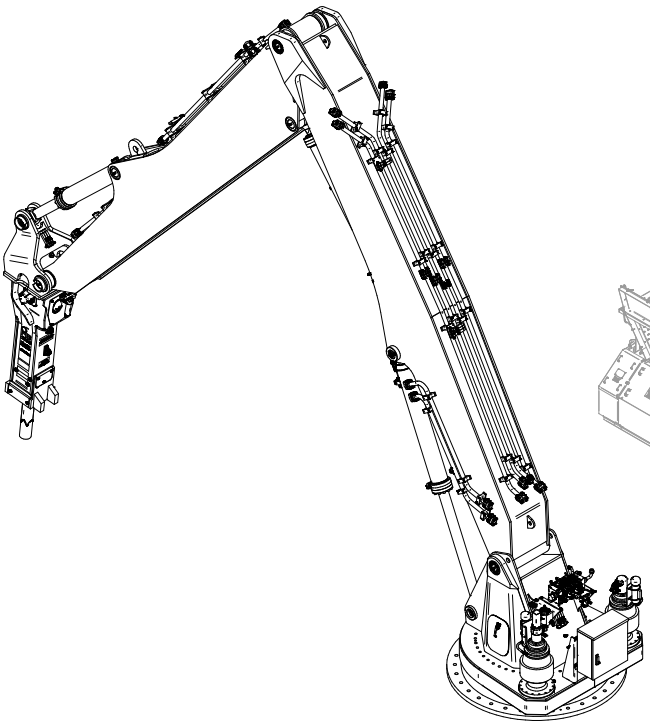
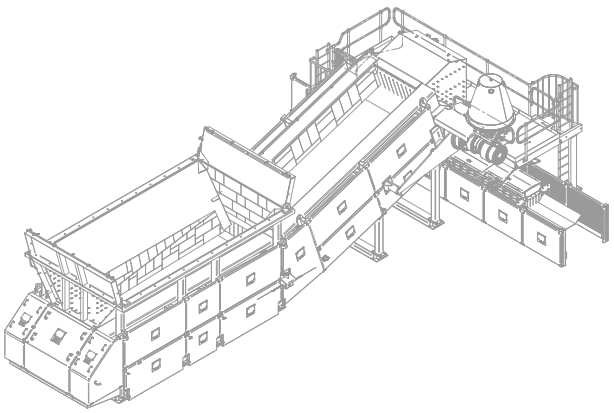
TRANSMIN

# Engineered Equipment

**Innovative Engineered Equipment and Systems for the Mining-Resources and Bulk Materials Handling Industries**





TRANSMIN EQUIPMENT

Committed to being a world class supplier and service provider recognised for integrity and innovation

# Company Profile

## Australian Engineering Worldwide

Transmin is a world-class provider of innovative engineered equipment, supplies and services to the resources and bulk materials handling industries, including; mining, minerals-processing, oil & gas, logistics, utilities, agriculture, quarrying and construction.

## Proven Results

Established in Perth in 1987, Transmin sets the standard for mechanical equipment design and application, led by our specialist Engineering division, and backed by our dedicated Service and Parts divisions. Transmin's Control and Automation division delivers award-winning software solutions specialising in remote equipment operation and systems integrations.

Transmin's head office and major manufacturing facilities are located in Perth, Western Australia, with regional offices situated in Brisbane, Johannesburg, Santiago and Belo Horizonte, Brazil. Our international network of suppliers and industry partners provides global reach and the capability required to undertake and support projects anywhere in the world. Transmin engineered equipment is currently deployed in over 60 countries.

The Transmin original equipment range covers most bulk materials-handling applications, including; feeders and conveyors, bulk loading and unloading hoppers, rock-breakers and grapples, hydraulic boom systems, bin isolation gates, reagent preparation and processing facilities, lime preparation facilities, ball mills, bucket elevators, and silos.

Transmin's dedicated and highly trained Service division supports mining and materials handling operations right across Australia. We provide comprehensive on-site and off-site servicing of both Transmin and third party OEM equipment.

Transmin also provides a range of strategic site maintenance and optimisation services, including shutdown and maintenance planning, HAZOP assessments, risk based inspections, systems de-bottlenecking, and general engineering support services.

***www.transmin.com.au***


- Transmin Head Office
- Transmin Offices
- Countries in which Transmin equipment is deployed (60+)

Quality System — AS/NZS ISO 14004 Compliant

WHSE System — AS/NZS 4801 Compliant

Environment System — AS/NZS ISO 14001 Compliant

Welding System — AS 3992 Compliant

Welding System — AS/NZS 1554 Compliant

ASME — ASME IX Compliant

# CONTENTS




## World Class Facilities

Transmin's head office and major manufacturing facilities are located in Perth, Western Australia; with over 4000sqm of fully equipped workshop space suitable for heavy assembly and servicing. Transmin also has regional offices situated in Brisbane, Johannesburg and Belo Horizonte, Brazil.

## Equipment you can rely on

**Heavy duty industry demands equipment that delivers reliability and performance. Transmin seeks to deliver on this demand every time.**

**We specialise in bulk materials handling, processing and general mining equipment - developed by experienced project managers, mechanical engineers and drafters, using the latest modelling and finite element analysis techniques.**

# //TRANSMIN EQUIPMENT

# Transmin Innovation Since 1987

**Our reputation has grown alongside our business. Since the company's inception, Transmin's commitment to innovation and integrity has laid the foundation for longstanding relationships with the world's leading mining companies.**

# The Low Profile Feeder™ (LPF)

## Innovative Thinking

**Heavy-duty mining and materials handling operations demand solutions which deliver performance.**

The Transmin Low Profile Feeder™ (LPF) is a hybrid belt feeder / apron feeder which delivers the advantages of both technologies, plus additional benefits unique to Transmin, including the ability to incorporate a change of direction using a bend transition.

Unlike conventional heavy duty belt feeders, the belt itself is not subject to high tension forces, which means a lower profile can be achieved. In addition, unlike apron feeders, a separate spillage clean-up conveyor is not required, again saving space and the cost of civil works.

Hybrid design combining belt and apron feeder technology **delivering high capacity tonnage**

Lowest possible profile for a high capacity feeder **delivering major plant space saving potential**

Change of direction from horizontal to inclined can be achieved in a single machine, reducing the number of conveyor transition points and **improving space flexibility**

Belt widths > **1.2m** → **4.0m**

No need for spillage conveyor (unlike conventional apron feeders), **reducing capital expenditure**



**Sprocket driven** eliminating tracking and belt slipping issues with the ability to reverse without risk of miss-tracking, unlike conventional belt feeders

**Proven industry standard components** driven by tractor chains carried on standard heavy duty rollers

## Typical Materials Handled

A huge variety of materials are handled efficiently and reliably with many advantages over traditional belt or apron feeders.

Materials include; various ores, iron ore fines, tailings, stockpiled ores, coal, fertilisers, metallic concentrates, filter cakes, wood chips, cement clinker, sewage sludge, refuse, biomass, construction wastes and aggregate.

## Chains

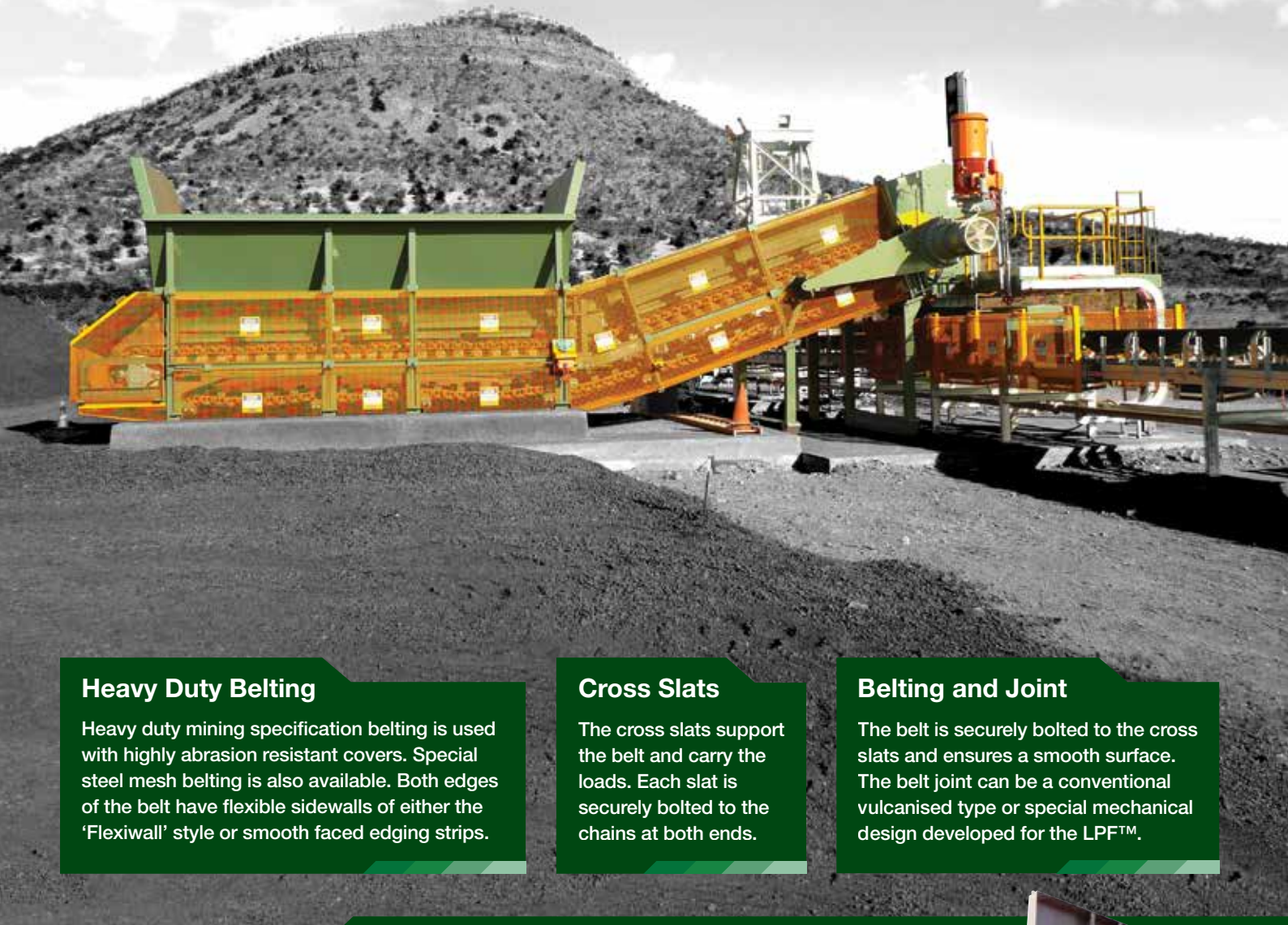
Twin strand heavy duty sealed and lubricated (SALT) chain is used, which is readily available and familiar to operations and maintenance personnel. Master link connections or endless configurations can be used, coupled with hydraulic tensioning if required.

## Lowest Profile

The lowest possible profile available in a high capacity feeder, typically no more than 1.0m from belt top surface to underside of footplates.

## Hybrid Design

Combining proven belt and chain technology, belt tracking or belt slippage problems are eliminated.



## Heavy Duty Belting

Heavy duty mining specification belting is used with highly abrasion resistant covers. Special steel mesh belting is also available. Both edges of the belt have flexible sidewalls of either the 'Flexiwall' style or smooth faced edging strips.

## Cross Slats

The cross slats support the belt and carry the loads. Each slat is securely bolted to the chains at both ends.

## Belting and Joint

The belt is securely bolted to the cross slats and ensures a smooth surface. The belt joint can be a conventional vulcanised type or special mechanical design developed for the LPF™.

## Change of Direction

A change in conveying direction from horizontal to inclined can be achieved without the requirement of a second machine, improving space utilization, flexibility of plant layout and saving on excess capital costs.

## Carrier Rollers

Low Profile Feeder™ chains are carried by standard heavy duty track type rollers. The above heavy duty Low Profile Feeder™ unit was fitted with D6 chain for rigorous conditions. Larger sizes are available.

# The Low Profile Feeder™ (LPF)

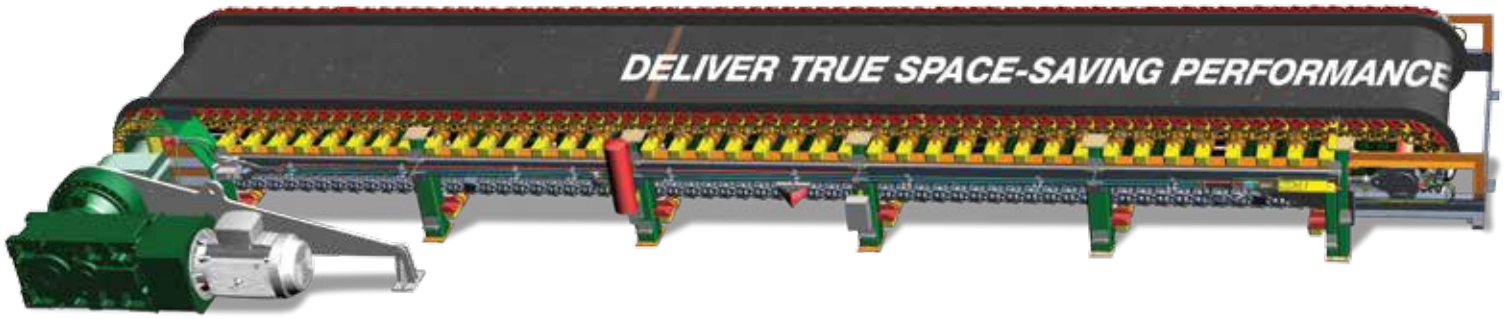
## Selection Data

Please consult Transmin for confirmation of selection. Capacity range covers materials of various types of particle sizing. Non standard widths are available for special orders.

| MODEL CONFIGURATION | | | | |
|---|---|---|---|---|
| MODEL DESIGNATION | STANDARD BELT WIDTH (mm) | EFFECTIVE SKIRTED WIDTH (mm) | TYPICAL BED DEPTH (mm) ** | NOMINAL CAPACITY MAXIMUM ($m^3$/hr) |
| DX-12 | 1200 | 900 | 600 | 520 |
| DX-16 | 1600 | 1300 | 600 | 1100 |
| DX-20 | 2000 | 1700 | 800 | 2000 |
| DX-26 | 2600 | 2300 | 800 | 2650 |
| DX-32 | 3200 | 2900 | 1000 | 4200 |
| DX-40 | 4000 | 3700 | 1000 | 5300 |

* *Nominal capacity @ 0.40m/s belt speed. A change in belt speed will affect the volumentric capacity. Higher speeds available on request. Please discuss with your Transmin representative*

** *Bed depth is dependant on application*




| PRODUCT COMPARISON | | | |
|---|---|---|---|
| Features | Transmin LPF™ | Conventional Belt Feeder | Apron Feeder |
| Space Occupied Within the Plant | Minimal - e.g. 3.0m wide belt, 4000tph iron ore = 1.0m vertical height ✓ | Can be substantial when high belt tensions present due to large head pulley diameters ✗ | Can be substantial, especially when spillage conveyors are required |
| Belt Tracking | No adjustments necessary ✓ | Belts can mis-track and require adjustment ✗ | No adjustments necessary ✓ |
| Belt Slippage | Belt cannot slip ✓ | Belt can slip ✗ | N/A - no slip ✓ |
| Product Spillage | Minimal ✓ | Minimal ✓ | Pan leakage ✗ |
| Requirement for Spillage Conveyors | Not required ✓ | Not required ✓ | Frequently required |
| Ease of Cleaning | Conventional belt cleaners ✓ | Full width conventional belt cleaners ✓ | Can be difficult to clean effectively ✗ |
| Belt Change Out | Simple modular sections ✓ | Belt splicing station required | N/A |
| Direction Change | Can change direction by the introduction of a bend ✓ | Limited to horizontal or inclined only ✗ | Limited to horizontal or inclined only ✗ |
| Suitability for ROM Dump Applications | Suitable for smaller Run Of Mine applications only | Generally not suitable ✗ | Proven for large Run Of Mine dump applications ✓ |

*Note the lower height compared to a conventional belt feeder.*

✔ *Less Spillage* ✔ *No Mis-tracking* ✔ *No Belt Slippage* ✔ *Lowest Possible Profile*

## Stockpile Reclaim

The Transmin LPF can be easily fitted into the restricted space beneath large stockpiles. The unique low profile is the lowest possible profile available in a high capacity feeder.

## Car Dumper Applications

A viable alternative to conventional feeders beneath rail lines and car dumpers at receival facilities in the port or mine.

# Bulk Loading/Unloading Hoppers

## Receival, Storage and Feeding of Bulk Materials

### Head Chutes

Transition head chutes into downstream plant and equipment can be customized to suit.

### Hydraulic Tensioning

Hydraulically sustained chain tensioning is available instead of the standard mechanical screw mechanism if preferred

### Inlet Plough

An adjustable inlet plough can be incorporated to assist in smoothing the burden height which results in a more consistent feed from the machine, especially at very low capacity applications.

### Inlet Hopper Liners

Hoppers can be provided with a variety of abrasion resistant liner plates or low friction materials if required.

### Skirts

A variety of skirting options are available depending upon the material characteristics.

Bulk materials are often received into process by truck, rail or ISO sea containers which require extensive and costly excavations to provide a below ground intake pit or hopper to receive the incoming materials. Transmin's Bulk Loading and Unloading Hoppers are surface mounted devices capable of accepting feed from rear and side tipping trucks or rail cars, which save on civil works and installation time, incorporating Transmin's unique Low Profile Feeder™ technology.

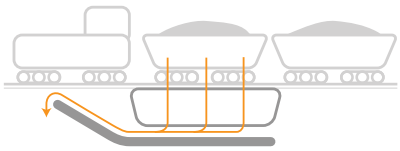
- Receival, storage and feeding in one machine.
- The ability to have a horizontal hopper of a length to suit the application followed by an inclined section means the hopper capacity can be the maximised for best possible efficiency.
- Various models are available for light, medium and heavy duty applications incorporating either roller or track type chains.
- Various features and options are available including low friction or wear liners and weather or dust enclosures.
- Capacities from 50tph to thousands of tonnes per hour.

LPF™
LOW PROFILE FEEDER

# Incorporating Transmin LPF™ Technology

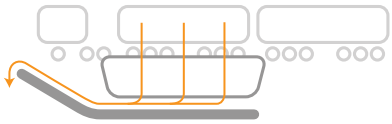
*Direct rail wagon – receival and transfer*

## Applications



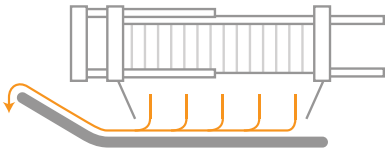
### Direct Rail Wagon

- Receival and transfer.



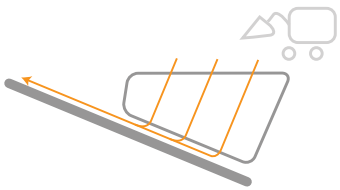
### Direct Side Tipping Truck

- Receival and feed.



### Plate Filter Press Discharge

- Eliminates belt slippage and mistracking. Saves space

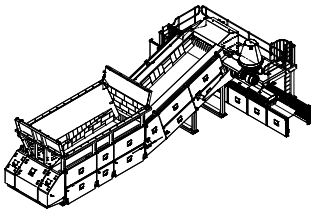


### Direct Dumper Receival

- Incorporating LPF™ on incline.

### Direct Truck Receival

- Incorporating LPF™ with change of direction.



### Standard Reclaim Feeder

- Front end loader feed from both sides.

LPF™ beneath rail line at a port installation handling iron ore at 3000tph.

Bulk loading and unloading hoppers are ideal for reclaim via front end loaders.

1500tph concentrate feeder at Bunbury Port.

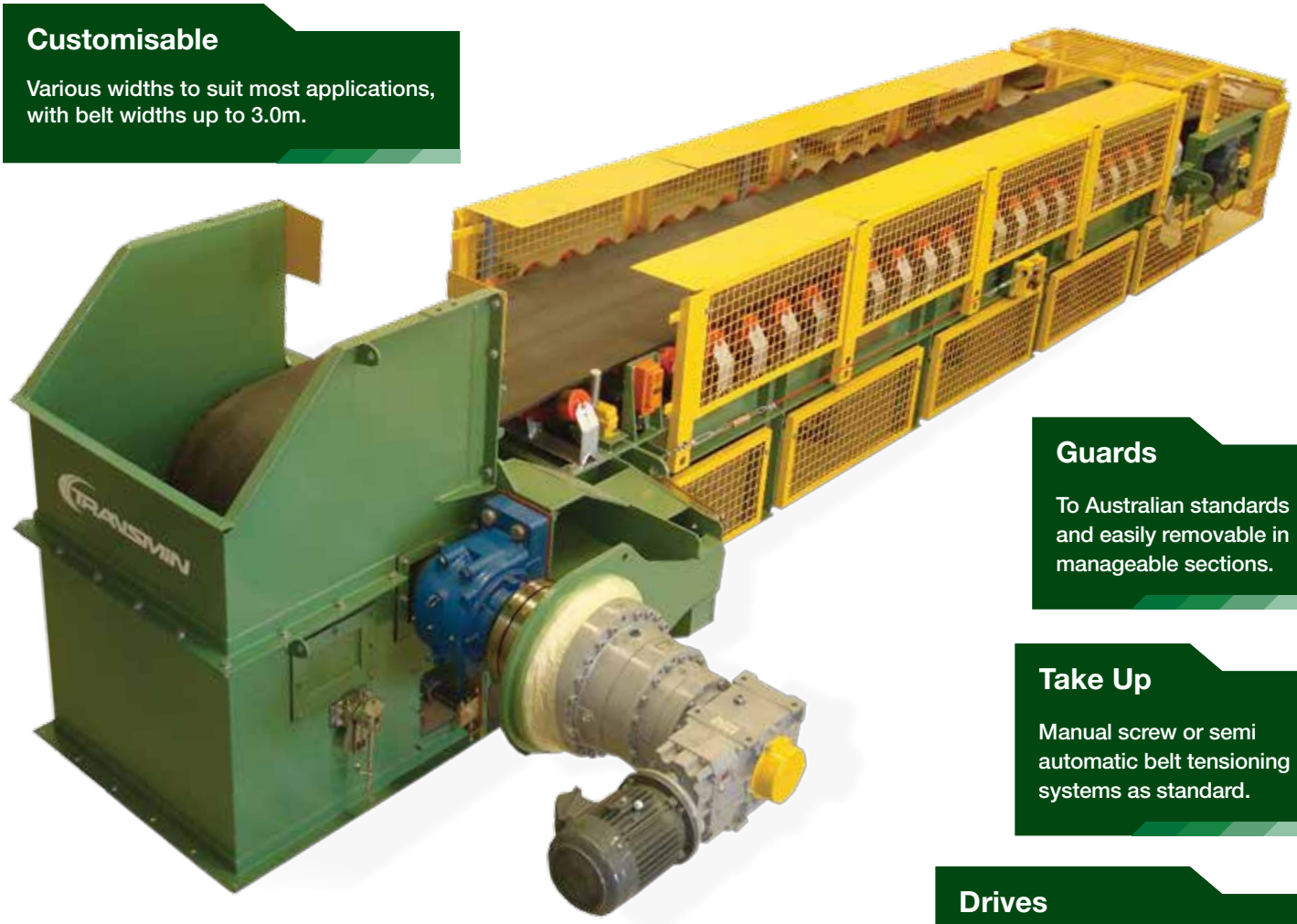
# Belt Feeders

## Conventional Troughed & Flat Belt Feeders

### The cost effective solution

**Customisable**

Various widths to suit most applications, with belt widths up to 3.0m.




**Guards**

To Australian standards and easily removable in manageable sections.

**Take Up**

Manual screw or semi automatic belt tensioning systems as standard.

**Drives**

Compact, shaft mounted drives with either planetory helical bevel combinations or hydraulic units.

**Head Enclosures**

Fully enclosed for safety and dust control, with access doors and mounting points for belt cleaners.

Since inception in 1987, Transmin has been designing and supplying bespoke belt feeders for mining and general industrial applications. In the early days these were mainly medium duty machines which sometimes incorporated load cells to accurately control or monitor material feed to process.

As is the case with Low Profile Feeders Transmin can undertake the design and supply of the feeder, inlet hopper transition piece and bin isolation gate as a package, therefore giving peace of mind to the customer that responsibility for feeding performance rests with a single supplier.

For high temperature or special applications Transmin can also design screw and drag chain feeders - contact Transmin for more details.

## Applications

- High Capacity Weighing Applications
- Screen Feeding
- Reclaim Hoppers
- Straight Inclined Feeding
- Surge Bin Feeders

*Belt feeders and conveyors in use at a building products facility.*

High quality head and tail pulleys.

Impact idlers for load support.

Hydraulic assisted tensioning.

Special belt feeder for sample plant application.

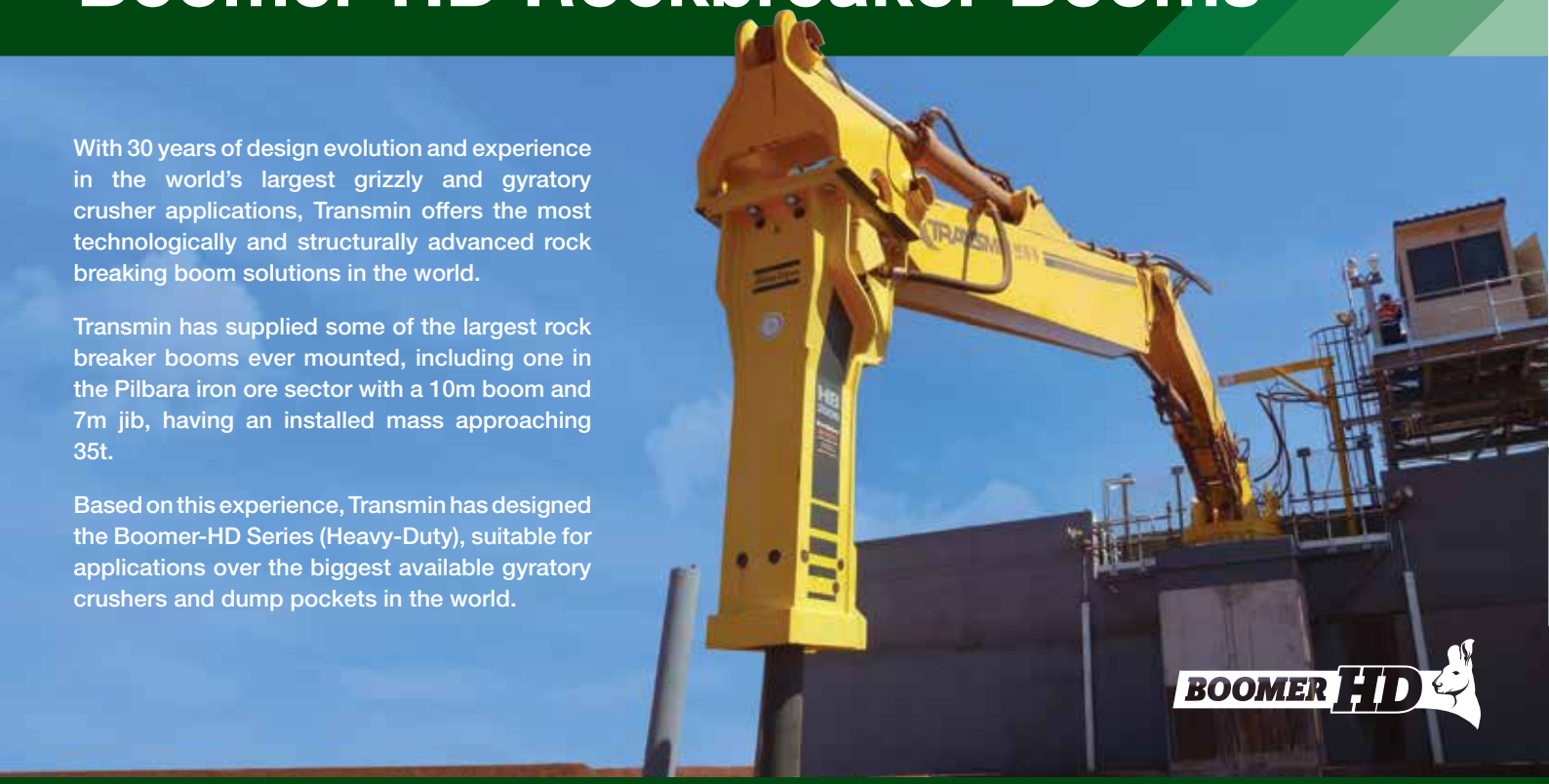
Two heavy duty units for Esperance Port.

# Boomer-HD Rockbreaker Booms

With 30 years of design evolution and experience in the world's largest grizzly and gyratory crusher applications, Transmin offers the most technologically and structurally advanced rock breaking boom solutions in the world.

Transmin has supplied some of the largest rock breaker booms ever mounted, including one in the Pilbara iron ore sector with a 10m boom and 7m jib, having an installed mass approaching 35t.

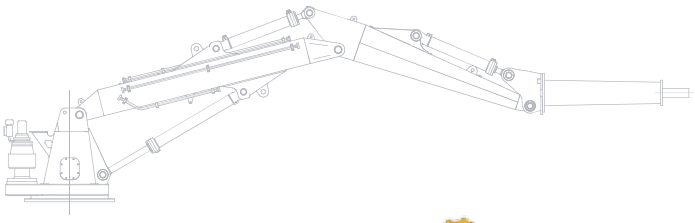
Based on this experience, Transmin has designed the Boomer-HD Series (Heavy-Duty), suitable for applications over the biggest available gyratory crushers and dump pockets in the world.




*Transmin Boomer-HD recommends Atlas Copco hammers.*

## Custom Engineering

Each machine can be custom designed to client specifications. The Boomer-HD Series 200 model can manipulate the heaviest and most powerful hammers available, weighing up to 7 tonnes - allowing quick and efficient breaking of even the largest run of mine ore.



100 Series

130 Series

160 Series

200 Series

*Transmin's dedicated assembly and testing workshop.*

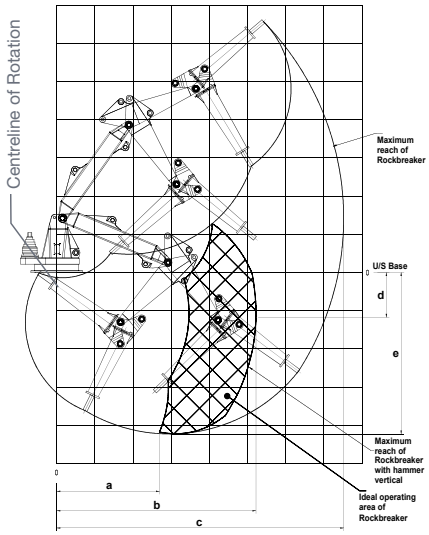
To ensure absolute reliability from first start-up, Transmin insists on complete trial assembly and test running of all our booms prior to commissioning. Transmin has a dedicated assembly and testing workshop which provides a clean environment for mechanical fitting and testing, as well as the ability to handle large quantities of booms efficiently and without delay. Client witnessing of testing is welcomed.

All booms are individually analysed on a Transmin designed engineering program which allows customised design and loadings to suit each application.

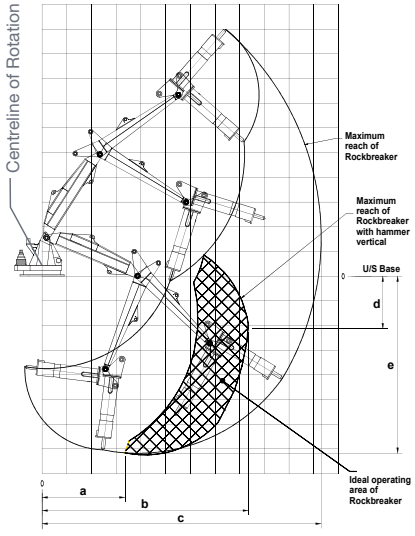
*Multiple pedestal mounted rock breakers in the Pilbara.*

# Reach Profiles: Boomer-HD Series

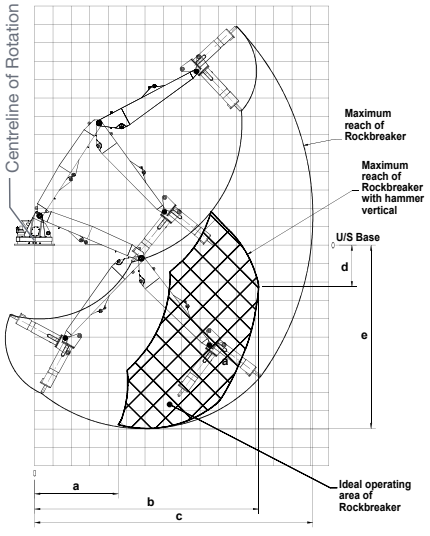
200 Series and larger machines available on request




| BOOMER-HD 100 SERIES | |
|---|---|
| Vertical Reach* | 3.9 to 6.6m |
| Horizontal Reach* | 7.1 to 10.3m |
| Rock UCS | 60~290MPa |




| BOOMER-HD 130 SERIES | |
|---|---|
| Vertical Reach* | 4.0 to 8.5m |
| Horizontal Reach* | 10.3 to 13.6m |
| Rock UCS | 160~320MPa |




| BOOMER-HD 160 SERIES | |
|---|---|
| Vertical Reach* | 9.5 to 11.5m |
| Horizontal Reach* | 15.0 to 17.6m |
| Rock UCS | ~320MPa |

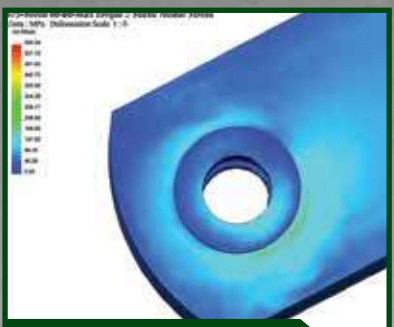
*Measured with hammer in vertical working position

The largest machine installed in Australia at a Pilbara Iron Ore mine.

All Boomer-HD booms are factory acceptance tested at our purpose built facilities.

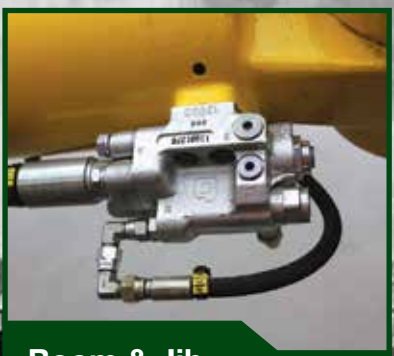
The latest design tools and programmes are employed throughout.

# Boomer-HD Rockbreaker Booms



## Heavy Duty Design

True boom operating loads have been established during years of experience in the field. Testing has allowed Transmin to compare calculated loads with actuals; refining our internal design programs.



## Boom & Jib Locking Kit

*Optional*

Boom and jib locking valves prevent boom and jib collapse if a hydraulic line is severed.

Each valve fitted to the cylinder offers load holding capability, to provide the safest possible solution.

## Heavy Duty Slew

With a large operating arc of 270° and a single or twin high torque planetary gearbox, the BoomerHD Series makes light work of the largest rocks on top of a gyratory crusher or grizzly. The unique slew motion control valve brings the rock breaker to a controlled stop when the slew control is released and delivers optimum torque through the drive train, improving wear rates and reliability.

## Radio Control

Enabling precise movements and maximising user visibility.

## Slimline Controller

For remote operation centres.

BOOMER HD


## Fully Automatic Greasing System

*Optional*

Pins are designed to accept and spread grease where required.

## Atlas Copco Hammers

Offering power and durability with a full range of hammers for any size crushing operation.

## Custom Design

Transmin has the engineering capability to supply custom designed booms able to operate in the harshest of climates, including operating environments in extreme high and low temperatures.

## Custom Designed Cylinders

Transmin cylinders are designed to provide superior strength and extended life under arduous conditions.

All cylinders are specifically built for rock boom applications with special rod coatings and full strength rod end attachment.

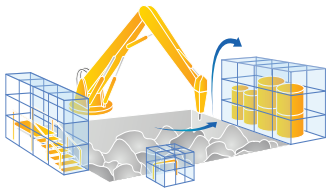
## Taper Lock Bush Assembly

Transmin has designed and developed standardised taper lock bushes. These ensure that the pins remain correctly aligned and prevent any suffering from unforeseen bending loads by gripping radially and axially. This feature often prevents the need for rebuilding and line boring pivot areas in older machines.

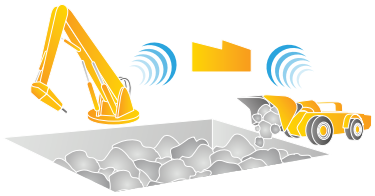
# RockLogic™

## Intelligent Rockbreaker Control

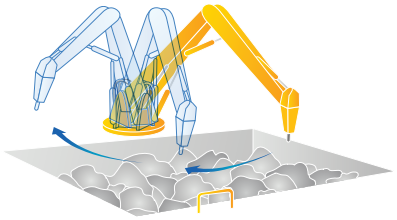
**The RockLogic™ Intelligent Rockbreaker Control System maximises safety, increases productivity and reduces downtime and maintenance costs through the systems' advanced suite of control modules.**



Collision Avoidance



Plant & Process Integration

Automated Movements

Remote Operation

- ✓ **Improve safety and productivity with Remote Operation.** Reduce personnel fatigue and heat stress. Remove personnel from flyrock, dust, noise and vibration hazards.
- ✓ **Control multiple rock breakers from one centralised Remote Location.** For high output mines, multiple rock breakers at different crushing stations can be controlled efficiently from one control centre, improving staff utilisation.
- ✓ **Improve rock breaker efficiency with Automated Movements.** Go to park and deploy positions with the press of a button, minimising crushing delays.
- ✓ **Eliminate site damage with Collision Avoidance.** Prevent unnecessary downtime by eliminating damage to rock breaker and surrounding plant equipment with customised collision avoidance software.
- ✓ **Increase throughput via improved communication between equipment with Plant & Process Integration.** Signals to and from vehicles and plant equipment automatically retract the rock breaker for continuous crushing operation.
- ✓ **Reduce the rock breaker operating costs with Preventative Maintenance.** Smoother rock breaker movements, cylinder sensing, data logging and collision avoidance minimises component wear and dramatically reduces on-site maintenance costs.
- ✓ **Integrate your safety procedures with SafeLogic*.** A tailored programmable safety system with accommodation for isolation gates and E-Stops saves lives. Available as a standalone product.
- ✓ **ZoneLogic* - An economical version of the full automatic system.** Suitable for retrofitting to all existing rock breakers. Provides configurable slew limiting. Create slow down zones to restrict rock breaker speeds.

**Also available as standalone products.*

## The RockLogic™ Core

All RockLogic™ systems (except ZoneLogic and SafeLogic) require the RockLogic™ Core package. This includes all the hardware and engineering required to enable remote rock breaker operation and provides an upgrade path for advanced feature modules.

## MULTI AWARD WINNING SYSTEM EXCELLENCE IN ENGINEERING & TECHNOLOGY

WESTERN AUSTRALIAN INDUSTRY & EXPORT AWARDS 2012 WINNER INNOVATION EXCELLENCE AWARD

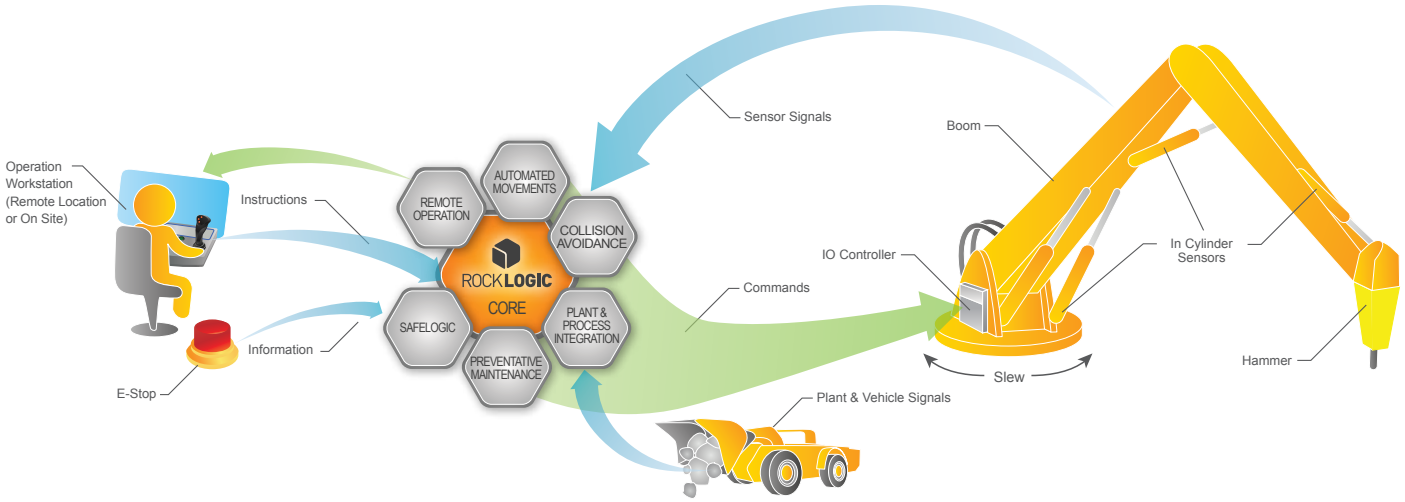
WESTERN AUSTRALIAN INDUSTRY & EXPORT AWARDS 2012 WINNER C.Y. O'CONNOR AWARD FOR EXCELLENCE IN ENGINEERING & TECHNOLOGY

21st WAITTA Winner 2011-12 Innovation

The 2012 iAWARDS

AIM WA WESTBUSINESS PINNACLE AWARDS 2013 WINNER INNOVATION EXCELLENCE


# How Does RockLogic™ Work?




- ✓ Improve safety by eliminating hazards
- ✓ Improve production capacity/throughput
- ✓ Increase rock breaking efficiency
- ✓ Improve staff utilisation and reduce reliance on fifo
- ✓ Reduce downtime and maintenance costs
- ✓ Complete integration with site operations

*The benefits of remote operation*

Operators are removed from the hazardous environment of site and placed into a safe office environment.

A Human Machine Interface (HMI) provides enhanced situational awareness during remote operation.

Transmin's remote operation Slimline Controller.

# Bin Isolation Gates

## Complete Isolation Safety

Isolation gates are primarily fitted to safely isolate downstream equipment such as Low Profile Feeders, belt feeders, screens and apron feeders, so they can be removed or worked on during maintenance site campaigns.

## Hydraulic Power Units

Unique hydraulic power packs with simple local control panels can be built to Transmin or client specifications.

## Diverse Custom Options

Transmin can customise our range of gates to suit a myriad of applications including clamshell, pin gate, metering, divertor or high capacity flow conditions of aggressive materials.

## Single or Double Sliding Plates

Dependent upon the size of the aperture to be isolated, Transmin designs feature either a single-gate plate or double-gate plates, closing from each end and overlapping in the centre.

Gates over approximately 3m long will utilise double plates to optimise the cylinder size to isolate even the largest apertures.

## Wear Liners

Wear liners are fitted for maximum durability and to protect the high wear edges and changes in direction of material flow.

Developed primarily for the needs of the iron ore industry, Transmin designs and manufactures some of the largest bin isolation gates in operation with opening apertures up to 12.0m long by 3.0m wide and materials up to 150mm lump size.

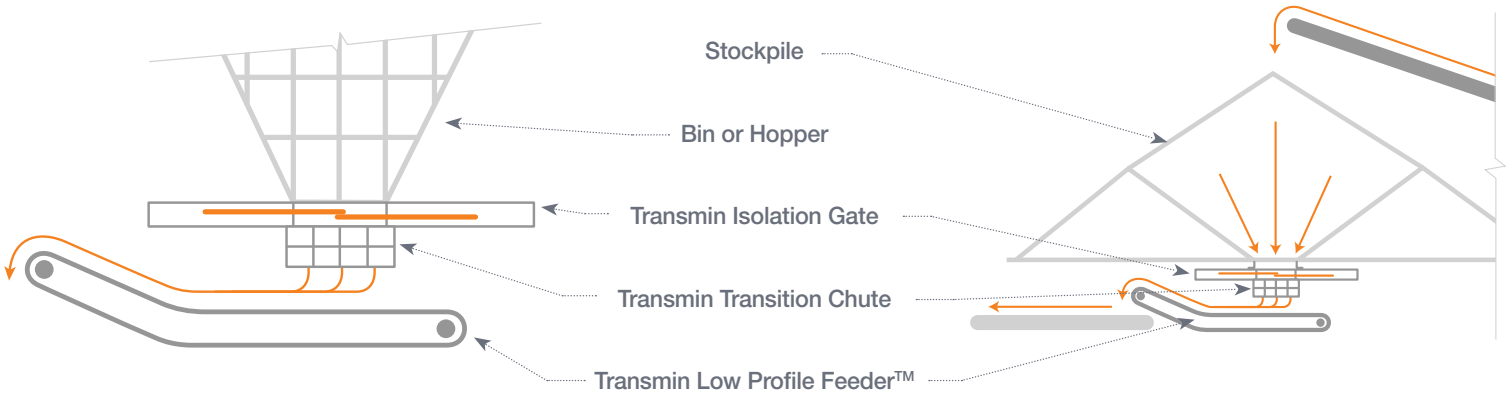
Most designs feature hydraulic operation using Transmin in-house designed cylinders and hydraulic power units. In addition, electric and pneumatic actuation has been supplied on the more lightly loaded duties.

Transmin also has the capability to design special gates including single or double clam shell type gates, diverter or travelling gates and simple rod gates.

*Multiple bin isolation gates on-site in Western Australia.*

## Applications

Primary applications include stockpile outlets, dump hoppers and screen feeding bins.




Ideal for screen house applications, safety isolation gates completely isolate feeders for maintenance.

Clam gate for truck loading, of the single or double clam design, for loading control.

Simple ‘spile’ or ‘rod gate’ designs are also available either manually operated or hydraulically activated.

# Reagent Preparation & Processing

### Processing

Slaking and grinding mills of the roller mounted or vertical type. Grind performance to suit client process requirements.

### Storage

Single or multiple silos dependent upon site storage requirements.

### Wetting

Pre wetting prior to mill for control of dust.

### Receival

Intake of lime via bulk bag or pressurised vehicle.

### Milk of Lime Storage

Tankage is either site built or supplied complete.

### Limestone

Separate limestone grinding facilities available.

*Lime processing plant in Western Australia.*

Transmin has been designing systems for lime processing since 1987. From simple hydrated lime mixing systems, comprising bag breaker and mixing tank, to full quicklime slaking plants and limestone grinding facilities.

A full turnkey service is available from concept development through to design, manufacture, installation and commissioning, including electrical controls and civil works.

On larger projects Transmin can include a package of design and manufacturing drawings for the client to manufacture locally rather than incur the cost of shipping large silos and tanks.

In addition to supplying systems for lime, Transmin has also successfully adapted the concept for cement, dolomite, soda ash, magnesium oxide and other mineral powders and reagents.

For applications requiring very fine grinding less than P80=50micron, Transmin has access to vertical mill technology which can be incorporated into the plant design.

*A large scale bespoke flocculent and reagent preparation system installed in a mineral processing plant.*

## Flocculent Preparation & Other Reagents

Flocculent preparation has been a mainstay of Transmin's business since our inception and extends to multiple reagent systems including guar, starch, depressant, coagulant and frother preparation systems. Transmin has experience in the preparation of liquid solutions for reagents such as soda ash, magnesia, ammonium sulphate, fluorosilicate, xanthate, PAC and other liquids.

## Roller Mounted Ball Mills

Transmin Roller Mounted Ball Mills are a low cost, easily installed and maintained solution for many small capacity wet grinding operations. Designed for either closed or open circuit grinding.

Also available is the new Trunion drive model with a simplified drive mechanism incorporating a Trunion ring on the front face.

Typical Transmin lime silo during installation at a Western Australian gold mining operation.

Dry flocculent powder is transferred to the wetting operation by a screw feeder and blowing line.

Typical Transmin reagent mixing and storage facility, designed and supplied as a stand alone module.

# Ball Charging & Grinding Media Handling

## Automatic Ball Charge Handling Systems

**Safe sorting and handling of grinding media in the range 27mm to 150mm diameter.**

### Safe & Compact Design

A safe and compact design that has a hoist to elevate an opened 200 litre drum of balls and tip the contents into the feeder kibble. Standard kibble capacity is 600 litres.

In the kibble and feed chute the balls are sorted into a single depth for presentation to the slot feeder. Our standard design can handle 30, 52 and 80mm balls simultaneously.

### Self Clearing

A self clearing mechanism is utilised to prevent jamming of balls.

### Meter Rate

The capability to infinitely vary the ball metering rate.

### Alarm Facility

The ball chargers feature an alarm facility to indicate feeder empty or blocked chute.

### Modular Construction

Designed in modular sections comprising storage hopper, kibble chute and either slot or star feeder means all duties can be accommodated.

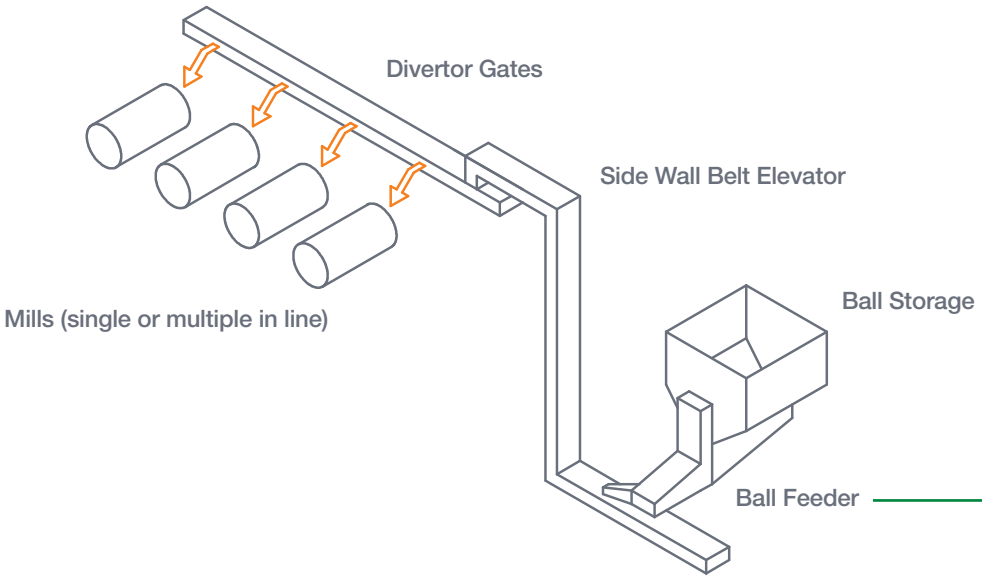
Tonnes of grinding media, normally in the form of steel balls, are consumed by all process plants having mills as part of their comminution process. The handling of heavy steel balls can be a safety issue when drums of balls are hoisted and tipped, often manually, into chutes and mill inlets.

Transmin has a range of systems available to safely store and feed balls from simple kibbles through to complex handling systems comprising of storage hoppers connected to ball feeders of the cassette or 'star feeder' type. These devices can feed directly into mill feed chutes or conveyors which are often the most cost effective solution.

For larger plants we incorporate side wall 'pocket belt' conveyors to elevate the balls within the plant and then transfer to flat belt conveyors incorporating multiple mill feed stations in the form of pneumatic ploughs and gates to feed multiple mills on demand. Recent projects have included feed conveyors over 100m long with up to five outlet ploughs.

*Steel balls diameters 27-150mm*

## Complete Ball Handling Systems from Delivery to Mills




Ball storage capacities to suit mill usage and various ball diameters (27 - 150mm).

Complete systems available from delivery through to mill feed.

Hoist operated kibble option is the simplest solution for low ball consumption.

# Special Products & Projects


*Totally enclosed and dust tight handling of sensitive materials.*

**Transmin also has the ability to undertake the design of special 'one off' products or small projects. Transmin has been producing small to mid size turnkey projects since 1987, by drawing upon the broad experience of our engineers and designers. Most of these projects are related to materials handling and can cover very diverse areas such as:**

- Conversion of ships for the export trade.
- Stainless steel 'en-masse' chain conveyors for ammonium nitrate handling on a mine site.
- High capacity bucket elevators for grain – up to 1200tph.
- Travelling spoon chutes for iron ore.
- Tubular vibrating conveyors for hot mineral sands.
- Telescopic container loading conveyors.
- Special divertors for up to 4000tph of iron ore.
- High temperature chain conveyors and bucket elevators for calcined materials.
- Stainless steel screw reclaimers for iron ore slurry.
- Clay handling equipment.
- Gravity discharge chain and bucket elevators for large lumps of nickel slag and revert.
- Multi shaft screw feeders for difficult materials or 'live bottom' bin applications.
- Open top container rotating plants, including lid lifters.
- Special 'weigh auger' screw feeders.
- Asphalt handling plants and hot mix-out loading systems.

*Ammonium nitrate prill intake and storage facility.*

Specialist or high capacity bucket elevators.

High temperature handling solutions. In this case, quicklime up to 600°C.

Small to medium size materials handling projects, design and install.

Special purpose grapples based on Transmin pedestal boom technology.

Complete bulk intake and storage facilities.

Special screws and feeders for difficult applications.

## Engineering Services

Allied to the ability to undertake special designs, Transmin also makes itself available for the provision of engineering services and often participates in on-site reviews, inspections, risk assessments. Please contact us for more information on the type of engineering services we could provide to your company.

# Special Products & Projects *Cont.*

## Additive Bins in Brick Works

Due to complex flow ability issues, some materials require a special design of storage bin to ensure proper extraction. In this example, damp sawdust with poor flow characteristics required a negative wall angle and a special rotary discharger having an arch breaking arm rotating around the inside of the lower cone to promote and sustain flow.

### Bin Activators

Transmin has a standard range of vibratory bin activators from 1200mm diameter to 3660mm diameter, plus the capability of designing bespoke models for difficult materials or odd sizes. The unit shown is 3660mm diameter and is fitted to a large lime silo at a nickel processing plant.

### Asphalt Handling/Storage

The handling of asphalt or hot-mix is difficult because the material is sticky, abrasive and must be kept at a high temperature to avoid going hard. Transmin has provided a number of systems for asphalt, with the storage bins being lagged and heated in some cases.

### Even Feed Rotors

Even feed rotors can be fitted to a variety of feeder devices for the purpose of eliminating surging at the discharge point of slow speed feeders. Typically used for poor flowing materials.

# Clay Handling

A series of belt conveyors handling clay was part of a much larger project undertaken by Transmin in 2007 at a Western Australian brick works. Transmin was responsible for the complete design, supply, installation and commissioning of all clay and additive handling equipment as part of a new kiln installation project.

## Clay Surge Bin (Pictured)

A special design of bin hopper for sticky recycled material which needed to be kept live and moving. It incorporated a belt feeder to transfer the product back into the processing stream in metered quantities.

## Divertor for Iron Ore (Pictured)

The client requested a special solution to divert a stream of iron ore at 4000tph two ways and commissioned Transmin to provide a suitable machine, which was actuated by a hydraulic system.

## Circle Feeder for Difficult Materials

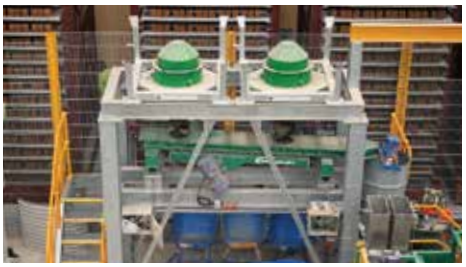
When difficult materials need to be discharged from bins and hoppers to a number of outlet streams, the circle feeder becomes a viable option, in this case three separate systems.

## Divertor Knife Gates (Pictured)

A series of divertor chutes and gates were provided to a nickel refinery handling toxic dust in the re-circulatory circuit.

## MHP Bagging Plant (Pictured)

The complete bagging plant for nickel concentrate at a processing plant in Western Australia.



## Additive Handling

Additives are often difficult to handle, various additive handling systems are available for a variety of industrial and mining processes.

# // TRANSMIN SERVICING

Transmin's dedicated and highly trained Service division supports mining and materials handling operations throughout Australia.

We provide comprehensive on-site and offsite servicing of both Transmin and third party OEM equipment.

# On-Site Services


**Transmin specialises in a range of on-site services and engineering solutions;**

- Equipment repairs and refurbishments *(see p36 for equipment range)*
- Equipment component change out *(Transmin Parts division)*
- Major equipment overhauls
- Hard-face welding repairs
- Fixed plant audits
- Shutdown maintenance
- Strategic maintenance services
- Plant de-bottlenecking services

*Hydraulic rock breaker boom servicing*

## Transmin Service Fleet

Transmin on-site services are supported by our dedicated on-road fleet of highly skilled and qualified service technicians and tradespeople.

The Service fleet is on call every day, supported by Transmin's experienced Engineering division in Perth.

*Mineral sizer repair work on-site in the Pilbara.*

## Maintenance Contracts

Transmin adopts a project-management approach to every service job. Our all-round capability means that your service work is managed every step of the way by a dedicated Transmin project manager, in conjunction with on-site Transmin service technicians and our dedicated Parts division. We ensure every job is carried out on time, and on budget - keeping your operation running with zero or minimal downtime.

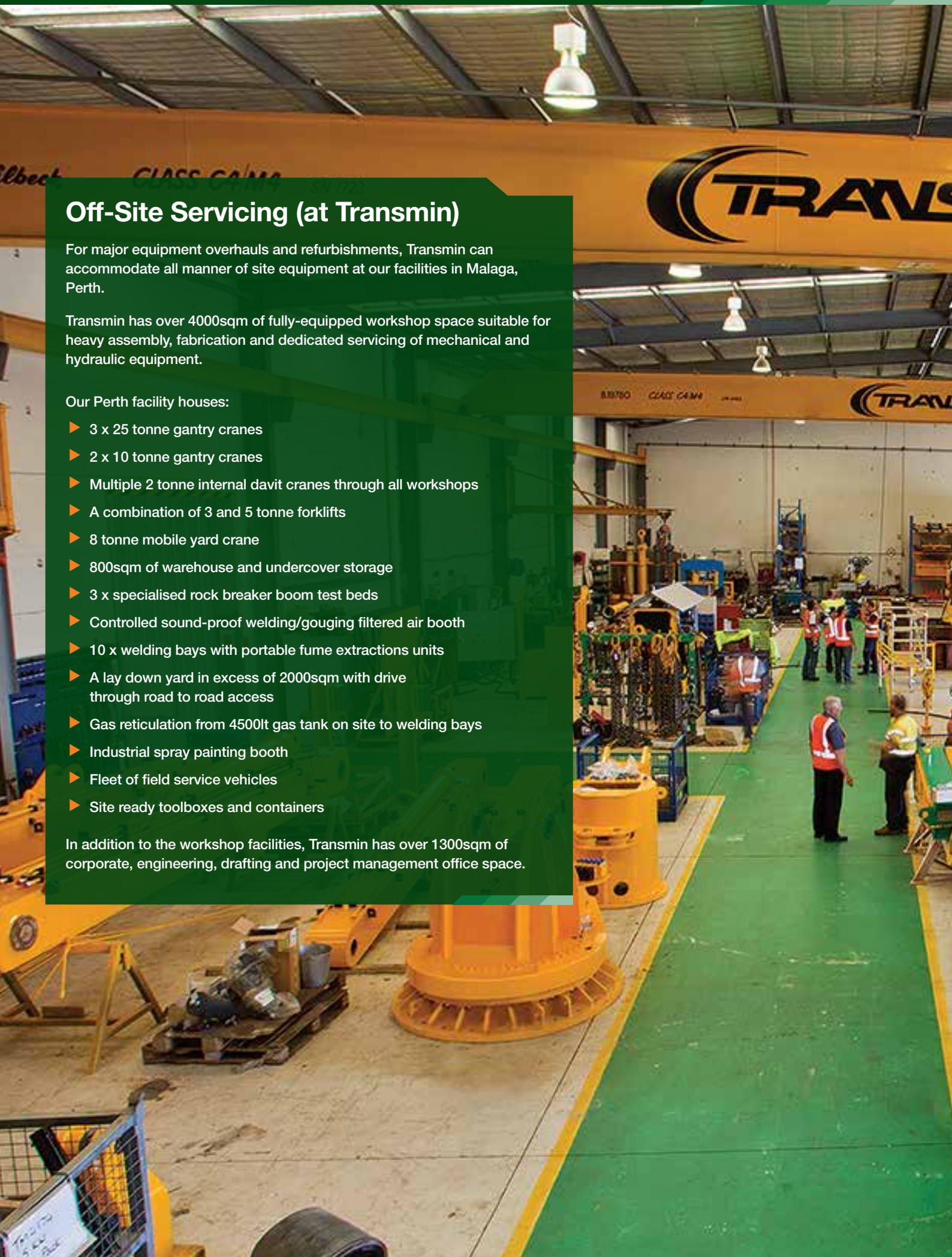
## Parts Division

Transmin's Parts division is your one-stop-shop for all Transmin original equipment replacement parts as well as third party equipment parts – we can source and supply these too.

Parts availability is paramount to the ongoing operation of every site. Transmin can source and supply a huge range of replacement parts quickly and cheaply, with most Transmin equipment parts kept in stock.

Our dedicated Parts team is on-hand every day to assist sites right across Australia.

# Off-Site Services



## Off-Site Servicing (at Transmin)

For major equipment overhauls and refurbishments, Transmin can accommodate all manner of site equipment at our facilities in Malaga, Perth.

Transmin has over 4000sqm of fully-equipped workshop space suitable for heavy assembly, fabrication and dedicated servicing of mechanical and hydraulic equipment.

Our Perth facility houses:

- 3 x 25 tonne gantry cranes
- 2 x 10 tonne gantry cranes
- Multiple 2 tonne internal davit cranes through all workshops
- A combination of 3 and 5 tonne forklifts
- 8 tonne mobile yard crane
- 800sqm of warehouse and undercover storage
- 3 x specialised rock breaker boom test beds
- Controlled sound-proof welding/gouging filtered air booth
- 10 x welding bays with portable fume extractions units
- A lay down yard in excess of 2000sqm with drive through road to road access
- Gas reticulation from 4500lt gas tank on site to welding bays
- Industrial spray painting booth
- Fleet of field service vehicles
- Site ready toolboxes and containers

In addition to the workshop facilities, Transmin has over 1300sqm of corporate, engineering, drafting and project management office space.




## Our Service Guarantee

Transmin workshop facilities, combined with our engineering, drafting and underlining QA/QC and safety commitments, insures that work practices are completed to the required customer, industry and Australian/NZ Standards.



## Controlled Gouging and Welding

Transmin's QA focus insures that all welds are qualified to the identified Australian/NZ Standards and are completed by fully qualified and experienced welders.



## Dedicated Paint Shop

In addition to full fabrication capabilities, Transmin has a dedicated paint shop which allows for complete management of painting quality and schedules.

# Equipment We Service

## Transmin and other OEM Equipment

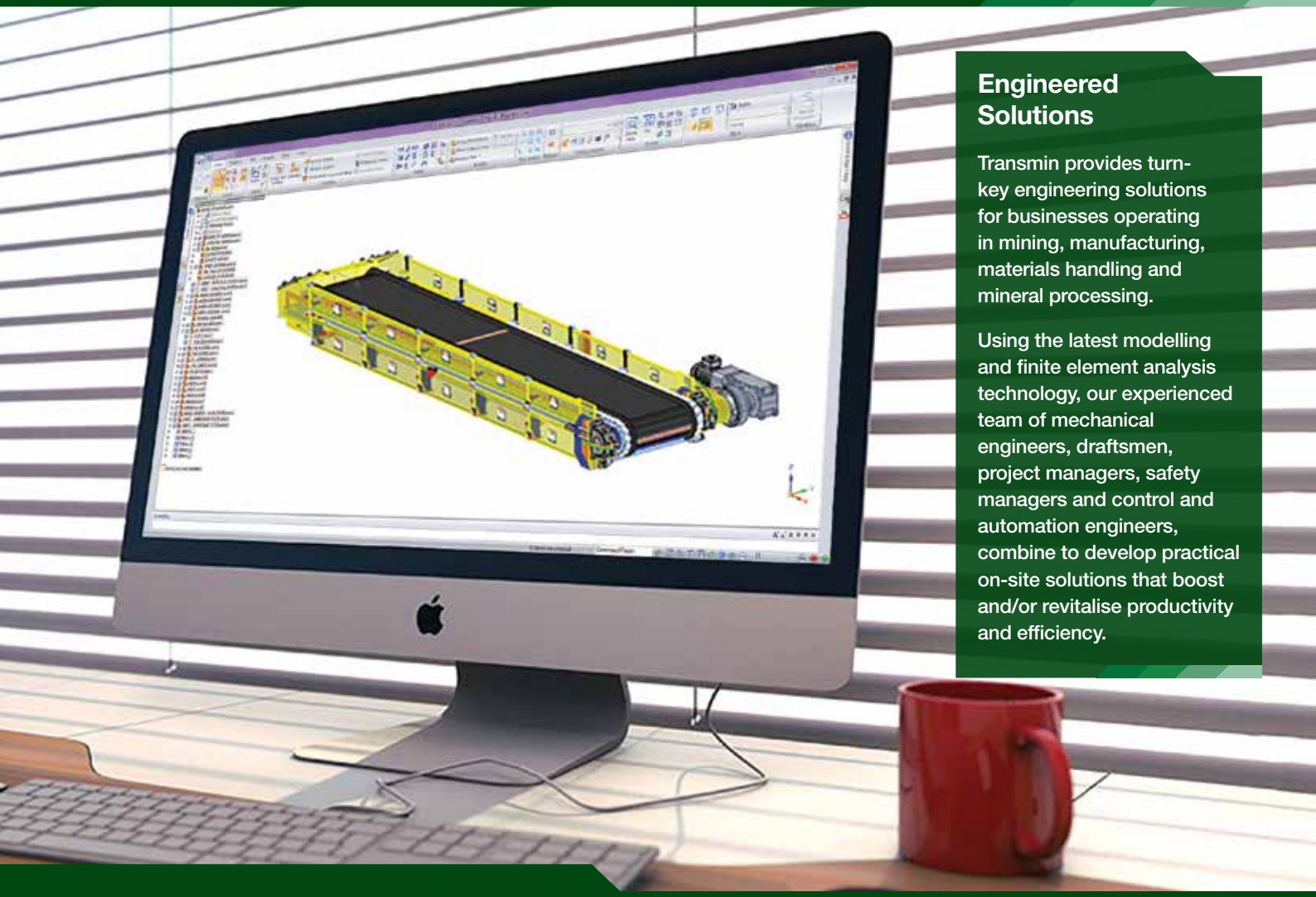
Transmin has the capability to repair and service a wide range of mechanical and hydraulic equipment - both Transmin equipment and third party OEM equipment.

The range of equipment we service includes;

- Feeders and Conveyors
  - Belt Feeders
  - Apron Feeders
  - Screw Feeders
  - Vibratory Feeders
  - Circle (Table) Feeders
- Hydraulic Boom Systems & Attachments
  - Hammers
  - Grapples
- Mineral Sizers & Crushers
  - All makes and models
- Hydraulic Cylinders
- Ball Mills
- Ball Chargers
- Bin Activators
- Bin Gates
- Bucket Elevators
- Industrial Shredders
- Lime Preparation Plants
- Flocculent & Reagent Processing Plants
- Rotary Valves
- Belt Scales
- Density Gauges
- Tilt Switches

Low Profile Feeder™

# Engineered Solutions



## Engineered Solutions

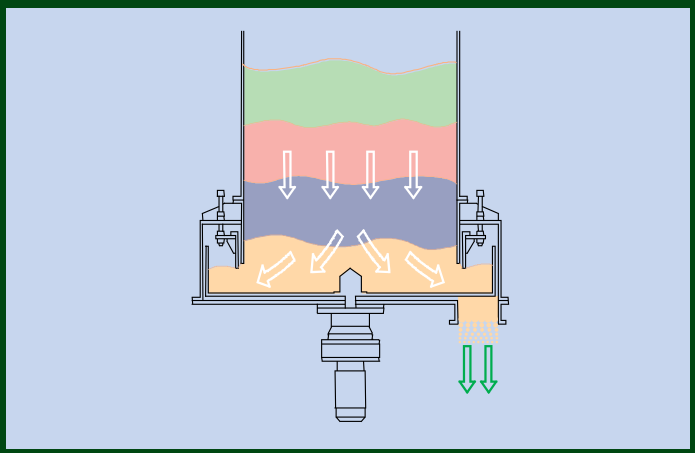
Transmin provides turn-key engineering solutions for businesses operating in mining, manufacturing, materials handling and mineral processing.

Using the latest modelling and finite element analysis technology, our experienced team of mechanical engineers, draftsmen, project managers, safety managers and control and automation engineers, combine to develop practical on-site solutions that boost and/or revitalise productivity and efficiency.


## Systems Integration

When all the cogs in a machine operate in perfect harmony, true efficiency is achieved. Using automated sensor technology, Transmin can develop systems to aid plant and process integration; increasing throughput by minimising lag times.

Transmin's Rocklogic™ system can be used to send signals to and from vehicles and plant equipment (for example rock breakers and loaders), alerting as to proximity and operational readiness, to achieve continuous throughput.



## De-Bottlenecking

Existing brown-field operations that have expanded, often rapidly over a short space of time, can suffer the associated growing pains of 'systems bottlenecking', as newly required capacity exceeds outdated systems and plant equipment. The resulting delays in productivity can damage the bottom line of any business. Transmin's experienced team of engineers will assess your overall operation before specifying the solutions required to relieve the productivity blockage, and realise plant potential.

# Agency Equipment


*An A-Ward container tilter in action*

## Agency Equipment

Transmin is the authorised Australian distributor and sales agent for a select number of prominent industrial equipment brands operating throughout various world markets.

A-WARD

RotaVaL

thermo scientific

YOSHIKAWA

BERCO
AUTHORIZED
DEALER

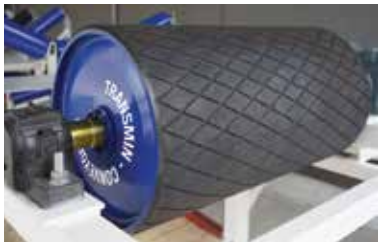
# ConveyorPro *Agency Line*

## ConveyorPro

If you're looking for 'everything conveyors' – look no further. Transmin's new ConveyorPro range is a full-service, 'one-stop-shop' for any business operating conveyors and feeders. Our range caters to all sizes across all industry sectors – from heavy-duty overland mining and materials handling, to precision pharmaceutical.

Most suppliers specialise only in parts and fittings. ConveyorPro however, is backed by Transmin's 30 year-long history and trusted world-wide reputation in engineering, fabrication, project management, installation and ongoing after-sales service and support.

Our standard parts and equipment range has been carefully compiled to include everything from belt and chain, to idlers, pulleys, tools, cleaners and scrapers, calibration systems and tramp detection/removal systems. We can also provide custom fabrications on most parts and consumables.

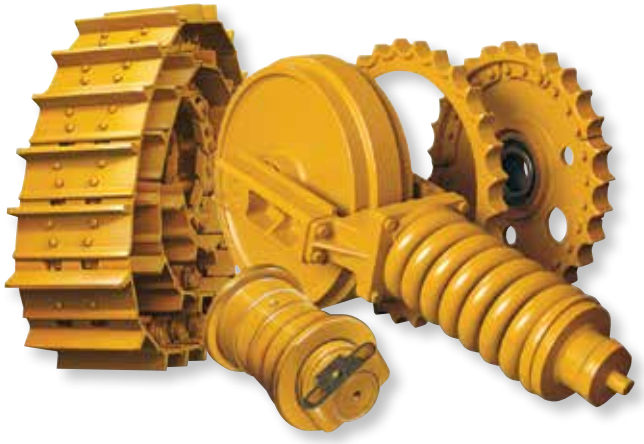


# Berco *Agency Line*

## Berco Track Chain for Apron Feeder and Mobile Plant

Transmin is an official Australian distributor of Berco track chain and componentry, including links, sprockets, bearings, pulleys, pins and rollers. As an official distributor, Transmin can offer highly competitive pricing, as well as superior service and support across the entire Berco range.

AUTHORIZED DEALER



# RotaVal *Agency Line*

## RotaVal Rotary Valves

Transmin is the Australian distributor of the RotaVal brand of quality rotary valves, blowing seals and divertors. From bulk minerals handling to the finest of industrial materials, RotaVal has a rotary valve for your application. Common applications use the HD range, with more arduous duties using the upgraded EHD range. For light duty non aggressive applications there's the low-cost medium duty XGD range up to 250mm diameter.

Transmin has a vast number of options to allow for fine-tuning of valve specifications in order to meet individual product characteristics, including food and chemical grade applications, so please contact Transmin direct if you are unsure of your requirements and we will find the right valve for your application.

Using the same basic design principles and the extensive range of options found in RotaVal's rotary valve range, a full range of blowing seals offer efficient and secure product entrainment in vacuum, lean and dense phase pneumatic conveying systems.

# A-Ward *Agency Line*

## A-WARD Container Tilters

Transmin is the Australian distributor for the A-WARD range of ISO Sea Container Tilters. Bulk products are increasingly being transported in bulk sea containers which need both to be filled at point of origin and emptied at destination point of delivery. The A-WARD 'Mi-Tilt' range comprises of a versatile series of tilters which can remove 20ft or 40ft sea containers from trucks, open the doors and tilt for discharge or filling.

Transmin has incorporated these units within small projects undertaken in the field of materials handling including a facility for the bagging of a nickel based concentrate in southern Western Australia. Transmin also sell the A-WARD 'Mi-Slide', the smart horizontal loader for 20ft and 40ft sea containers, a unique device for safely and efficiently filling sea containers with bulk products.


## Thermo Scientific Material Analysis and Measurement

Transmin is an authorised Australian distributor of the Thermo Scientific range of conveyor belt scale systems, tramp metal detectors, mercury free tilt switches and control units and density gauges.

### Belt Scales

Thermo Scientific is the world's largest provider of conveyor belt scales and electronic integrators. The rugged construction and leading edge design of the Thermo Scientific Ramsey belt scale range has delivered reliable performance and provided unmatched versatility for over 50 years.

All belt scale systems in the range allow you to monitor production output and inventory, or regulate product loadout, while providing vital information for the effective management and efficient operation of your business.


### Tilt Switches and Control Units

This rugged, abrasion-resistant tilt switch is actuated when material rises to tilt the probe 15 degrees or more from its vertical position. These switches are precisely positioned so that, regardless of the direction of tilt, its normally closed contacts will open. Various probe assembles are available to suit applications utilising an array of materials in a wide range of environmental conditions.

### Density Gauges

The Thermo Scientific DensityPRO NAI Gauge is a non-contacting nuclear density gauge that offers accurate process material density measurements within a ruggedized housing designed for challenging applications.

The DensityPRO NAI offers flexibility, durability and precision in order to enhance the efficiency of industrial processes. The NAI gauge is designed to withstand varying conditions and ensure the protection of the source.

# Thermo Scientific *Agency Line*

## Weight Belt Feeders

Thermo Scientific are one of the world's largest providers of conveyor weigh belt feeders. Their rugged construction and leading edge designs have ensured reliable performance and provided unmatched versatility for over 50 years.

Transmin are an official distributor of Thermo Scientific Weigh Belt Feeders throughout Australia. The Thermo Scientifc range includes the Ramsey 90.100, 90.125 and 90.150 weigh belt models.

Each model provides a consistent flow of material, offers increased sensitivity for more accurate weighing of the lightest materials, and permits quick and easy cleaning and maintenance.

Each system has four major components: integrator, weighbridge, belt speed sensor and load cell digitizer.


# Yoshikawa *Agency Line*

## Yoshikawa Circle Feeders

Transmin is an authorised Australian distributor of the Yoshikawa range of circle feeders. Yoshikawa Corporation was established in 1954 in Sendai City, Kagoshima, Japan. Today the company has grown to become the world-wide leader in circle feeder technology.

Circle feeders are a highly innovative and effective alternative to traditional belt and screw feeders. Thanks to their circular motion, they guarantee consistent draw-down of materials – ensuring 'first-in, first-out', whilst removing the risk of material 'bridging' and 'sludging'. They also allow the potential for multiple material inlet/outlet points.

The result for many clients is a more efficient, more flexible handling operation that experiences reduced material wastage and spoiling, a more reliable flow, and improved space-saving efficiencies. All of which can have a positive impact on the bottom-line.

Yoshikawa Corporation manufactures circle feeders for virtually any commodity or material – from coal, to powdered chemicals, from food, to feathers. Each feeder is engineered to the specific attributes of the material being handled, with feeder diameters ranging from 30cm through to 4m.

YOSHIKAWA

TRANSMIN EQUIPMENT

**Committed** to being a
**world class supplier** and **service** provider
recognised for **integrity** and **innovation**

***www.transmin.com.au***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Western Australian Industry & Export Awards 2012 WINNER Innovation Excellence Award

Western Australian Industry & Export Awards 2012 WINNER C.Y. O'Connor Award for Excellence in Engineering & Technology

The 2012 iAWARDS

AIM WA WESTBUSINESS PINNACLE AWARDS 2013 WINNER Innovation Excellence

Work Safety Awards 2014 Finalist

Committed to being a world class supplier and service provider recognised for integrity and innovation

TRANSMIN