

MINING & TECHNOLOGY

QUARTERLY UPDATE

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CONTENTS

01

MESSAGE FROM BRIAN BEAMISH

02

TECHNICAL SOLUTIONS

03

Consulting launches LabWise

04

Technovate places Technical Solutions top of mind

05

Field Services plays a new role in Zero Harm for diamond mining

06

Congratulations to Marek Dworzanowski

06

Platinum IM is changing information technology solutions into business results

08

TECHNOLOGY DEVELOPMENT

09

Dialogues inspire and inform

09

Comminution: Massive collaboration to improve commodity extraction

12

HEALTH OF DISCIPLINE

13

Technical People Ways roll out

13

Partnership approach ensures health of technical discipline

14

ENGINEERING

14

Meet the team

15

GROUP TECHNICAL STANDARDS

16

GTS 2 Integrated Risk Management standard: Moving forward

16

RP 25 - Blueprint for integrated operations centres integrates asset management (GTS 20), process automation and control (GTS 31) and mine business planning (GTS 35)

18

GTS 10 Underground Equipment: Multidisciplinary team acts swiftly to improve collision control (RP 35)

21

GTS 19: Structural Integrity - high attendance at structural inspection and maintenance management (SIMM) courses

22

CONTRIBUTORS

MESSAGE FROM BRIAN BEAMISH

APPLAUD - WHAT AN OUTSTANDING CELEBRATION OF TALENT

Welcome to the third issue of our quarterly newsletter for 2013 that serves as an update of our activities to the Anglo American technical community.

The nomination process for the annual Applaud Excellence Awards is always a time of joyful reflection. The nominations demonstrate the depth of talent in our organisation, ranging from massive team projects to value-adding individual contributions. Mining & Technology features prominently in the nominations list. I am proud and privileged to be part of a team that is involved in a wide array of single and cross-discipline activities.

Some projects span years, such as the suite of 43 Group Technical Standards that Keith Wainwright and a multidisciplinary team developed and the Exploration Leadership Development Programme that Debbie Marshall has developed from scratch.

Some projects have given the Group quick wins, such as the TOP open-pit design tool developed by a team of Anglo American and outside stakeholders under the leadership of Mike Livingstone-Blevins. TOP, amongst others, reduces design time by more than 80%.

Other projects are paving the way to increase our sustainability over the long term, such as the global collaborative comminution project, steered by Paul Dempsey, which led to the establishment of the Anglo American Centre for Sustainable Comminution at The University of Queensland in Australia.

Let me not get carried away – I am sure that you have seen the full list of nominations and share my pride of working with dedicated people. Many of you deserve applause, but, unfortunately the Applaud nominations are restricted to the most outstanding projects.

Value add

This edition of our quarterly newsletter again highlights the depth of Mining & Technology's value add across the Group:

- the Technical Solutions LabWise mobile explosives testing laboratory for surface operations (also a worthy Applaud nominee)
- an automated mineralogical technique, developed by Technical Solutions, that characterises the fine fraction of coal-bearing borehole samples
- an overview of the success of the Technology Development Dialogue sessions in sharing information and creating an awareness of how various disciplines tackle common challenges
- and a practical explanation of GTS 41, the Group Technical Standard for Technical Quality, which defines the minimum technical and quality assurance requirements to control supply activities.



Brian Beamish, Group Director of Mining & Technology



APPLAUD NOMINATIONS

The nominations demonstrate the depth of talent in our organisation, ranging from massive team projects to value-adding individual contributors. Mining & Technology features prominently in the nominations list.

As we enter the final quarter of 2013, I wish each and every team member the best – including my successor, Tony O'Neill, a seasoned miner with 25 years experience across a wide range of commodities. I am sure that, under his leadership, the technical portfolio will flourish.

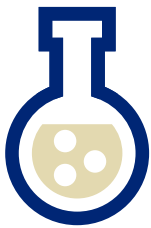
TECHNICAL SOLUTIONS: CONSULTING LAUNCHES LABWISE

Technical Solutions' LabWise is a mobile testing laboratory in a truck that houses all the equipment necessary for testing explosives for the Group's surface operations.

This techno-economic innovation developed to determine the quality of explosives is the outcome of a multidisciplinary partnership between Technical Solutions' Consulting, Research and Field Services departments, Supply Chain, and Kumba mining operations. Supply Chain's Drill and Blast team were the initiators and sponsors. Research contributed to the initial building of the test equipment.

The need to house multiple-testing equipment in one truck that is designed to travel between operations was a requirement identified by Supply Chain to facilitate greater control in testing and/or assessing the quality of explosives, and all ancillary items. This would improve supplier services and accountability, as well as increasing the awareness of drill and blast quality at operations.

LabWise has the capacity to measure, analyse, test and evaluate quality, reliability, efficiency and effectiveness of bulk explosives, initiating systems, boosters and associated services; all leading to enhanced safety, consistency and efficiency of blasting.



LABWISE

LabWise has the capacity to measure, analyse, test and evaluate quality, reliability, efficiency and effectiveness of bulk explosives, initiating systems, boosters and associated services; all leading to enhanced safety, consistency and efficiency of blasting.

The improvements to the Group's blasting will be achieved by guaranteeing that quality products are used at operations. Supply Chain's product selection is already guided by the Group Technical Standards (GTS 13 and GTS 37). LabWise has expanded these technical standards by specifically defining quality measurement methodology and acceptance criteria, enhancing Supply Chain's ability to assess whether explosive suppliers meet the Group's standards.

LabWise, which has been developed in South Africa, overcomes numerous challenges and limitations by providing independent, quality tests of explosives. This includes the legal difficulties associated with transporting explosives from one location to the other due to complex licence/permission requirements from bodies such as South Africa's Department of Minerals and Energy Resources and the South African Police Services; as well as commercial obstacles such as confidentiality and intellectual property (IP); and a lack of standard-testing-equipment for quality testing.



LabWise team working on site

LabWise is an Applaud Award 2013 nominee in the innovation and partnership categories.



The value-add of LabWise is extensive. It reduces bad blasts and contributes to Zero Harm in meeting the operations' demand for safe and reliable products. It also ensures quality of explosives and accessories for reliable and consistent results as well as driving continuous improvement from the manufacturers due to the competitive nature of testing and product comparison.

Initial piloting of LabWise has been completed at Kumba's Sishen operation in South Africa. It comprised a quality benchmarking exercise that was conducted by the multidisciplinary team comprising Sezer Uludag, Jason Pitchford and Izak Mey all from Technical Solutions, Consulting; two technicians from Technical Solutions, Field Services; and an additional resource from Supply Chain. The broadest range of external stakeholders and third party suppliers has also been consulted. There is currently one LabWise mobile truck, with a long-term plan for two mobile units in Southern Africa, one in Australia and one in South America.

For more details email izak.mey@angloamerican.com



TECHNOVATE PLACES TECHNICAL SOLUTIONS TOP OF MIND

Technical Solutions has launched a new multi-language electronic brochure, Technovate. Sent to over 4,000 employees as an e-book, the brochure includes product overviews, benefits and key contacts for operations requiring further information.

"Technovate brings you the results of applying leading-edge technology across the entire mining value chain; our contribution to Anglo American's operational excellence," says Martin Dohm, group head of Technical Solutions.

The multidisciplinary solutions and services presented in Technovate are the result of partnerships and teamwork between Technical Solutions' four teams: Consulting, Research, Field Services and Compliance; partnerships with Group functions; with operations, projects and business units; as well as with external experts.

To view Technovate go to:

<http://thesource.anglo.local/gf/minetech/Newsletters/Technovate/Pages/Technovate.aspx>



MINING & TECHNOLOGY

TECHNOVATE
July 2013

**LEADING SERVICES
FROM TECHNICAL
SOLUTIONS**



TECHNICAL SOLUTIONS: FIELD SERVICES PLAYS A NEW ROLE IN ZERO HARM FOR DIAMOND MINING

Recent non-destructive rope inspections improved safety at a Namdeb inshore diamond mine – a shallow-water mine where diamonds are mined from a bedrock close to the shore.

Technical Solutions: Field Services' senior machinery inspector, Jaco Pretorius, conducted successful magnetic rope tests for Namdeb in Namibia, on a novel piece of equipment. These safety-critical inspections, a first for Field Services', extend Technical Solutions' capabilities and offerings to the Group.

The tests were carried out on the aerial rope-way system (ARS) at an inshore diamond mining project. The ARS, based on the shore, is connected to the probe drill platform (PDP), a platform mounted in the seabed where the diamonds are being mined, and uses hydraulically operated winches to transfer people and supplies from the shore, via steel wire ropes.

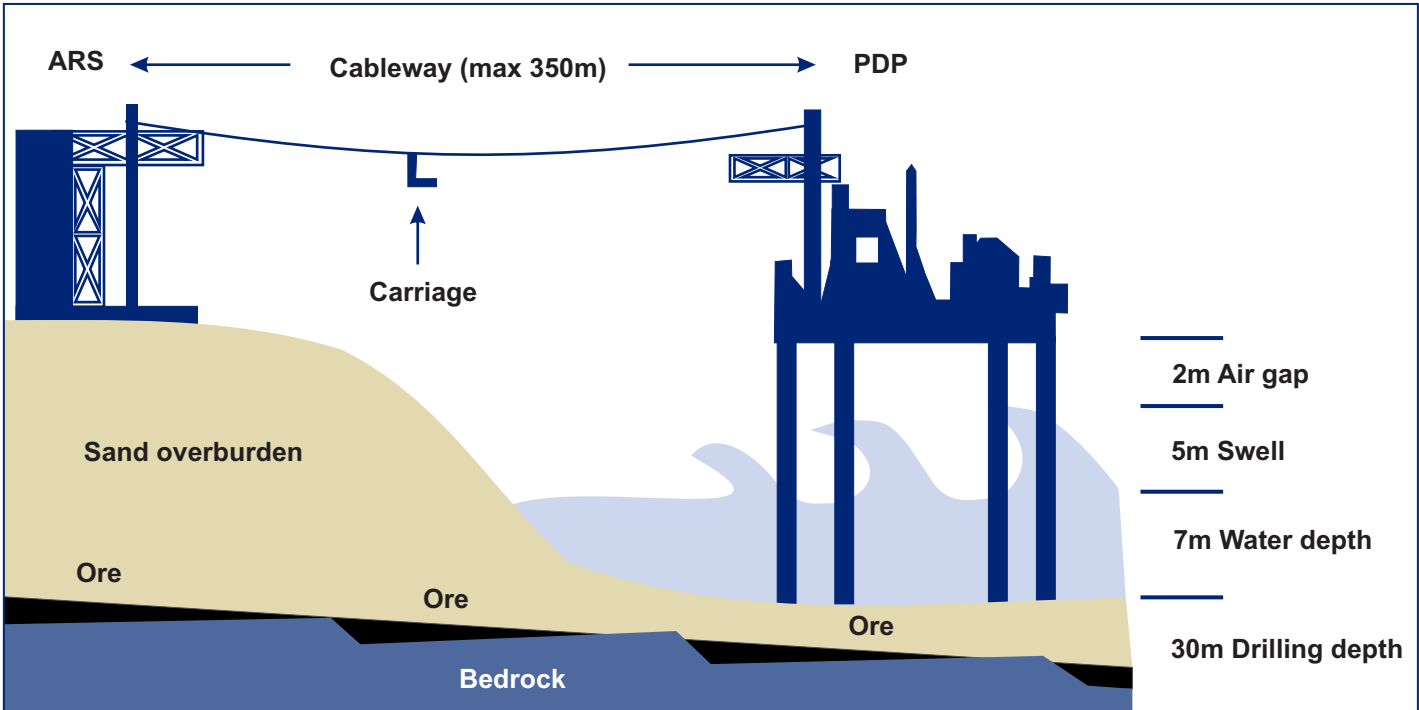
The ARS consists of an eight millimetre diameter rope, known as the 'travel rope', used to transfer equipment; and a 15mm diameter rope, the 'support rope', used for supporting the carriage that transports people. The ARS crew work for 21 days followed by a seven day rest period, allowing for maintenance and services, such as rope condition assessments.

The magnetic rope test (MRT) indicated that the support rope was corroded, with the resulting recommendation to remove the rope from service within two months. The inshore project operates in a harsh environment with a high moisture and salt content in the atmosphere.



Jaco Pretorius, senior machinery inspector for Field Services, conducting a magnetic rope test for Namdeb in Namibia

For this reason, Field Services also recommended that rope condition assessments be conducted on an annual basis to ensure safe operation.



The probe drill platform (PDP) at an inshore diamond mining project in Namibia

Some basics of inshore diamond mining

- The probe drill platform (PDP) drills a hole, to an approximate 30m depth in the seabed, until it reaches the bedrock.
- One metre samples are taken of the different sections of the seabed.
- Drilling is carried out at 10m intervals on the seabed, until it reaches a maximum of 350m from the shore.
- The PDP's legs can extend to approximately 15m, allowing a seven metre water depth, a five metre swell and a two metre air gap.
- In bad weather conditions, the PDP is moved back to shore; the hydraulic system enables the PDP to 'walk' back to shore with a leg-shift movement.
- The aerial rope-ways system (ARS) can be retrieved by pulling it with a back actor, a tractor specially designed for tough beach conditions.
- Once the PDP samples have been studied and assessed by geologists, the inshore mining starts.

CONGRATULATIONS TO MAREK DWORZANOWSKI

New president of the Southern African Institute of Mining and Metallurgy (SAIMM) appointed

Marek Dworzanowski, a technical specialist at Technical Solutions: Research, has been appointed president of the Southern African Institute of Mining and Metallurgy (SAIMM), the professional home of all mining engineers and metallurgists in South Africa. Marek's appointment recognises his considerable achievements in the mining industry, particularly in metallurgy.

"Being elected the president of the SAIMM is a great honour indeed," says Marek. "As the new incoming president for 2013/2014 I will strive to further grow the membership and influence of the institute locally and in Southern Africa, as well as broaden the scope of co-operation globally with our sister institutes."

He was inaugurated at the SAIMM's annual general meeting on 22 August 2013, where he delivered his presidential address entitled: "The role of metallurgy in enhancing beneficiation in the South African mining industry".



PLATINUM IM IS CHANGING INFORMATION TECHNOLOGY SOLUTIONS INTO BUSINESS RESULTS

Platinum Information Management (IM) is converting traditional technology-based assignments into business focused projects that deliver business results using an improvement and change management methodology called Rapid Results. Rapid Results is supported by Mining & Technology's Technical Solutions function.

Head of Platinum Information Management (IM), Shawn Fisher, has stated that in future, as many IM projects that he can influence will be implemented using Rapid Results. He says that: "Rapid Results is changing how we approach IT projects - and the results speak for themselves".

Some of the first Platinum IM projects that have been implemented using the Rapid Results methodology:

The project management information (PMI) project: Platinum IM developed a project management information reporting dashboard, providing management with a single source, near real time report on the status and health of Platinum's capital project pipeline that it delivered in 100 days versus an unfinished 18 month attempt previously at the same deliverable.

Fast Forward Mining Daily Reporting project: This reporting solution presents mining data automatically and directly from the source to management without any human interaction, eliminating human error and time delays. It is available electronically and on mobile devices and allows management to drill down into further information as required. For the first time, quality production, safety and labour reports are available on a daily basis to management across operations, enabling fast, meaningful business decision making. Rapid Results helped put the client into the driving seat of the project, upping the project's success.



Shawn Fisher, Head of Platinum Information Management (IM)

"We have raised the bar and stretched ourselves to achieve challenging, shorter-term objectives. As a result, we have upped our productivity, our service delivery and our client satisfaction and have challenged our service providers to do the same."

PROJECT APPROACH

By changing the objectives from IT-based to business-defined, the focus changes from IT solutions to business results.

Licence to thrill, Windows 7 roll-out project: This traditional IT upgrade project involved migrating 2,800 personal computers from Windows XP to Windows 7. Rapid Results helped the team overcome obstacles and come up with innovative ways of achieving the set goal.

"Rapid Results requires strong leadership that is open to seeing opportunities, acting on the identified gaps and embedding the changes required to ensure the sustainability of the operational change. The methodology's true capacity becomes evident when a big-picture focus is incorporated. Rapid Results has helped Platinum IM to expand the teams' operational capacity and level of innovation." Says Alrien van der Walt, change and implementation manager for Technical Solutions.

Specific to Platinum IM's projects, their implementation encompassed several key elements:

- Platinum IM applied reverse engineering to its projects, defining the results first and setting 100 days for the teams to achieve the objectives. The Rapid Results approach helps to define project deliverables into smaller, shorter-term quotas, increasing their achievability.
- A broader project implementation team composition was needed to achieve the defined objectives. Individuals outside the IM team were identified and invited to participate in what was previously perceived as "IM" projects. This brought additional expertise to the teams, and added broader visibility of the business value higher up the value chain.

- Shorter-term deliverables significantly increase the buy in and participation by clients, which helps to transfer the project ownership to the client. Traditionally IT projects are IM driven; setting the client in the driver seat improves the rate of adoption and adds to the project success due to their increased commitment and support.
- Platinum IM used internal resources for the development, implementation and support services for the information solutions. As a result, sustainable business solutions are delivering cost and time efficiencies and improving overall client satisfaction.
- Rapid Results has helped Platinum IM achieve sustainable operational change by transforming some of the daily processes and systems; implementing additional checks and controls; and ensuring buy-in and support at appropriate levels.

"We have raised the bar and stretched ourselves to achieve challenging, shorter-term objectives. As a result, we have upped our productivity, our service delivery and our client satisfaction and have challenged our service providers to do the same," adds Shawn.

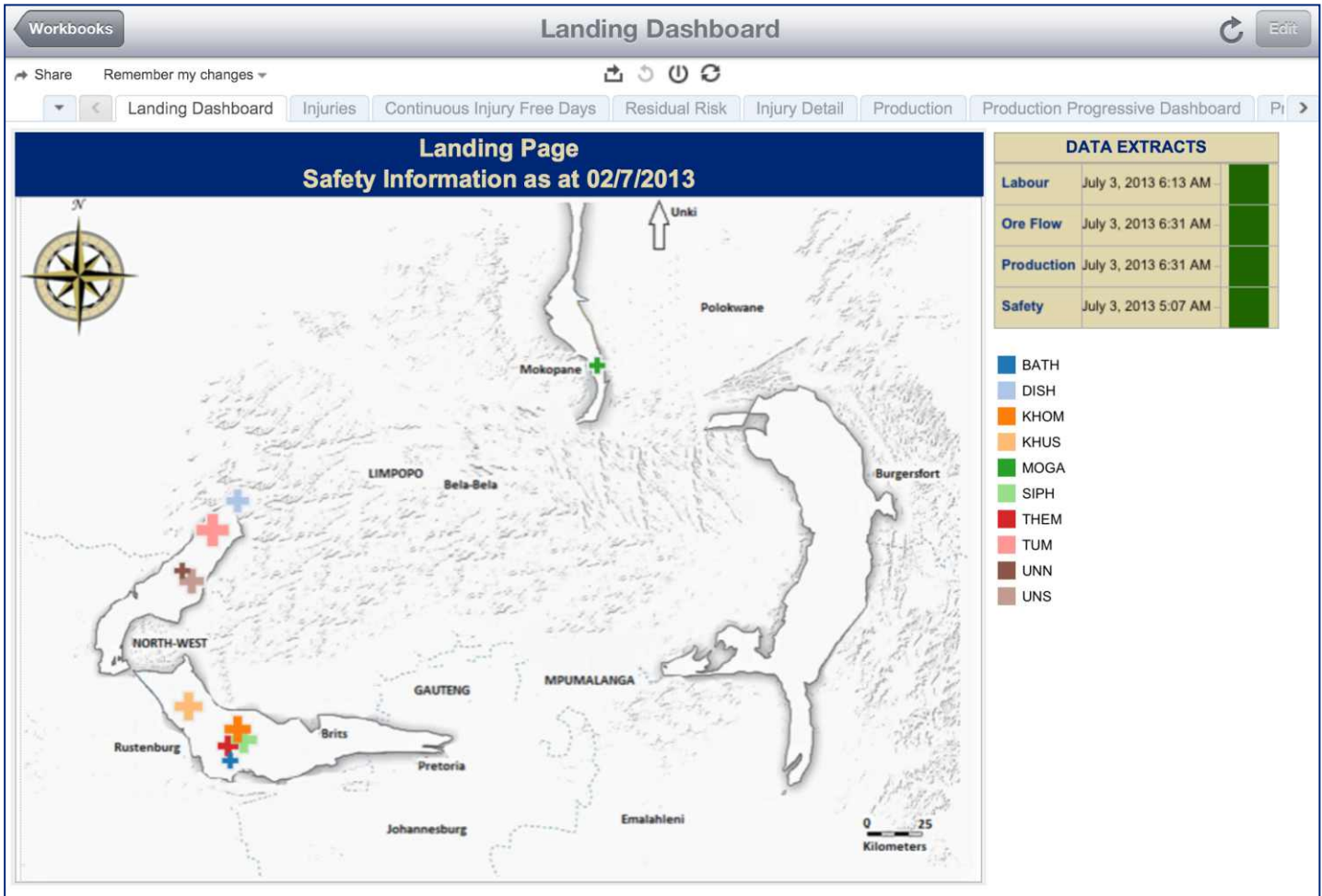
2012 APPLAUD AWARD WINNER

Alrien van der Walt, change and implementation manager: Technical Solutions and specialist in change management initiatives was awarded the 2012 Applaud Award in the partnership category.



Rapid Results:

- Proven approach
- Delivers immediate, sustainable results
- Builds problem solving capacity
- Eliminates silos
- Stimulates partnership and collaboration
- Delivers measurable value
- Builds a culture of innovation



Daily reporting dashboard - outcome from Platinum IM project using the Rapid Results methodology

For more information on Rapid Results or the improvement projects at Platinum IM, please contact:

Alrien van der Walt, change and implementation manager: Technical Solutions, alrien.vanderwalt@angloamerican.com

TECHNOLOGY DEVELOPMENT: DIALOGUES INSPIRE AND INFORM

Power, water, infrastructure, labour and safety are the key issues to consider when planning for community sustainability.

This was the conclusion drawn by the 30-odd delegates who attended the recent Sustainability Dialogue organised by Technology Intelligence in Group Technology Development.

The quarterly discussions aim to share information and intelligence around topical issues that are relevant to Anglo American. Guest speakers were invited to give a ten minute, discipline-specific overview of various topics, but without formal presentations.

“The latest Dialogue explored the technology required when planning mining community sustainability,” says Jeremy Mann, Head of Geosciences, Safety and Sustainable Development Technology Development, who facilitated the workshop.

“As was the case with previous workshops, attendees appreciated being exposed to the challenges that other disciplines face in planning for a specific outcome. We often work in isolation to other disciplines that are trying to solve an aspect of a common problem.”

Speakers gave their perspectives on national planning, water provision, power supply, carbon emissions, infrastructure, labour and safety.

The workshop came to the conclusion that water is the most pressing challenge in community development, because it is a finite resource threatened by diminishing quality – especially in Limpopo where rapid expansion necessitates sound development planning.

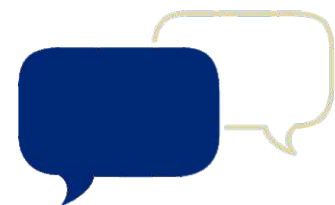
Sustainability is also threatened by delays in power infrastructure delivery and the national shortage of electricity. Self-generation was one of the options discussed.

Recent developments in finance and taxation, land stewardship and health and their impact on sustainability were not discussed but it was agreed that these areas should be included in future dialogues about sustainability.

Johann Havenga, Technology Intelligence Consultant and input co-ordinator for the Dialogues, says the workshops complement the work of Technology Intelligence, namely to provide intelligence on high-priority issues.



Johann Havenga, Technology Intelligence Consultant



NEXT DIALOGUE

The next Dialogue will focus on new projects, specifically lessons learnt when starting new exploration projects globally.

“We keep track of the priorities listed at the end of the sessions and collect information relating to them, such as changes in legislation. This information is available on the Technology Intelligence Teamspace.

If you wish to be invited to attend the upcoming Dialogues, or if you require specific technology intelligence, please email Johann (johann.havenga@angloamerican.com) or visit him at 45 Main Street, office 809.

COMMINUTION: MASSIVE COLLABORATION TO IMPROVE COMMODITY EXTRACTION

Comminution is the process in which solid materials are reduced in size by crushing, grinding and other processes. In mining, ore rock is comminuted as the first step in minerals processing to liberate minerals containing valuable constituents to facilitate subsequent processing.

Declining ore grades, steep increases in the cost of energy, the availability of energy, the strong focus on eco-efficiency and a dwindling expertise base have put the comminution process firmly in the spotlight. Anglo American responded to the challenges of comminution by establishing the Anglo American Centre for Sustainable Comminution at The University of Queensland (UQ) in Brisbane, Australia.



COLLABORATION

We want to make a real difference in developing and maintaining sustainable competence in comminution and furthering collaboration in this field across the globe.

Comminution:

- is a process commonly applied across all our commodities: coal, diamonds, iron ore, copper, niobium, phosphates and platinum
- technology advances have primarily been through increased scale of equipment (mills have increased in diameter from 6 feet in 1960 to 40 feet today with installed power increasing concomitantly from 3MW in 1960 to 30MW today)
- is often the bottleneck in the processing circuit
- is probably the most capital and operationally expensive process at plants
- typically comprises between 40% and 60% of a mine's power consumption
- consumes up to 3% of global electric power
- is inherently energy inefficient with most of the energy applied being dissipated in friction and heat (a 20% improvement in milling efficiency in Platinum and Copper could result in savings of \$US80 million per annum).



Jeremy Mann, Head of Geosciences, Safety and Sustainable Development in Technology Development

“We are in a vulnerable situation, as there is a lack of sustainable expertise to conduct the design and operation reviews required in one of the key, most capital intensive processing areas of mining operations,” says Jeremy Mann, Head of Geosciences, Safety and Sustainable Development in Technology Development.

“We want to make a real difference in developing and maintaining sustainable competence in comminution and furthering collaboration in this field across the globe.”

Anglo American has committed a five-year budget of \$AU10 million to the establishment of the Centre at UQ's Julius Kruttschnitt Mineral Research Centre (JKMRC). It is one of five academic centres of excellence in The Global Comminution Collaborative (GCC) funded by Anglo American. The others are at the University of Cape Town in South Africa, the Chalmers University of Technology in Sweden, the Hacettepe University in Turkey and the Laboratory of Mineral Technology (LTM) in Rio de Janeiro, Brazil.

The Centre will advance and co-ordinate research in key areas of comminution via The Global Comminution Collaborative, comprising university experts and milling practitioners who will effect knowledge and technology transfer to operations and projects in the design, commissioning and optimisation of production and energy efficiency of comminution circuits.

COMMUNUTION continued

A unique aspect of the collaboration is that the students at each of the universities will be co-supervised by two to three supervisors from the different universities, while the post-graduate degrees will be joint degrees. Typically, a university would only provide a single supervisor, while there would be no possibility of a joint degree.

The Centre aims to:

- conduct core research projects addressing the energy efficiency of comminution
- research novel ways of liberation that will meet the requirements of the Group's future mining technologies
- transfer know-how and technology, through collaboration, into the Anglo American Group's metallurgical discipline
- expose students of the collaborative to practical experience through involvement in operation and project reviews
- incentivise postgraduate studies as well as research and development in comminution at the five institutions
- ensure students are schooled in traditional as well as cutting-edge comminution technologies
- ensure a sustainable pipeline of metallurgists and process engineers into this important part of the processing value chain
- and provide preferential access to the five centres of excellence.

The core research projects are structured to be spread across the five centres of excellence, appropriate to their specific areas of expertise.

The Centre has already initiated four projects:

- research into ways to mill finer feeds, as a result of greater fragmentation at the rockface
- investigating ways that mills can be adapted to process future cuttings feed instead of current blasted material
- explore non-traditional milling methods
- and research mineral liberation through technologies other than the currently used mechanical methods.

Business unit project and operation review teams will have access to the Centre.

Anglo American and its affiliates will have a perpetual non-exclusive, non-transferable, royalty-free licence to use any intellectual property that might arise from the projects.

Anglo American is represented on the Centre's board by:

- Paul Dempsey, Group Head of Metallurgy (chair)
- Neville Plint, Head of Research, Platinum
- and Jeremy Mann, Head of Geosciences, Safety and Sustainable Development in Technology Development.

The Centre is managed by:

- Professor Malcolm Powell, centre director, who will also co-ordinate the Global Comminution Collaborative
- Tracey Richards, centre manager
- and Jeremy Mann, Anglo American's co-ordinator.

"Comminution is integral to mineral processing, but the number of senior researchers in this area is diminishing. The Centre will play an important role in educating the next generation of researchers in this area, in addition to providing solutions for the challenges facing the industry." JKMR director, Professor Malcolm Powell

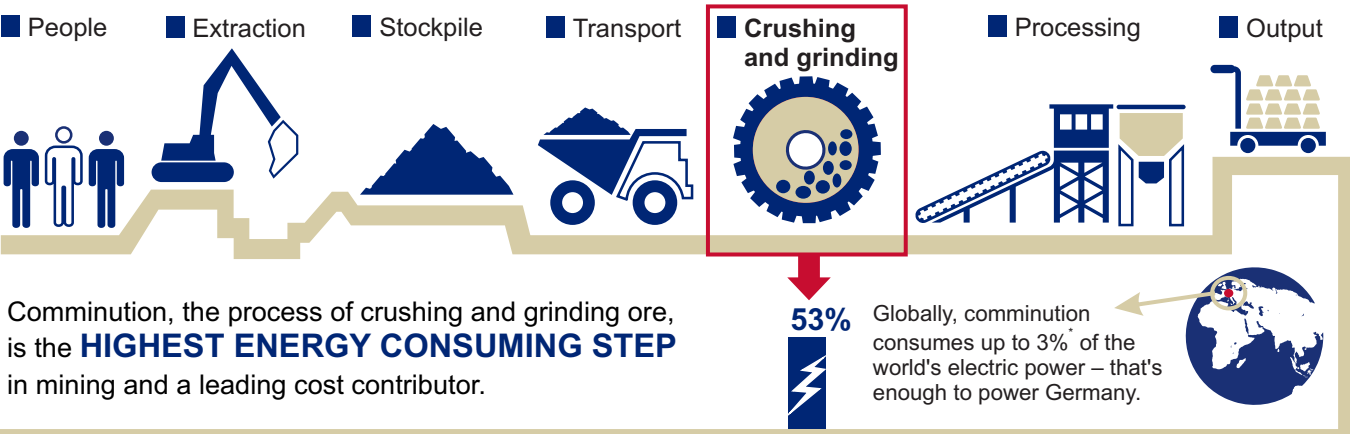


Checking a grizzly (left) and maintaining the spare grizzly unit (right) that enables quick change so there is minimal down time when the unit needs maintenance.



ANGLO AMERICAN IS RESPONDING TO AND COLLABORATING WITH GLOBAL EXPERTS ON THE FACTORS AFFECTING THE COST AND EFFICIENCY OF COMMUNITION.

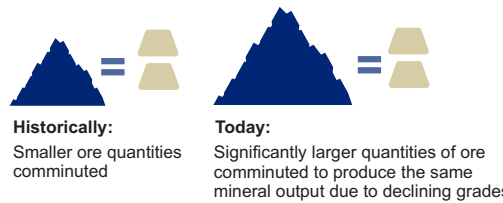
Ore is mined, rock is crushed and broken into smaller pieces for the mineral to be extracted.



* Source: The Coalition for Eco-Efficient Comminution (CEEC) Update, July 2013, page 2

EXTERNAL CONSTRAINTS

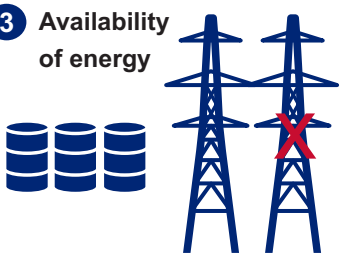
1 Falling ore grades, more milling required



2 Rising cost of energy



3 Availability of energy



OUR RESPONSE: Improve efficiencies and technology development

NEXT

NEXT breakage technology

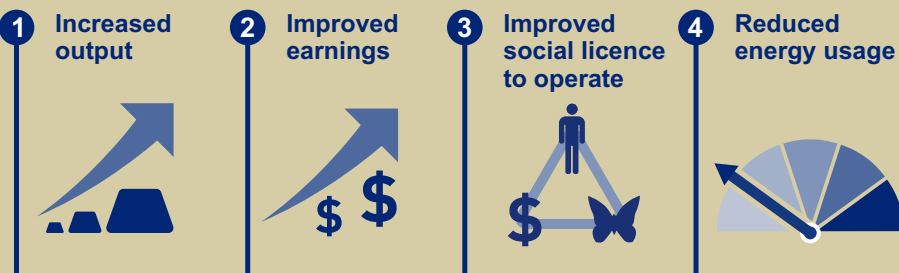
- Improving efficiencies of current breakage technology
- Developing different circuits to accommodate feed streams with smaller particle sizes
- More efficient screening and classification resulting in 10-20% energy saving

NEW

NEW breakage technology

- Development of non-mechanical mechanisms for crushing and grinding ie. thermo-mechanical fracturing, microwave comminution, electro-mechanical breakage, supersonic implosion, etc.
- Rock breakage, fragmentation and cutting at the mine face resulting in:
 - smaller feedstream
 - less intensive crushing and milling requirements at the plant
 - capacity to cope with the increased tonnage

BENEFITS OF IMPROVED COMMUNITION



GLOBAL COLLABORATION

Five academic centres of excellence in The Global Comminution Collaborative funded by Anglo American.



TECHNICAL PEOPLE WAYS ROLL OUT

Following the successful launch of the six Technical People Ways – Mining, Engineering, Geosciences, Processing, Safety & Sustainable Development and Projects – to the Corporate Centre in February, the launches in the business units commenced.

“During this phase, the business units take ownership of the tool, rolling it out in a way that works for them and will ensure buy-in and embedding into the way they do business. This tool will provide technical employees with detailed guidance on technical competence requirements in their roles and assist with career-path planning,” says Gisela Gips, Technical Development Manager, Metallurgy, the technical lead on the Processing People Way.

“During the launch we have received valuable feedback, which indicates that the improved scope of discipline-specific career information is widely welcomed. Feedback will also be provided through surveys circulated by HR, giving us the opportunity to further refine and optimise the six Technical People Ways.”

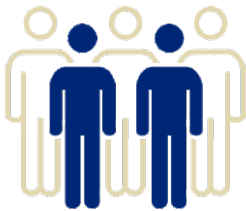
The Technical People Ways contain technical guidelines that complement the already established behavioural guidelines, which help people to be able to structure more meaningful conversations around their performance contracts, and specifically their individual development plans (IDPs).

The performance contract is a two-way process between managers and employees to agree on performance and delivery KPIs, with the IDPs focusing on personal development.

Generic roles have been clearly defined per discipline, in universal terms across the Group, and people, in conjunction with their line managers, will be able to identify the role that currently relates to them.

Required competencies are clearly laid out per role, in four levels from basic to mastery, enabling people to compare their current competencies against required competencies. In addition, aspirational roles can be investigated and plans put in place to start building those competencies. This process helps with both short and long-term career development plans.

“The Technical People Ways provide people with a transparent view on career opportunities, both in and out of their discipline, clear competency requirements per generic role as well as case studies of people in the Group to showcase examples of different career path options,” says Gisela.



OWNERSHIP

During the phase, the business units take ownership of the tool, rolling it out in a way that works for them and will ensure buy-in and embedding into the way they do business.



More information is available on the Career Pathways portal at <http://applications.anglo.local/pathways/pw.mvc>

PARTNERSHIP APPROACH ENSURES HEALTH OF TECHNICAL DISCIPLINE

Mining & Technology works closely with Human Resources and the Global business units to ensure the Engineering, Mining, and Metallurgy health of discipline.

“During the past three years, the approach to health of discipline activities have evolved from a broad, statistical review to a people and role-orientated evaluation,” says Ian Morison, Technical Development Manager in Group Engineering.

The basis for this approach was the development of a global health of discipline metrics in 2010, which spans disciplines, business units and operations. The metrics, which are currently being automated, provide insightful statistics for the talent management process within Anglo American. Talent management, associated career development panels and, more recently the roll-out of The People Ways in the technical community is part of the process to make Anglo 'the employer of choice'.

“At the base of the success in elevating health of discipline activities to a people-orientated level globally, lies the partnership between HR, business units and the various disciplines,” says Ian.

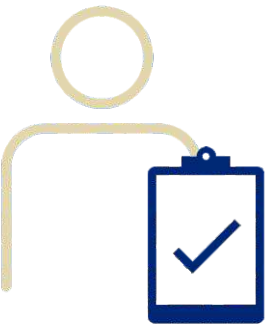
HR provides the tools and the various disciplines provide governance and contribute career-specific focus in their areas of expertise.

There are several platforms for delivering technical health of discipline – the annual Group Technical Talent Review held in London, a global annual review per discipline as well as regular Technical Development Manager (TDM) meetings. In essence, the reviews aim to ensure that the right people are available at the right time, at the right place.

The yearly Engineering Health of Discipline review is attended by HR, Mining & Technology and heads of Engineering from Australia, Brazil, Chile and South Africa. The focus is on overall health of the engineering discipline and high-level activities such as governance, five-year workforce plan for business units, engineers needing moves and critical areas of staff shortages.

The regular TDM meetings, attended by, Mining & Technology, Projects, Safety & Sustainable Development representatives and HR, focus on:

- Technical People Ways
- Global role framework, including role-mapping, mentoring, talent review process and young professionals
- graduate programmes, including the Global Comminution Collaborative (GCC) in the South African context
- gender and broad-based black economic empowerment issues
- and providing input for the various Group HR projects.



PEOPLE AND ROLE-ORIENTATED

During the past three years, the approach to health of discipline activities have evolved from a broad, statistical review to a people and role-orientated evaluation.



ENGINEERING: MEET THE TEAM

The ambition of the Engineering team is to establish world class engineering practices across Anglo American in support of the Group's business objectives, in close collaboration with the business units.



Mining & Technology's Group Engineering function, headed by Keith Wainwright, is responsible for the health of the engineering discipline across the Group and provides governance and technical support to the engineering functions in Group Projects and operations.

Its roles include:

- motivating and implementing Group Technical Standards (GTSs) in the engineering discipline
- co-ordinating the overall GTS system
- participating in operation reviews and supporting the asset optimisation opportunities identified through the reviews
- custodianship of Asset Management
- applying Anglo American Projects Way in capital and SIB (stay in business) projects
- maintaining minimum standards in recruitment, development and retention of suitably skilled and experienced professionals so that the right person is available in the right place and at the right time to meet strategic business-growth targets
- Group Technical Risk Management relating to safety and performance
- custodianship of the engineering-related safety and risk technical standards
- provision, through the Engineering Council, of knowledge management, best-practice sharing and Group alignment across all of the above activities.



Engineering Reviews,

managed by Krish Pillay, provides ongoing guidance to project engineering teams during study and execution stages and conducts governance reviews of projects at the close of each stage gate.

The team also provides engineering resources for operation reviews towards identifying opportunities for asset optimisation and leads technical reviews for due diligence for mergers and acquisition.



Technical Development,

under the leadership of Ian Morison, provides direction, support and governance for the management of health of the engineering discipline and technical talent, ensuring that Anglo American is equipped with suitably qualified professionals in the technical realm to meet current and future strategic needs. Ian is also responsible for high-level guidance, monitoring, liaison and reporting on the availability of electricity supply to Group operations within South Africa.



Engineering Standards and Governance,

headed by Johann Wannenburg:

- develops and maintains Anglo American's engineering GTSs and specifications
- provides support to the business units for GTS implementation and compliance
- provides administration of all Group technical documents
- interfaces with technology partners and suppliers, Supply Chain and business units
- provides direction and support to business units for implementation of appropriate technologies
- provides governance in the specialist discipline of asset management, EC&I, structural and mechanical/transport engineering
- and represents the technical disciplines in governance of integrated risk management activities

GTS 2 INTEGRATED RISK MANAGEMENT STANDARD: MOVING FORWARD

Risk management should be tailored to fit into the activities and processes of a company, it should form part of its decision-making process and should be made as simple a management tool as possible.

These were the main conclusions drawn at the second international conference on the ISO 31000 Risk Management – Principles and Guidelines standard held recently in Toronto, Canada.

Lenelle Thomsen, Principal Engineer: Technical Risk & Assurance, who attended the conference and related master class, says GTS 2 for Integrated Risk Management, which is based on the principles of ISO 31000, agrees with these two requirements.



VALUE ADD

Risk management should be made as simple as possible; it is imperative that the process adds value and is perceived to add value to ensure that it is embraced by everyone in the organisation.

"However, one should be careful that your focus is not on creating risk registers and reports, but on managing and controlling risk. Another important aspect of risk management is that it should not focus only on risks with potential negative impacts – risks also have potential positive outcomes and these should be managed to the advantage of the organisation.

"Risk management should be made as simple as possible, must be tailored to fit the organisation's processes (fit for purpose) and it is imperative that the process adds value and is perceived to add value to ensure it is embraced by everyone in the organisation."

Carl Spetzler, CEO of the American Strategic Decisions Group, gave an interesting perspective on decision-making processes and risk management.

"ISO 31000 defines risk as the effect of uncertainty in attaining objectives, which means that we have to take decisions amidst uncertainty. We are not wired to think clearly about probability and we have to remove bias from the decision-making process. Decision making is a forward-looking activity in which



John Fraser: Senior Vice President, Internal Audit and Chief Risk Officer, Hydro One, Canada; Carl Spetzler: CEO and Chairman, Strategic Decisions Group, USA; Jeffrey Posluns: Board Member, GRCSI, Canada (speaker); Michael Rasmussen: Chief GRC Pundit and Principal Analyst, GRC 20/20 Research, USA; and Alex Dali: President at Global Institute for Risk Management Standards G31000, France

decisions should be made on alternatives and probabilities that allow us to value information on fact and not on intuition," he said.

"We should bear in mind that a decision is not evaluated as good or bad according to its outcome. The quality of the decision is a function of the person making the decision, based on his or her skills and experience and the information that is available at that point in time. We should separate decisions and outcomes, and people should be rewarded on the quality of the decision, not its outcome.

A quality decision hinges on someone who:

- understands what the question and alternative answers are
- knows what the organisation wants in terms of its value metrics for potential outcomes
- has information on forward-looking probabilities
- has the competency to find the highest value option
- and is willing to act, because decisions must lead to actions.

RP 25 – BLUEPRINT FOR INTEGRATED OPERATIONS CENTRES, INTEGRATES ASSET MANAGEMENT (GTS 20), PROCESS AUTOMATION AND CONTROL (GTS 31) AND MINE BUSINESS PLANNING (GTS 35)

Recommended Practice 25 (RP 25) for integrated operations centres, finalised last year, has been initiated with operations in Copper, Thermal Coal and De Beers.

“An IOC study is a process, typically involving a two-week period of studying an operation and presenting a business case based on the advantages of integrated operations,” says Henk Coetzee, Principal Engineer: Electrical Control and Instrumentation – Governance, in Group Engineering.

“An integrated operations centre is an enabling working environment which makes it easier for teams to plan, execute and sustainably improve an operation in an integrated way that targets value and minimises risk.

“Many operations have fragmented planning and infrastructure, established as the business expanded, which result in management receiving reams of paper reports, often with inaccurate statistics and too late to take real-time corrective action.”

In practice, this development resulted in operations focusing mainly on execution, neglecting planning and improvement. Integrated operations approach restores the balance between planning, execution and improvement, as summarised in graphic below.

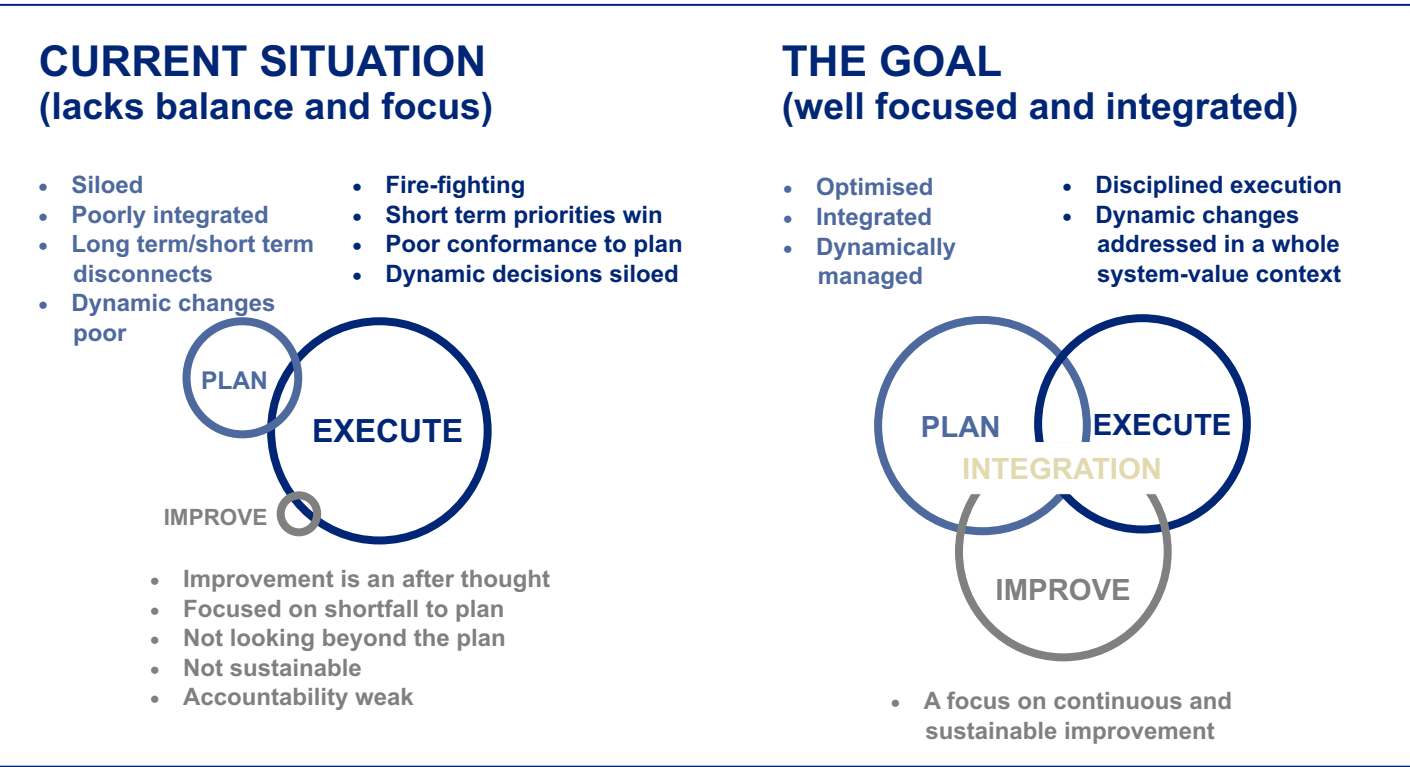
Developing a blueprint to achieve integrated operations is a complex process of analysing current control measures across all operational disciplines.



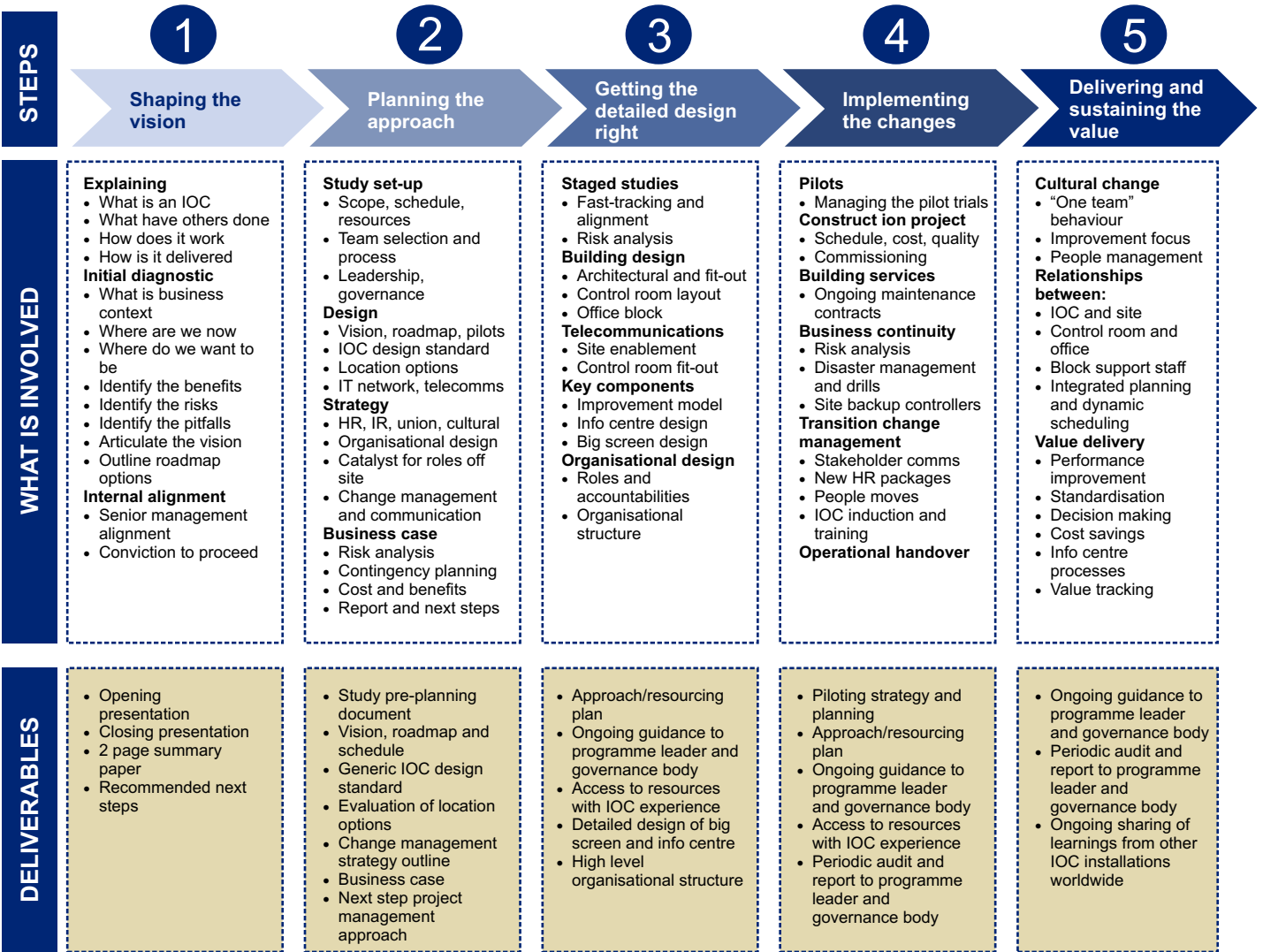
INTEGRATED OPERATIONS

An integrated operations centre is an enabling working environment which makes it easier for teams to plan, execute and sustainably improve an operation in an integrated way that targets value and minimises risk.

- The five steps towards achieving integrated operations are:
- shaping the vision
 - planning the approach
 - finalising the detailed design
 - implementing the changes
 - and delivering and sustaining the value.



The graphic below explains the steps and deliverables required to achieve the objective of integrated operations.



“The ultimate objective of integrated operations is to make it easier for operating teams to run their operations efficiently and effectively,” says Henk.

The integrated approach achieves optimised, integrated and dynamically managed planning, which sharpens the focus and accountability of the execution and improvement roles within the business.

Execution is disciplined and changes are addressed in the context of the entire value chain. Improvement is based on analysis, it is forward-looking, highly accountable, and focused on continuous and sustainable improvement.

An integrated operations centre brings together these functions in a custom-designed, collaborative working environment with clear visibility of the whole system and easy access to so-called one-truth information – encapsulated in integrated systems and integrated communication and reporting processes.

“There is no ‘one-size-fits-all’ approach,” says Henk.

“The process begins with a focus on value and an understanding of the opportunities and constraints of the business in question. It requires a clear vision to guide the operation in its journey, which includes quick-wins in combination with a staged implementation.”

Contact Henk Coetzee (henk.coetzee@angloamerican.com) if you wish to discuss RP 25, or have a look at the practice on http://eunomia.anglo.local/Technical%20Documentation/AA_RP_000025.pdf.

GTS 10 UNDERGROUND EQUIPMENT: MULTIDISCIPLINARY TEAM ACTS SWIFTLY TO IMPROVE COLLISION CONTROL (RP 35)

Three tragic loss-of-life incidents at Thermal Coal underground operations in the first quarter of this year demanded swift and determined action from management to ensure that further incidents were prevented. The incident investigations highlighted an urgent need to closely examine the safety controls on underground equipment in line with international best practice.

Following a call for assistance from Thermal Coal, a multidisciplinary task team co-ordinated by Group S&SD Risk and Assurance was created to guide and support a comprehensive technological survey.

The scope of the survey was limited to the operation of continuous miners, shuttle cars and load haul dumpers, and looked specifically at the safety hazards and the controls in place at the underground operations when operating this equipment. Their remit was to identify how to improve control effectiveness and to ensure that the learning gained was acted upon.

The project was divided into four main areas and included experts from Thermal Coal, Mining & Technology and Safety & Sustainable Development.

Firstly, a wide-ranging assessment of underground equipment used in bord and pillar coal mining helped to build an understanding of world class safety performance and provided the benchmark against which Thermal Coal's performance could be measured and improved.

The second task was to review the results of investigations on the implementation of proximity devices and related controls already done across Anglo American operations. This included the recommended practice, which details the approach, selection and application of instrumentation and controls for collision avoidance systems and how this is being applied by Thermal Coal as they install the next generation of collision avoidance systems at their underground operations.

A third team of specialists – including technical and operational experts and an industrial psychologist focused on behaviour – conducted a thorough review of the operation of shuttle cars, LHDs and CMs at Kriel colliery, with a focus on the safety hazards related to people, process and equipment. This work included the review of documents and systems, observation of safety practices, one-on-one interviews and focus group sessions.

The fourth and most important part of the exercise was a workshop that brought together all the findings from the various studies, both behavioural and technical, to determine the way forward for Thermal Coal aimed at improving its safety performance in underground operations. Anglo American's technology development department also presented a



COLLISION AVOIDANCE

Anglo American's Technology Development department presented a summary of the innovative work they are doing to investigate and develop collision avoidance technology in both underground and opencast mining operations.

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Mining & Technology's Engineering Governance function together with Technology Development also held a specialist workshop with Thermal Coal on the collision avoidance systems development project. During this workshop, Recommended Practice for selection and assessment of collision avoidance systems (RP 35), which links to GTS 10 for underground mining equipment, together with the associated risk evaluation tools, was used to verify the Thermal Coal user requirements for collision avoidance and the hierarchy of controls. The effectiveness of the 'Now' and proposed 'New' controls was evaluated and the user requirements for the collision avoidance system were confirmed by using the RP 35 process.

The team conducted that while there are ongoing improvements in collision avoidance systems both locally and internationally, there is no obvious new technology available that promises a quantum shift in performance. By working closely with the provider, Thermal Coal have prompted significant improvements to the collision warning technology that will result in a greater number of controls with higher overall effectiveness.



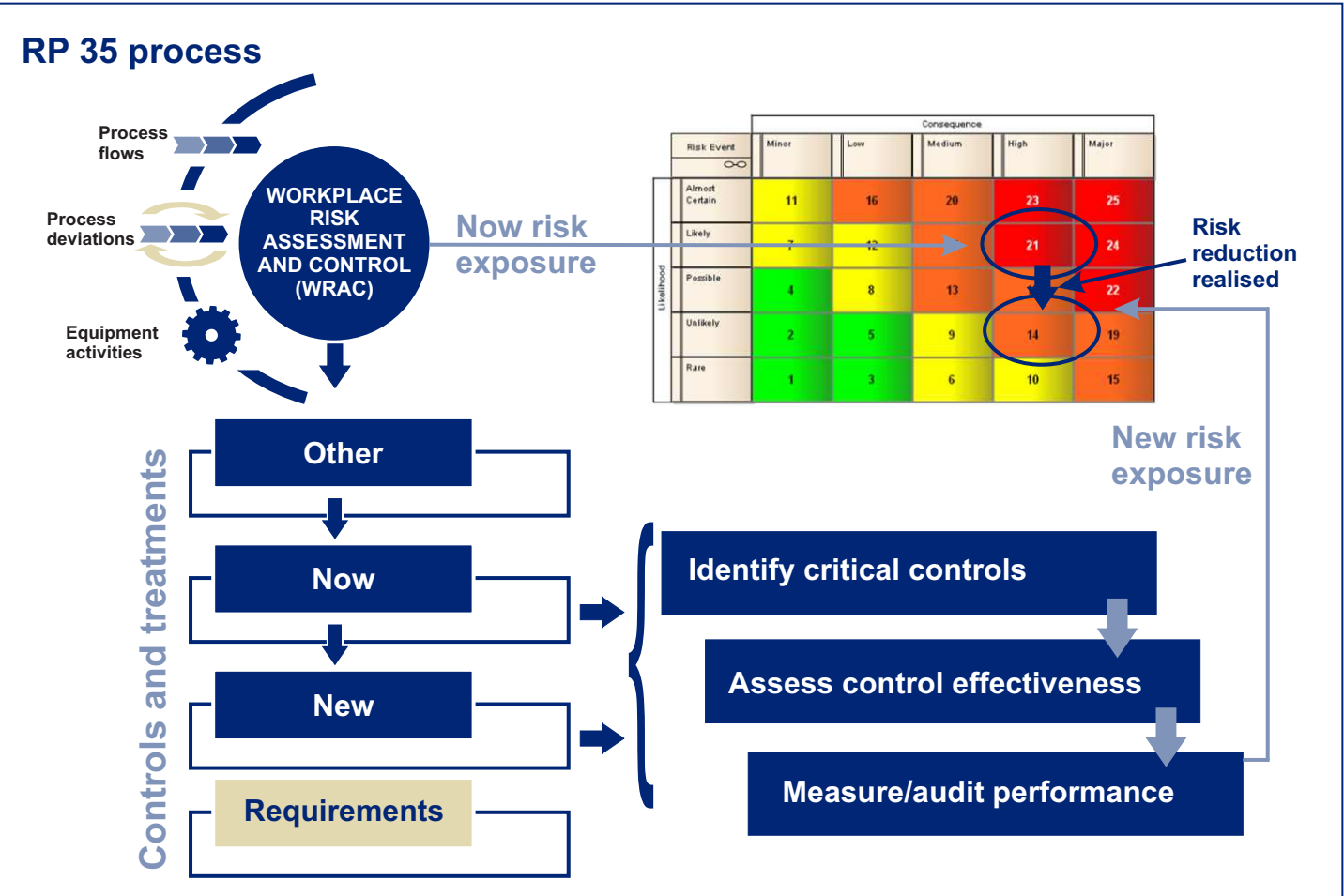
Underground miners reviewing a safety poster

There were, however, several areas where it was recommended that Thermal Coal could take action to improve the effectiveness of controls associated with underground equipment. These included:

Change management approach
As Thermal Coal contemplates the implementation of the new generation Booyco CWS900 system, intended to reduce the risk of collisions with pedestrians, the project has highlighted that it needs to look beyond just the development of the technology to incorporate a complete change management approach, which requires dedicated and experienced project management resources.

Fast tracking existing trials
There are also a number of smaller trials being conducted at Thermal Coal operations, all related to the use of equipment. These trials ,which are looking at areas such as lighting, dust control and the application of cameras to improve the operator's field of vision, need to be concluded as quickly as possible so that the information gained can be used to take immediate action to strengthen existing equipment controls.

Improved communication
It was agreed that communication in the hazardous zone is limited and requires an urgent review of technology that could be employed to improve signalling between the operators of equipment and others who may be in the area.



GTS 10 UNDERGROUND EQUIPMENT

continued

Engaging employees

The team also emphasised the importance of not overlooking the behaviour of employees that can impact on safety performance. Employees who are truly engaged, have a positive attitude to their work, want to make a meaningful contribution and feel that their input is valued. This is critical to enhanced safety performance and visible felt leadership is a key driver. Leaders need to make the time to be at the workplace with the crews and need to adopt an approach of coaching rather than reprimanding.

Enhanced training

Training also plays a key role and it was recommended that operators of critical underground equipment are sent for periodic refresher courses. More practical training, including the use of simulators, also needs to be considered. Furthermore, the team suggested a review of rules and procedures to assess whether they are understandable - given the language barriers - and appropriate for explaining the safe and effective operation of technically advanced equipment.

The information gathered by the project team will now inform several newly established work streams within Thermal Coal.

Thermal Coal's head of engineering, Johnny Coetzee, said that the recommendations from this review study will go a long way to ensuring that the business unit eliminates safety hazards related to moving equipment underground. "After the terrible loss of three colleagues earlier this year, we needed to take urgent steps to ensure that we prevent further incidents on our mines. The lessons from those incidents stress what we have always known: while technology will be able to help us reduce incidents, more emphasis needs to be placed on the human factor."

Overall, the collaborative approach of this project has been hugely valuable, not only in charting a way forward for Thermal Coal, which is confidently based on best practice, but also in providing a case study that demonstrates our unwavering commitment to achieving Zero Harm and can be used for learning across the organisation.

Importantly, it also highlights the value in different disciplines working together to make sure that we properly identify the key learnings from incidents and that we take action to both improve our safety performance and how we manage critical risks to our business.

More practical training, including the use of simulators, is being considered.



GTS 19: STRUCTURAL INTEGRITY

HIGH ATTENDANCE AT STRUCTURAL INSPECTION AND MAINTENANCE MANAGEMENT (SIMM) COURSES



Course delegates at Kumba Iron Ore's Sishen plant on their way to inspect a structure

The leaflet and video material to support the roll-out of GTS 19, governing structural integrity, will be available in the fourth quarter of 2013. In the meantime, the GTS 19 courses are being introduced across the Group.

Kurt Waelbers, Principal Engineer: Civil & Structural Engineering in Group Engineering, says SIMM training courses are presented on request from the Anglo American's business units.

These courses are evaluated and after successful completion and evaluation the candidates can be used as structural inspectors, as defined in the Anglo American guidelines for inspections of this nature.

To date, more than 220 Anglo American employees have attended SIMM training courses. The 2013 Q1 to Q3 SIMM training courses were presented at Platinum's Waterfall smelter and Dishaba mine, Kumba Iron Ore's Thabazimbi plant and Sishen mine, and at the Thermal Coal RLT and New Vaal plant. The next course is scheduled at Thermal Coal for the end of October 2013.

During the SIMM course a full day is spent lecturing the delegates and illustrating the Anglo American inspection system, where after a second day is dedicated to illustrate structural deterioration mechanisms in the field on a selected structure, with the delegates utilising the remainder of the second day performing a SIMM inspection on an alternative structure.





A FINAL NOTE

If you would like to be included on the database to receive an electronic copy of *Mining & Technology's Quarterly Update* as well as further information on Mining & Technology, its services and offerings, please contact Janine Rothwell.

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