and construction drawings are detailed for estimation of final costs;
- d) Finite measurement for final account purposes.

4.2 Modus Operandi

A typical measurement modus operandi for post contract to a final account measurement on a large project (phases c and d above) is described hereafter.

4.2.1 Civil Engineering Works

- a) Excavation;

The horizontal dimensions of excavation/s will be determined from the drawings and the requirements of the 1200 series. The vertical dimension or depth will be calculated from the Engineers' site levels of accepted foundation depths and by a physical examination by our on-site representative.

- b) All other works:

These will be measured from drawings issued to the Contractor as Construction drawings.

4.2.2 Structural/Mechanical Works

- a) Structural Steelwork and Platework:

Estimated initially from GA drawings for final cost forecasting and ultimately measured from CAD schedules or traditional shop detail drawings checked and categorised against general arrangement layouts for final account purposes.

- b) Cladding:

Measured initially from elevations for final cost forecasting and then from drawings issued as "For Construction" for final account purposes.

- c) Suspended Floors/Merchants:

Measured from layout plans for final cost forecasting and then from construction drawings or shop fabrication drawings for final account purposes.

- d) Handrailing

Measured initially from plans and elevations for final cost forecasting and then physically on site for final account purposes.

- e) Piping

Measured initially from P & ID and G A drawings for final cost forecasting and then from isometric drawings for final account values.

Site run piping is factorised and assessed from the P & ID, GA drawings and mechanical schedules and then measured physically on site or scheduled against site sketches for final account purposes,

f) Grouting

Measured for final cost forecasting from G A drawings using specification tolerance allowances.

For final account measures large volume areas are measured from drawings and small areas (plinths etc) physically on site.

4.2.3 Electrical/Instrumentation

a) Cable Racking

For final cost forecasting racking is measured initially from G A drawings as well as monitoring against material supplied to site. Physical on-site measurements are undertaken for final account purposes.

b) Cabling

Measured initially for final cost forecasting from client supplied cable schedules together with monitoring of the cable supplied to site by the contractor.

The above is analysed on an ongoing basis against the contractor's pull length schedules or cable drum management systems. For final account purposes, measurements are undertaken by way of :

- (i) A physical measure of installed cabling on a random basis until the estimated cable schedule, pulled length and actual measures are rationalised and agreed to by both parties.

This analysis is also checked and balanced against cable supplied to site and normal wastage factors.

The actual measure varies in extent depending on the accuracy of the schedules and pull lengths and may require a 100% physical measure,

or

- (ii) a 100% cable measure utilising new technology equipment which is of high accuracy.

4.2.4 Support Steelwork

a) Pipe Support and Brackets

For final cost forecasting the quantities are assessed from the P & ID and GA drawings during the measures described in 4.2 above. A physical count per size category is undertaken for final account purposes.

b) Cable dropper and sundry brackets, etc.]

Allowance assessed for final cost forecasting and physical measure on site undertaken for final account purposes.

Note

- (i) Where possible on site measures will be undertaken in conjunction with the Contractors' representatives.
- (ii) The above assumes that the Contractor supplies all materials and there is no "Free Issue" of material.
- (iii) More pragmatic systems of final account calculation based on delivery notes and agreed wastage factors can also be undertaken.

5.0 COST BENEFITS OF QS USAGE

5.0 Value for Money

The principle that the client is always looking "for maximum value for money" is the area in which the benefit of utilising the services of a quantity surveyor/cost consultant are to be found. It is the quantity surveyor's implementation of financial discipline, in the areas of budget setting, alternative design option costing, cash flow predictions, final cost forecasting, management of variations including potential areas of dispute and timeous final account settlement, etc. that allow the maximum value for money principle to be achieved.

A quantity surveyor's involvement early in the project allows accurate budget setting utilising the extensive cost information drawn not only from the particular client data base, but from experience of many other clients' projects and geographic areas.

The ongoing involvement of the quantity surveyor during the project implementation stage allows strong financial discipline to be imposed on the project by ensuring that construction design complies with original specifications and cost allowables and that design changes are timeously identified, recorded and that the final cost forecasts are accurately maintained and adjusted as the design phase becomes more accurate.

The quantity surveyor, if properly utilised as an independent consultant is seen by both sides of the construction team as being, independent and impartial in the settling of accounts.

5.1 Quantum Savings

It is considered that the implementation of the above principles of financial control, as exercised by the quantity surveyor, will result in a saving in the project total cost far in excess of the fee payable to the quantity surveyor.

The concept of a "saving" in the total project cost is a subjective or intangible concept as value for money expended implies no savings.

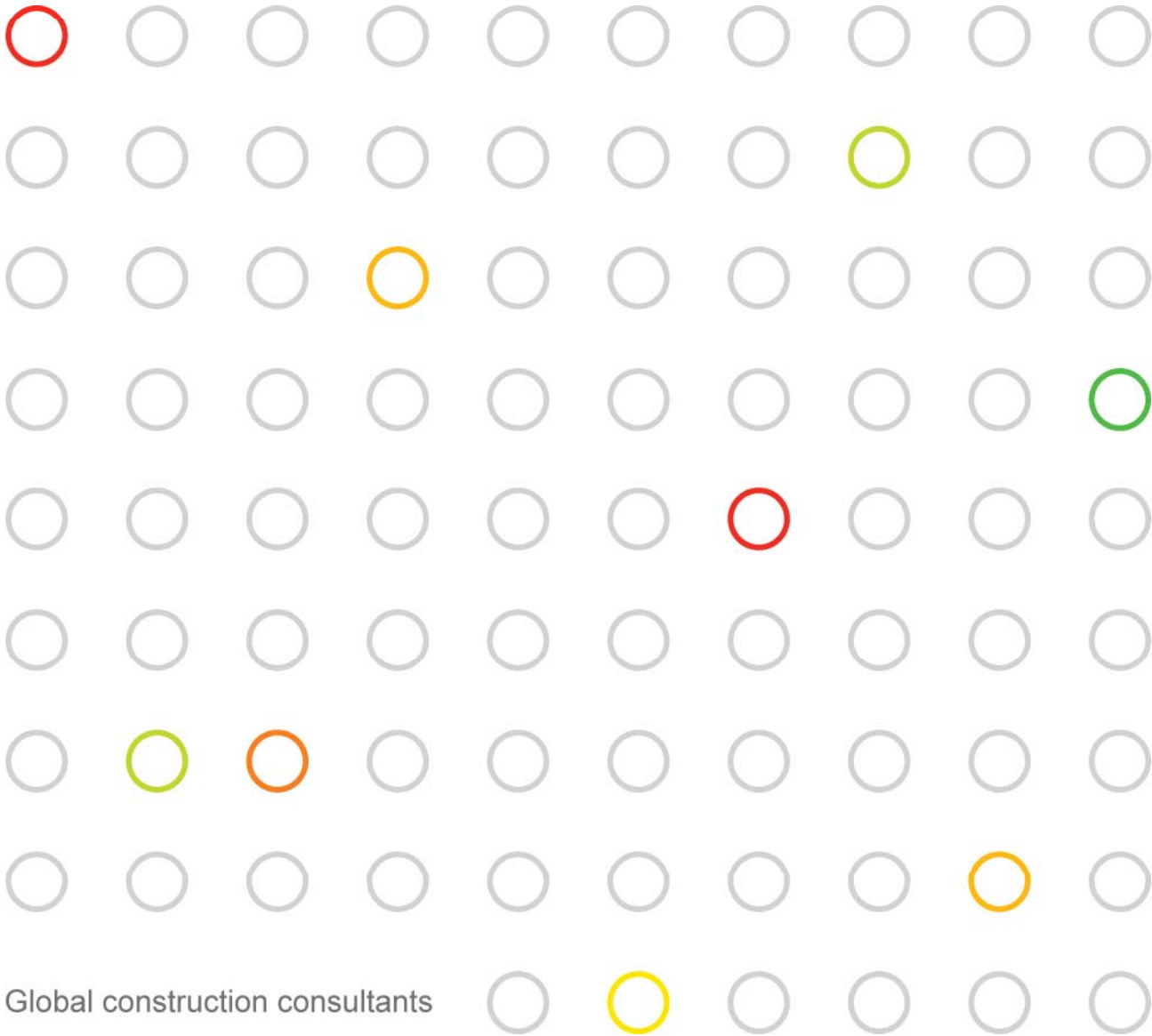
It is the fact that value for money is attained that negates project cost overruns and it is this area that the quantity surveying discipline has most influence, a well managed project financially as well as technically should attain a final value within the initial budget parameters.

Experience of projects which have shown budget excess and which have required audits of the total project costs to ascertain if value for money has been attained, have revealed that in many cases the over-runs have been incurred by poor initial estimating and/or sloppy financial control due to a lack of clearly defined procedures, all of which could have been controlled by the employment of a financial controller.

6.0 CONCLUSION

In conclusion it is considered that the fee payable for the quantity surveying services results in a saving in project cost, in excess of the fee paid.

Schedule of Experience



SCHEDULE OF EXPERIENCE

Year	Client	Project
1985	LONMIN	Western Plats - 'No 4 Shaft - Concrete Headgear
1986	LONMIN	Western Plats - No 4 Shaft - Winder Bases
1987	LONMIN	Western Plats - 'Headgear - Steelwork
1987	LONMIN	Western Plats - 'Tailings Retreatment Plant (Civils)
1987	LONMIN	Western Plats - 'No 4 Shaft Treatment Plant
1988	LONMIN	Western Plats - Electro Winning Plant Modifications
1988	LONMIN	Eastern Plats - 'New Concentrator Plant - all disciplines
1988	LONMIN	Eastern Plats - New Treatment Plant - all disciplines
1989	LONMIN	Western Plats - 'No 1 Shaft - UG2 Treatment Plant Extensions
1989	LONMIN	Western Plats - 'New Smelter Plant - all disciplines
1989	LONMIN	Western Plats - EMV Workshop Estimate
1989	LONMIN	Western Plats - 'Koepe Winder - Refurbishment and Installation
1989	LONMIN	Western Plats - Koepe Winder House
1989	LONMIN	Eastern Plats - Tailings Dam Estimate Check
1989	LONMIN	Western Plats - 'New UG2 Tailings Retreatment Plant
1989	LONMIN	Eastern Plats - 'Extension to Plant for New "B" Stream
1989	LONMIN	Western Plats - 'Compressor House Civils
1990	LONMIN	Western Plats - 'Miscellaneous Civil Works
1990	LONMIN	Western Plats - CCH Plant - Proposed Filter and Driving Plant - Stream A
1990	LONMIN	Western Plats - 'UG2, 2nd Stream Extensions
1991	LONMIN	Eastern Plats - New Fines Thickener
1991	LONMIN	Karee Platinum - Engineering Services Enquiry
1991	LONMIN	Western Plats - 'Merensky Silo and Conveyor System
1991	LONMIN	Western Plats - New Thickener
1991	LONMIN	Karee Platinum - 'Plant Extensions for New "B" Stream
1992	LONMIN	Eastern Plats - Opencast - Claim Analysis
1992	LONMIN	Western Plats - Furnace Rehabilitation
1992	LONMIN	Karee Opencast
1992	LONMIN	Karee Platinum - 'Documentation Preparation
1993	LONMIN	Western Plats - 'Estimate of Rehabilitation Works
1993	LONMIN	Western Plats - 'Future Plan - Estimating Services
1993	LONMIN	Western Plats - Opencast - Document Preparation
1993	LONMIN	Western Plats - Estimating Services
1993	LONMIN	Eastern Plats - Contract Documentation
1993	LONMIN	Western Plats - Slag Treatment Plant - Engineering Enquiry for design services
1994	LONMIN	Western Plats - Slag Treatment Plant
1994	LONMIN	Western Plats - Ore Transportation
1995	LONMIN	Karee Mine - Ore Transportation Documents
1996	LONMIN	Eastern Plats - Opencast Mining
1996	LONMIN	Karee Mine - Bulk Sample Plant - UG2 Reef
1996	LONMIN	Eastern Plats - Transportation of Personnel
1998	LONMIN	Eastern Plats - Middelkraal - 'Civil works
1998	LONMIN	Eastern Plats - Decline shaft and tunnel tenders - Newman #
1999	LONMIN	Western Plats - 'Smelter Plant Expansion
1999	LONMIN	'Civil
1999	LONMIN	'Structural Steel
1999	LONMIN	Piping
1999	LONMIN	Eastern Plats - Decline Sinking - Newman Shaft
1999	LONMIN	Karee - Vent Shaft - Civil Works
1999	LONMIN	Karee - UG2 Plant Fees Estimate - Concentrator expansion

1999	LONMIN	Karee - UG2 Total Concentrator Expansion
1999	LONMIN	Karee - 3AVS - Civil
1999	LONMIN	Karee - Feasibility Estimate - Concentrator plant expansion
2000	LONMIN	Saffy - Shaft Sinking
2000	LONMIN	Saffy - Shaft Top all disciplines
2000	LONMIN	Afford Housing specifications
2000	LONMIN	3A - Equipping
2000	LONMIN	Karee 3 - Reservoir - Civil Works
2000	LONMIN	Karee 3 - Conveyor - Steelwork / Platework / Mechanical / Piping
2000	LONMIN	Karee 3 - Pipeline
2001	LONMIN	Karee - 3 Shaft Rehabilitation Trust Fund Costing
2001	LONMIN	Karee - K4 - New Concentrator
2001	LONMIN	Eastern Plats - New Concentrator
2001	LONMIN	Eastern Plats - Opencast
2001	LONMIN	Hossy - No.1 Shaft
2002	LONMIN	Pandora Phase 1 - Bulk Earthworks
2002	LONMIN	Pandora Mining Capital Estimate Phase II
2002	LONMIN	Karee 3 - Shaft Surface Conveyor System - Civil Works
2002	LONMIN	Lonplats Rehabilitation Trust Fund Costing
2002	LONMIN	Saffy & Hossy Shaft Raisebore Contract Doc
2002	LONMIN	Hossy Shaft - Headgear S/S
2002	LONMIN	Hossy Shaft - Underground S/S
2002	LONMIN	EPL - ORE Transport Opencast Documentation
2002	LONMIN	Lonplats - Tender Doc Review (Helipad)
2002	LONMIN	EPL - ORE Transport Review of Tenders
2002	LONMIN	Hossy Shaft - Conveyor
2002	LONMIN	Saffy Headgear Bins & Conveyors
2002	LONMIN	EPC Concentrator Civils - Roads, Terrace
2002	LONMIN	K4 Concentrator, Civils, Roads, Terracing
2002	LONMIN	Hossy - U/G Steel - Level 11
2003	LONMIN	1 Haulage Mining
2003	LONMIN	K4 Silo & Conveyor Bases
2003	LONMIN	Lonmin Grout Plant Contract
2003	LONMIN	Wonderkop Electrical Reticulation. 88kV System Cont. Doc.
2003	LONMIN	Precious Metals Refinery Cont. Doc.
2003	LONMIN	Hossy/Saffy Minor Works
2004	LONMIN	Saffy Shaft Steelwork
2004	LONMIN	Middelkraal CBE
2004	LONMIN	Hossy/Saffy Miscellaneous Building Works
2004	LONMIN	Lonplats Rehab Costs - PMR
2004	LONMIN	Karee Crusher Plant Proposal
2004	LONMIN	EPL - Pandora JV 5 Decline Shaft CBE
2004	LONMIN	Hossy Phase II CBE
2004	LONMIN	EPL - No.2 Shaft Development Proposal
2004	LONMIN	Hossy Shaft U/G Steel
2004	LONMIN	Saffy Shaft - Permanent Headgear Steel
2004	LONMIN	EPL Newman # Ext. 2004/2005
2004	LONMIN	Newman Shaft - Ext of Phase 5
2004	LONMIN	Newman Shaft
2005	LONMIN	Saffy Shaft - Conveyor Steelwork
2005	LONMIN	Saffy Development Contract
2005	LONMIN	EPL - Shaft Deline - 10 level development
2005	LONMIN	EPL - Shaft Deline - 10 level development
2005	LONMIN	Saffy Shaft Grout Plant
2005	LONMIN	Pandora Opencast

2005	LONMIN	3 Shaft deepening
2005	LONMIN	Shaft Deepening
2005	LONMIN	Lonmin Limpopo
2006	LONMIN	Opencast U2 Pit
2006	LONMIN	Saffy Shaft – Overland Conveyors
2006	LONMIN	Eastern Plats Opencast Claim
2006	LONMIN	Hossy - Capex Review
2006	LONMIN	Middelkraal No.2 Vertical Shaft CBE Update
2002	IMPALA PLATINUM RUSTENBURG	Development - QS Services
2002	KROONDAL	Kroondal - Material Bond Estimate
2002	MARULA PLANT	Structural Package
2002	AQUARIUS	Marikana Opencast Monthly Certificates
2002	TWP/AMPLATS	Styldrift Review of CBE Costs
2002	AMEC	Estimating Services to AMEC - Concentrator Smelter Refinery
2002	IMPALA PLATINUM	Marula Plant: Piping Package
2002	ANGLO PLATINUM	ACP Phase B
2003	IMPALA PLATINUM	Marula Plant: Tailings and Return Water Piping
2003	IMPALA PLATINUM	Marula Plant: ROM Electrical
2003	IMPALA PLATINUM	Marula Plant: ROM Claim Advice
2003	IMPALA PLATINUM	16 Shaft OME
2003	RIDGE MINING	Blue Ridge Project
2003	IMPALA PLATINUM	Marula - Electrical & Instrumentation
2003	AQUARIUS	Marikana - Opencast Contract Document
2003	AQUARIUS	Marikana Low House Costing
2003	ANGLO PLATINUM	Amandelbult Concentrator
2003	IMPALA PLATINUM	Impala 16 Shaft CBE
2003	IMPALA PLATINUM	Marula U/G Costing Review
2003	IMPALA PLATINUM	RSV - Marula Mining Recapitalisation
2003	AFRICAN MINERALS	Platreef Smelter Review
2004	ZIMPLATS	Ngezi Project Proposal
2004	METS	Messina CBE Proposal
2004	AQUARIUS	Kroondal PSA
2004	IMPALA / R MORRIS & ASSOC.	Marula Underground re-evaluation
2004	IMPALA PLATINUM	16 Shaft early work activities
2004	IMPALA / R MORRIS & ASSOC.	Marula Underground - Infrastructure Costing
2004	AQUARIUS	South Everest - U/G Mining Tender and Adjudication
2004	AQUARIUS	South Everest - Opencast Tender and Adjudication
2004	RIDGE MINING	Sheba's Ridge Conceptual Estimating
2004	IMPALA PLATINUM	16 Shaft Interim Cost Engineering Services
2004	ANGLO PLATINUM	LPM early works
2004	AQUARIUS	Everest South
2004	MIDDELKRAAL	Middlekraal OBE 11/2004 - 03/2005
2004	AQPSA	Kroondal Conveyor
2004	IMPALA	Impala 16 shaft implementation
2005	ANGLO PLATINUM	Asset Register for Anglo Platinum
2005	TWO RIVERS	Two Rivers Plant Operation - Document Services
2005	RIDGE MINING - BLUE RIDGE	Blue Ridge - 2005 - Ridge Mining
2005	MINOPEX	Everest Plant Operation Document
2005	KROONDAL	Aquarius Underground - Murray & Roberts
2005	PLATREEF	Platreef Project - Ivanhoe NEP
2006	MARIKANA	Marikana 4 Shaft

2006	KROONDAL	Kroondal - 5 Shaft
2006	AQPSA	Marikana - 1 Shaft
2006	AQPSA	Marikana - Opencast Contract Doc No 4 #
2006	AQPSA	Marikana - Audit of Claim
2006	AQPSA	Marikana U/G Certification
2006	AQPSA	K5 U/G Certification
2006	ANGLO PLATINUM	Lebowa Platinum Mines - Brakfontein and Middelpunt Hill Mining Initiative Projects - all surface and underground infrastructure works
2007	ZIMPLATS	Ngezi Phase 1 - Civil Implementation