

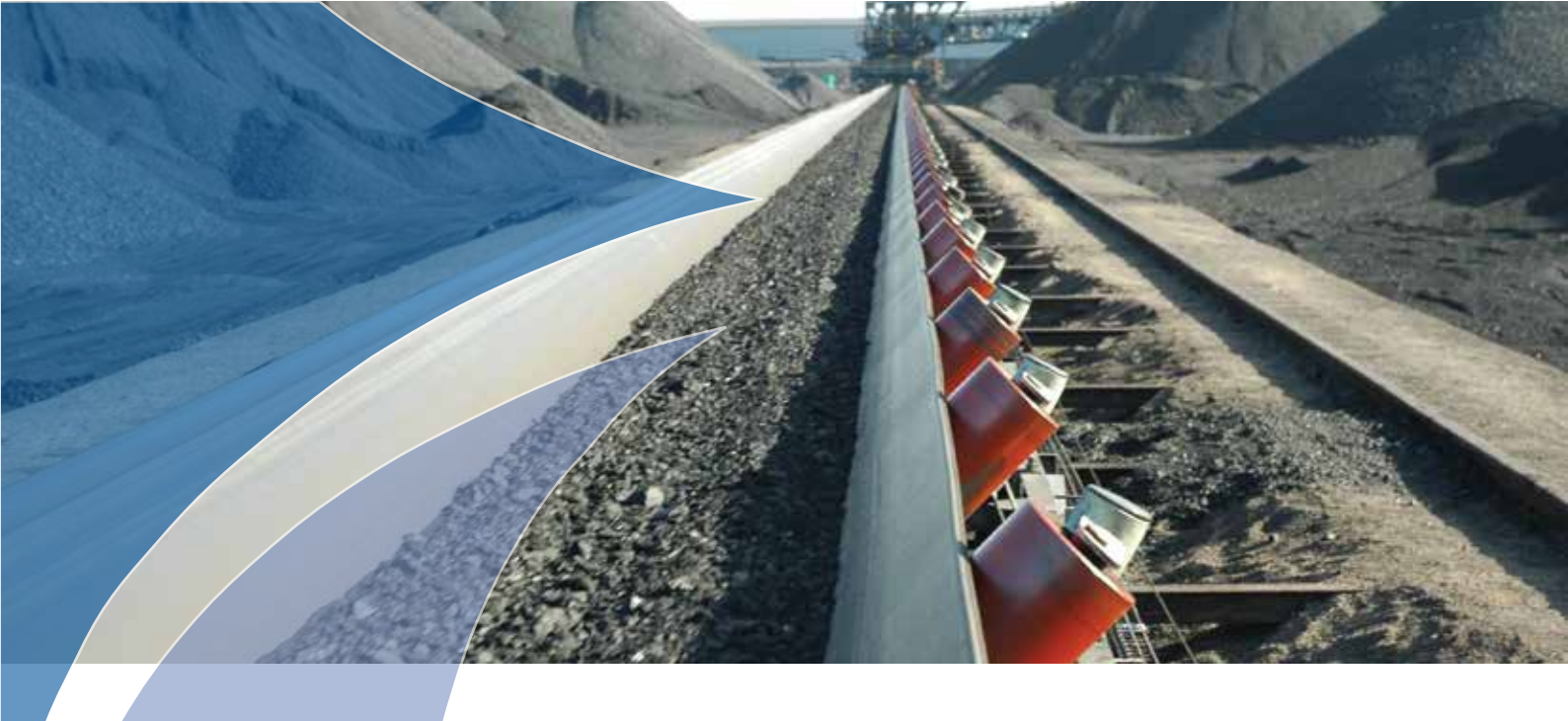


ENGINEERING SERVICES

www.elb.co.za

Bulk Materials Handling





ABOUT ELB ENGINEERING SERVICES

ELB Engineering Services (ELB) is an internationally recognised technology driven holistic solutions provider to the mining, power, port, construction and industrial sectors.

This is achieved through ELB generated innovation, supply of equipment and technology from our world-class partners, in-house developed expertise and integration of the services and products from the ELB Group of companies.

Our comprehensive services include in-house construction, electrical, control and instrumentation, spares and life extensions and total logistics solutions as an integral part of the overall business.

From design to advice, ELB offers quality engineering services that benefit Stay in Business and Greenfields operations. Our internationally accredited quality assurance system, coupled with efficient project management protocols, ensures that the client receives a consistently high quality product.

We tailor our services to the needs of our growing client base, and focus on maintaining and building long-term relationships with our clients.

OUR APPROACH TO BULK MATERIALS HANDLING

ELB is a global leader in bulk materials handling with world-class capability encompassing the supply of turnkey packages from run-of-mine tip to ship loading equipment.

Providing a full materials handling solution, ELB's complete service offering ranges from design, manufacturing, erection and commissioning to maintenance and life extension programmes.

Drawing on a high level engineering and know-how base, the result is a world-class technical service covering:

- All conveyor options e.g. in-plant, overland and pipe.
- Stockyard equipment e.g. stackers, bridge/portal/ bucket wheel reclaimers.
- Rapid train and truck loading systems.





- Rail wagon unloaders / tippler stations and positioners.
- Ship loading equipment.
- Simulation modeling.

Using the latest technology available, bulk material handling systems are designed to suit individual client needs, ensuring the most effective and economical solution over a wide range of dry bulk material applications, including amongst other; the handling of ores, coal, cereals, woodchips, sand, gravel and stone in loose bulk form.



Our clients are represented in a wide range of industries including power generation, cement, mining, metallurgical, manufacturing and ports. Our systems are found in operation at mines, plants and terminals.

From advice to execution, ELB offers quality engineering services to meet short or long-term objectives. Our internationally accredited quality assurance system, coupled with efficient project management protocols, ensures that the client receives a consistently high quality product.

Through our life extension services process, ELB's specialist material handling engineers assess performance, reliability and maintainability, access and system flexibility to ensure a 'fit for purpose' re-design.

Servicing ELB installed equipment, as well as installations by other OEMs, the life extension services team utilises specialist tools, such as laser scanning, finite element analysis, discrete particle modeling, fatigue and conveyor analysis, to reverse engineer designs of machines which are no longer supported by the global OEMs.

TECHNOLOGY PARTNERS

ELB has over a number of years developed significant experience and capabilities in the fields of bulk materials handling and stock yard / stock pile facilities. In addition we have a long standing relationship with global technology partners and have worked in partnership with them on a number of projects.

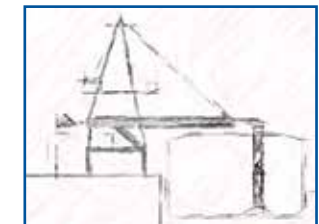
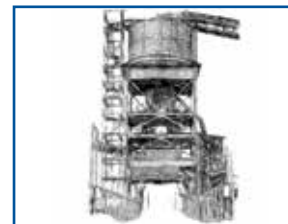
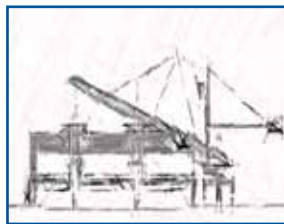
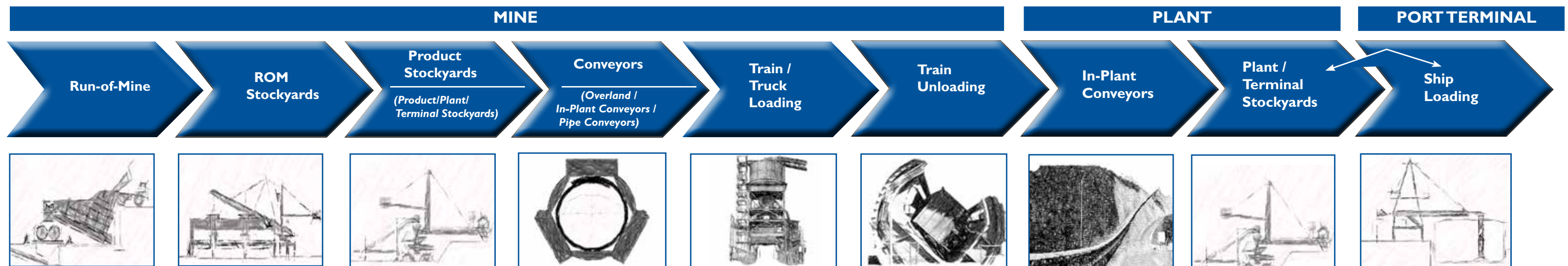
They have formed an integral part of a number of projects at mine, plant and port facilities incorporating the design, supply, erection and commissioning of machines such as tipplers, stackers, reclaimers and ship loaders.

The companies know and understand each others' systems and procedures and have worked well together in the past on all projects undertaken together.

In order to augment the in-house bulk materials handling capabilities, ELB have entered into a number of cooperation agreements with world leading partners.



BULK MATERIALS HANDLING - VALUE CHAIN



RUN-OF-MINE (ROM)

For ELB, this is where it all starts. The run-of-mine (ROM) ore refers to ore in its natural, unprocessed state. The metal or other valuable material is recovered via 'processing'. The first stage in processing ore involves crushing and grinding the ROM material to the point where it becomes a fine sand-like substance so that commercially valuable minerals or metals can be separated from the waste material.

As the starting point in the ore processing value chain, ELB's design approach to these systems is to define the point in the curve where particle crushing size and energy consumption intersect to identify the least amount of energy required for the processing operation. ELB designs and supplies crushing and grinding systems that range from mobile plants on skids, rubber tyred or track mounted to static plants.



STOCKYARDS

When an ELB engineer approaches a stockyard layout and design at a mine, plant or port terminal, it is with the backing of a team with more than 100 years experience in application engineering to ensure that ROM and product stockyards are optimally designed to the specific client requirements.

ELB offers extensive expertise and know-how, whether it be for the supply of stand-alone equipment such as stackers or reclaimers or a turnkey installation.

Whether the need is for blending or only stacking, ELB couples it to the reclaiming methodology for optimal feeding of a plant, a train loading station or even a vessel.

CONVEYORS

From in-plant, pipe to overland conveyors, ELB offers state-of-the-art technology and engineering expertise to deliver a conveyor system that is efficient, dependable and cost-effective.

The extensive reference list includes the world's longest single flight overland conveyor for a coal operation which has a length of just under 27km.

Advanced design methods together with its' partners, ELB has developed a modern commercial method for conveyor belt design and analysis based on rubber rheology, viscoelastic properties and fundamental physics. This has the benefit of reducing friction and as a result, the power consumption resulting in longer belt life and savings in operating costs.





TRAIN / TRUCK LOADING AND UNLOADING SYSTEMS

The in-house designed ELB train / truck loading and unloading systems have been proven in numerous iron ore, coal and bauxite applications worldwide. Combining proven process knowledge, structural and mechanical design and reliable, fast acting hydraulics with feeding, weighing and automation technology, the systems offer:

- Simple loading with minimal components for optimal performance and minimised downtime.
- Weighing technology for superior weighing accuracy and repeatability, which can measure wagon loads to within $\pm 0.5\%$. This will ensure that wagons are evenly loaded due to the ability to integrate with the loading system.
- Key components designed and manufactured to superior quality standards for long life and reliable operation.

TRAIN / TRUCK LOADING SYSTEMS

Key components of the ELB train / truck loading systems are specifically designed for the application and to meet site specific needs. These include:

- Surge bin.
- Weigh flask with clam shells.
- Self-calibrating weigh flask with test load weights.
- Hydraulic actuator bank (in the event of a power failure).
- Load cell technology.
- In-motion weigh scale technology.
- RFID tag system.
- HMI system.

TRAIN UNLOADING SYSTEMS

ELB's comprehensive train unloading technology, from C-frames and O-frames, to random, rotaside and tandem tipplers, ensures that there is a product to meet a wide range of applications.

ELB Tandem Tippler

The ELB's rotary tandem tippler is ideal for dumping of rotary-coupled cars. High speed, semi-automatic dumping is combined with cycle times as fast as 35 seconds per car, and a dumping rate of 10,000 tons per hour in a tandem configuration. Control is simple with just one operator and is ideal for random car or unit train applications.





ELB Rotary Tippler

The ELB C-frame and O-frame rotary tipplers, for unloading of random and non-rotary coupled cars, operate at low power. This is combined with fast cycle times refined for maximum productivity.

Historically the popular tipplers of choice in Southern Africa, the C-frame and O-frame rotary tipplers have been redesigned by ELB to meet new wagon configurations whilst working within the existing limitations of the civils structures.

For tippler station upgrades that could include mechanical, structural, El&C and civils, ELB offers either individual equipment or a turnkey approach from de-dusting to apron feeders for a complete solution approach.



Side Arm Chargers and / or Positioners

ELB offers a complete line of side arm chargers (SAC) or positioners that utilises advanced equipment and control philosophy to maximise operation and efficiency. ELB SACs can be used for a variety of loading, unloading and other types of applications, without locomotive assistance. These machines can push or pull railcars in either a manual or automatic mode, offering more unloading capabilities associated with either the operational philosophy or to support maintenance activities.

SHIP LOADERS AND UNLOADERS

ELB's ship loaders are designed to meet stringent international standards. Our installation process includes trial or full assembly, testing, commissioning and transportation piece small, piece large or fully assembled with heavy-lift transportation vessels. Installation is designed taking consideration of the erection strategy to minimise terminal related activities. ELB ship loaders and unloaders:

- Have been applied to a wide range of bulk solid materials from iron ore and coal, through to fertilizers, grains as well as bagged material such as cement bags.
- Are built in capacities from 500 to 15,000 tonnes per hour, designed to suit loading from Handymax, Panamax and Cape up to Valemax / Chinamax vessels.
- Are available as fixed installations (the most widely used) and as mobile versions where they can add versatility in 'multi-product' terminals. Fixed installation types include travelling and radial-quadrant. Mobile ship loaders are available in rubber tyred or track mounted versions.



ZERO HARM

The ELB Health, Safety & the Environment (HSE) policy guides all of ELB Engineering Services activities and operations to minimise risk to employee health and safety as it continuously strives for zero harm. Business processes are certified in compliance with OHSAS 18001. As part of its commitment to a harm-free environment, ELB projects are conducted in a sustainable manner to ensure minimal impact on the environment.



QUALITY

ELB is committed to meeting and exceeding best practices and standards within the industry. The company is certified for compliance with international quality management standards (ISO 9001) and proactively manages quality control throughout all its own and its sub-contractors' operations using a formal quality assurance procedure.



PROJECT MANAGEMENT

Leading-edge project-management systems ensure a high level of control over all stages of a project, with cost and time overruns minimised by timeous management techniques. Productive utilisation of project resources is achieved by integrating the entire project process using best-of-breed software for design, engineering, 3D modelling, cost management, planning, materials control and document tracking and control.



RISK MANAGEMENT

ELB's de-risking capability coordinates the company's collective technical, project execution, construction, financial and relationship building skills, using:

- Structured risk and project management tools that take into account that each project is unique in size, shape, complexity and execution.
- Qualitative and quantitative de-risking methods, supplemented by a broad risk management plan, to continuously evaluate projects in terms of risk from business development to completion and hand-over.

CONTRACT MANAGEMENT (FLEXIBILITY) AND PROJECT FINANCING

ELB offers flexible contracting options tailored to the requirements of small to mega-sized projects, covering technical audits, studies, EPCM services, turnkey solutions, and life extension and after-sales services.

A project financing facility operates in conjunction with a leading financial institution.



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