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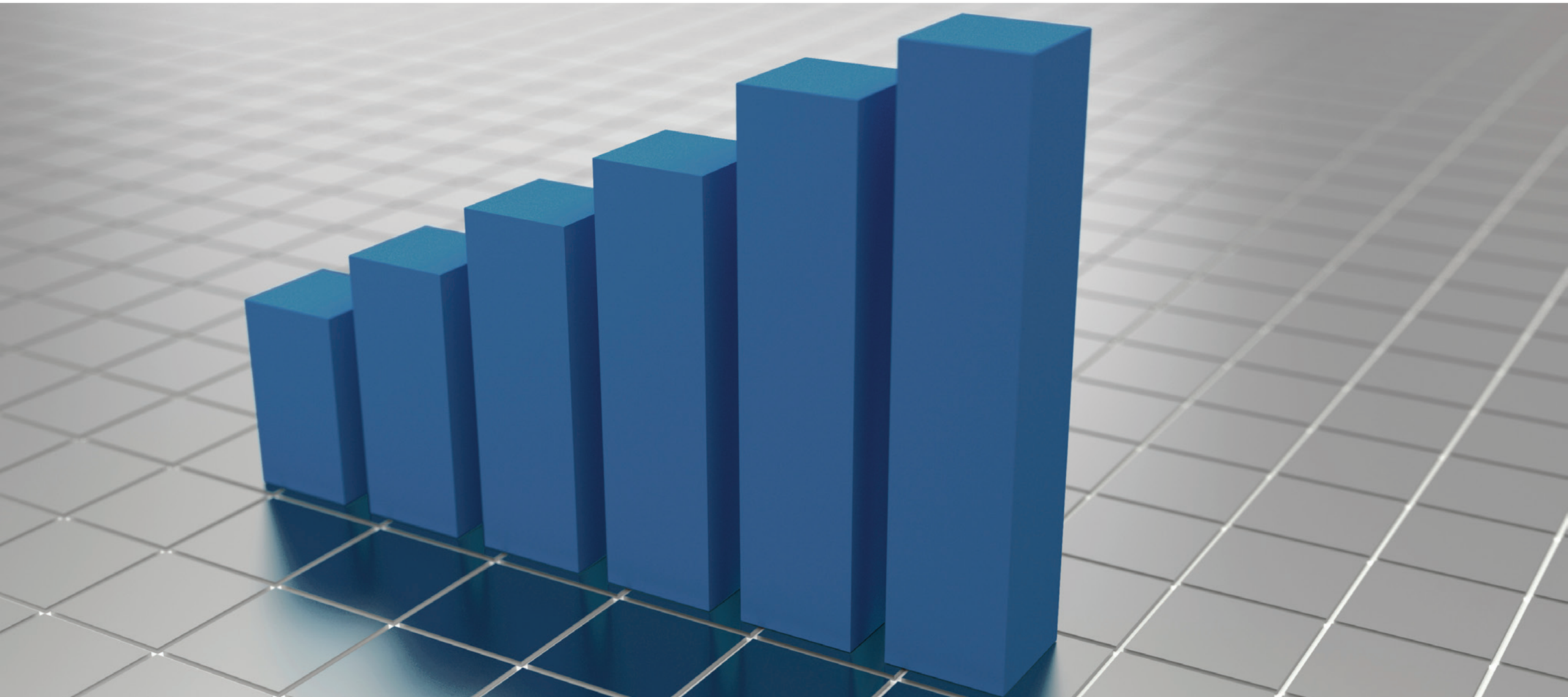
SIX STEPS TO OPERATIONAL STABILITY

A MINING EXECUTIVE'S GUIDE TO BUSINESS TRANSFORMATION



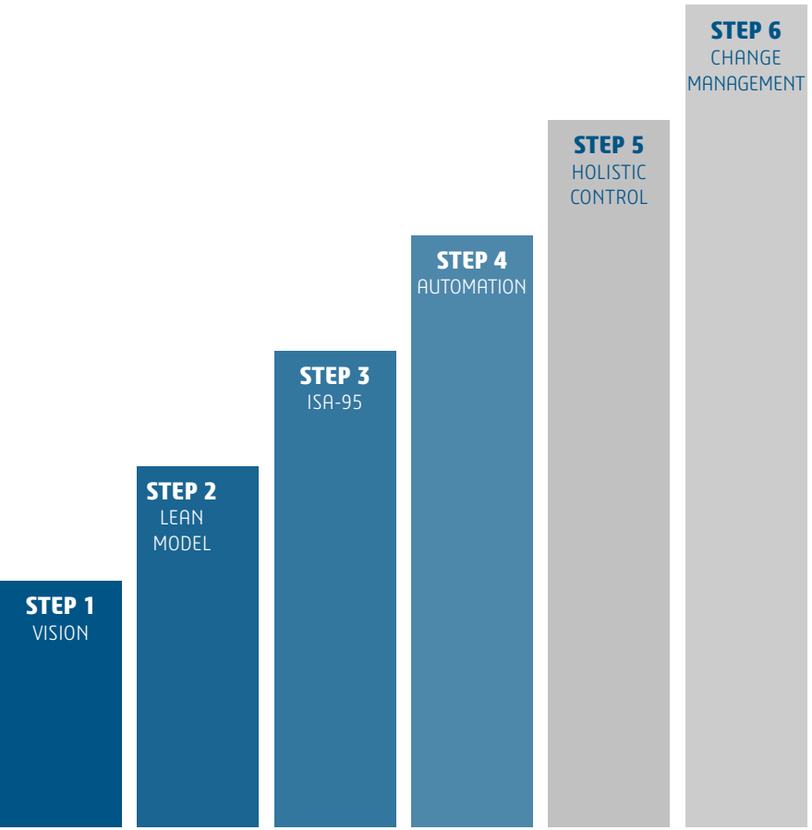
INTRODUCTION

The mining industry has reached a turning point, with executives discussing not only the need for change, but for transformative change. Decades of productivity decline, slow economic recoveries and uncertainty about the future have led to new conversations about mining execution excellence. The near-term goal is operational stability, with a view to ultimately achieving enterprise business agility.

This short brochure summarizes industry research and conversations with mining executives conducted by Michael MacFarlane, former Executive Vice President, Strategy and Business Planning, with AngloGold Ashanti. In the pages that follow, we outline his recommendations on what mining companies must do to realize operational stability and to set the foundation for business agility.

"Mining companies are freely giving away about 20% of their installed capital capacity because of too much variation in processes. When processes are under control, this number is between two and four percent since more of the total the potential output is realized."

— Mike MacFarlane, former Executive Vice President Strategy and Business Planning , AngloGold Ashanti



WHERE OPERATIONAL STABILITY FITS IN YOUR BUSINESS

All mining operations have a number of planning routines that occur throughout the year, which are often referred to as "the planning process". Generally speaking these planning routines fall into four separate categories:

1. **Strategic Planning** – This looks at big picture issues such as should we be selling or acquiring an asset.
2. **Integrated Mine Plan** – Often referred to as Life of Mine Planning and takes the longer term view specific to an asset; however, most effort is put into annual and quarterly plans.
3. **Short Term Planning (STP)** – Also known as **Work Management**, it the execution discipline to build a culture of reliability – are we hitting the quarterly and annual budget numbers? Generally speaking the time horizon for STP is inside one month with specific attention to the upcoming week.
4. **Continuous Improvement Planning.**

All mining companies run these four planning process concurrently. However, STP is the focus of this discussion. The quality of detailed planning (drive short term planning) is often not sufficient to deliver the level **Operational Stability** that is expected from senior executives, shareholders and other stakeholders.

SHORT TERM PLANNING

The primary purpose of drive short term planning is to reliably deliver on short-term plans and schedules established by the mine management. This area of planning is primarily focused on the next 30 days. Generally speaking, variation at the task execution level is driving a large percentage of the variation that results in shortfalls in short term production targets. Improving STP activities can often lead to 10 – 20% improvement in the unit costs with little or no additional capital.

STP is comprised of three separate planning steps:

1. **Planning** — Here we are planning all aspects of task execution down to the shift level. We are focused on people, equipment, supplies and task location.
2. **Scheduling** — Schedules for all the aspects of each task on a shift-to-shift basis.
3. **Execution** — All activities relating directly to task execution.

> "You cannot get to a point of operational stability if your mine sites are being managed in the rearview mirror."
>
> — Mike MacFarlane, former Executive Vice President, Strategy and Business Planning, AngloGold Ashanti

STEP ONE:

Set your strategic vision and lead from the top

Getting to a point of operational stability involves a cultural change in the way the business is run. To ensure your organization arrives at the destination you set for it, you need to be the flight commander and provide the ground control system. Your flight plan, the vision, must be understood and acted upon by your pilots, the people who will execute it. The ground control systems, the supporting infrastructure, must be in place to help both you and your team navigate their way and monitor their progress.

STEP TWO:

Move to a lean mining business process model

Lean manufacturing is a proven approach to build a culture that drives operational stability; however, its principles need to be translated into mining language. To achieve this, it is critical you define and systemize your business processes. You must also collect data to track progress on task execution in-shift and real-time.

The data you gather must be:

- Accurate. Deploy automated collection and sensors wherever possible. There more data is touched by people, the more it gets corrupted.
- Complete (holistic across the operation, within and across processes).
- Collected in real time.

"You can align everyone in your business to your strategic vision by ensuring information and measures flow to the top of your organization."

— Mike MacFarlane, former Executive Vice President, Strategy and Business Planning, AngloGold Ashanti

STEP THREE:

Adopt ISA-95 architecture

Do what manufacturing does to drive visibility into productivity in its operations: Adopt ISA-95 Architecture. Putting an automated interface between enterprise and operational control systems will help align the organization to your vision. It is also the foundation for gathering data and making it actionable from the rock face to the boardroom.

- Establish a five-level flow of information through the organization.
- Aggregate the data you collect.
- Implement a Mining Execution System/Mining Operation Management platform to make data actionable when variation is detected.
- Connect your operational systems to enterprise resource planning.

STEP FOUR:

Automation is required and all the technology required to do this already exists

The level of detail require to drive short term planning and bring operational stability to your operation requires automating, enabling technology. Relying on a manual, paper based system unnecessarily burdens the organization with work that can be done using technology.

All the technologies you need to achieve operational stability already exist, if you take the time to research them. Invention is too slow, too expensive, and too uncertain when compared to discovery of what is available for rapid deployment from other industries.

STEP FIVE:

The system must be end-to-end

Holistic control is required and success must be measured against strategic objectives such as equipment and production cost, free cash flow, etc.

- Provide yourself with the luxury of new information, with on-demand operational analytics.
- Put standard measures in place to track variation reduction in processes and in conformance to plan.

STEP SIX:

Change management

The people who will play the most critical roles in making your vision a reality lie deep inside the organization. Do the following to ensure the program does not devolve into an IT project:

- Communicate and continuously reinforce your vision for change.
- Ensure everyone understands what is in it for them.
- Think through the "people" side of the initiative and examine the organizational structure to determine new job roles.
- Put a strong training plan in place, train more, and train again.
- Connect the program to financial levers to build in accountability.

Do not skip any steps

It is important that none of the steps listed above be skipped. Leave any of them out and the value realized will be cut not just a little, but significantly. Skipping several steps multiples the lost value-add.

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