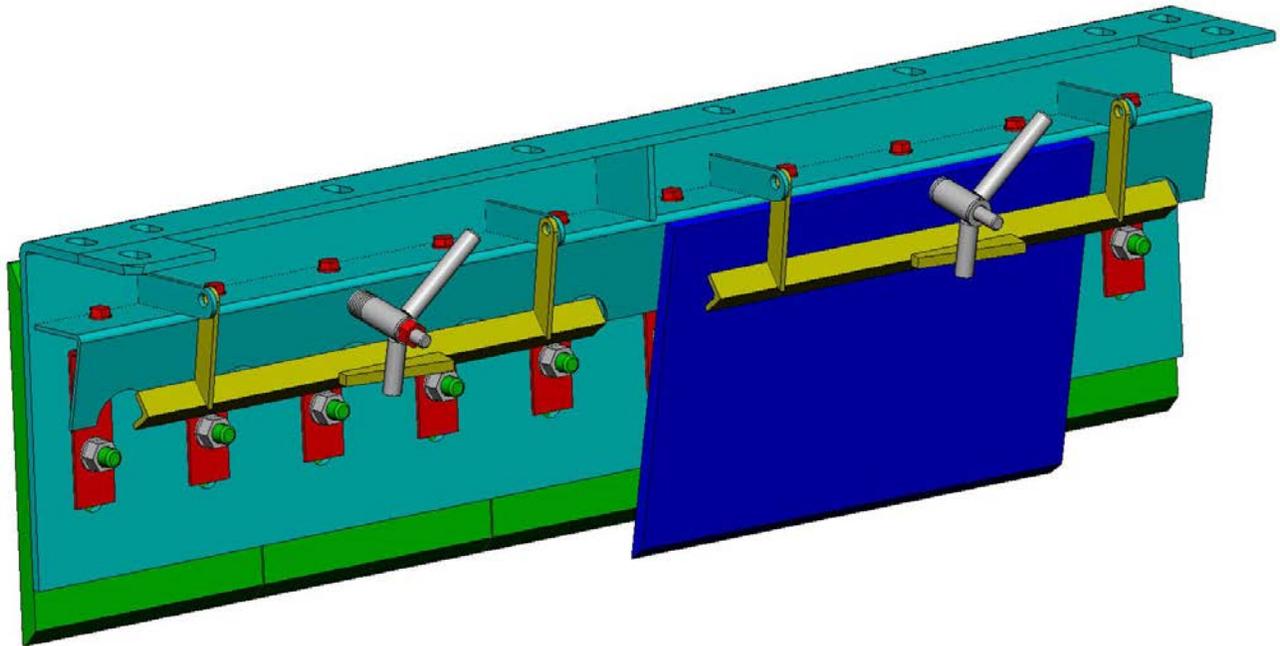




EASY MAINTENANCE SKIRTING

HB1436

- *INSTALLATION* -
 - *OPERATION* -
 - *MAINTENANCE* -
- MANUAL*



PROTECTED BY:-
AUSTRALIAN PATENT No: 714374

CUSTOMER: FORTESCUE METALS GROUP
 WORLEY PARSONS

PROJECT: FMG PORT EXPANSION PROJECT
 T155: PORT

P.O. No: 505PP0033

DOC No: 505PP0033-00010-IM-QA-001

REV No: 0



H & B MINING SERVICES

**- INSTALLATION -
- OPERATING -
- MAINTENANCE -
MANUAL**

CLIENT	FORTESCUE METALS GROUP WORLEY PARSONS
PROJECT/SITE	FMG PORT EXPANSION PROJECT T155: PORT
SUBJECT	EASY MAINTENANCE DUST COVER
H & B CONTRACT No	HB1436
CLIENT PURCHASE ORDER No	505PP0033
CLIENT DOCUMENT No	505PP0033-00010-IM-QA-001
REVISION No	0



H & B MINING SERVICES

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SECTION 2	OPERATION & MAINTENANCE
SECTION 3	EASY MAINTENANCE SKIRTING SYSTEM DATA
SECTION 4	H&B MINING SERVICES INFORMATION
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SECTION 1 INTRODUCTION & INSTALLATION

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INTRODUCTION TO THE EASY MAINTENANCE SKIRTING SYSTEM

H & B Mining Services have pleasure in providing general information and specification for the Australian designed and supplied Easy Maintenance Skirting System.

The Easy Maintenance Skirting System is manufactured by H & B Mining Services under license from Gary Braithwaite and Eddy Hodgkinson who own the Australian Patent No 714374 for the system.

The Easy Maintenance Skirting System was conceived and designed in Australia by the proprietors of H & B Mining Services in conjunction with the maintenance crews of several of the country's foremost mining companies.

Many of the unique design features of the E.M.S. Skirting System were designed to overcome the problems associated with existing systems. These problems were brought to light during discussions with maintenance personnel.

The major maintenance friendly features of the E.M.S. Skirting System include:

- Installing and adjustment of skirt rubber now a one man operation.
- Skirt rubber secured by manually operated handles. No tools required.
- Fixed wedges eliminate problems associated with regular loose wedges. (Lack of room to hammer wedges in and out, or wedges becoming dislodged.
- Liner bolts can be accessed with an impact wrench simply by removing skirt rubber.
- Fixed hinge clamp bars remain in position on the skirt panel. They cannot be lost or damaged.
- Skirt panels are custom designed to suit the clients preferred standard liner plates.
- Liner adjusters allow easy vertical adjustment of liner plates.



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- E.M.S. Skirting System can be supplied in full panels or the clamping units only can be supplied to fit onto clients existing standard skirt panels.
- E.M.S. Skirting components are supplied hot dip galvanized as standard.
- The E.M.S. Skirting System can accommodate either curved or straight skirt rubber profiles.

The Easy Maintenance Skirting System is designed for both new and existing installations and as a result of the versatility of the design; it can be utilized on any conveyor system.



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EASY MAINTENANCE SKIRT COMPONENTS

WHY THE EASY MAINTENANCE SKIRTING SYSTEM WAS DEVELOPED

The system was developed to meet the need of a simple and quick method of maintaining and/or replacing worn out conveyor skirting rubber from skirted transfer points. The easy maintenance skirting system has met this requirement providing a single man operation for the maintenance of the skirt rubber and skirt liner plates.

DESIGN/COMPONENTS (SEE 3D DIAGRAM ON PAGE 8)

The design of the easy maintenance skirt system incorporates the following components;

1. SKIRT PANEL

- The skirt panels have been designed to suit the eco-light standard skirt liner type EL-PC-18-SL1 which has a nominal length of 300mm.

2. SKIRT RUBBER SUPPORT PLATE

- The skirt rubber support plate (bent plate) supports the E.M.S. skirt handles, E.M.S. skirt clamp assemblies and skirt rubber.

3. CLAMPING BAR ASSEMBLY

- Hinged to the skirt support plate the clamping bars remain permanently on the skirt panel.
- The wedge is welded directly onto the clamping bar and cannot become dislodged.
- Stainless steel bolts with nyloc nuts to hinges ensure hinges don't become seized with rust.

4. CLAMP HANDLE

- Clamp handle provides direct clamping pressure to the wedges. Hand operated levers are supplied so no tools required.
- The use of stainless steel bolts with nyloc nuts ensure handles don't become seized with rust.

5. SKIRTING RUBBER

- The conveyor skirt panels are designed to accommodate 50/60 duro 220 x 16 thick skirt rubber which ensures a constant dust seal along the length of the transfer.

6. LINER ADJUSTER ASSEMBLY (see page 13)

- A bent plate with a threaded hole and an M12 set screw forms the design which is the liner adjuster assembly. The bent plate creates a housing for the skirt liner bolt, while the M12 set screw, when rotated, acts against the horizontal surface of the skirt rubber support plate. Thus, moving the housing plate vertically up or down, depending on the rotational



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direction. This action allows maintenance crews to adjust the vertical position of the skirt liner.

- Once positioned and liner bolts tightened, the adjuster prevents the liner plates slipping down the slotted holes in the skirt panel.

7. SKIRT LINER PLATES

ECO LIGHT STANDARD CAST LINER PLATES TYPE 'EL-PC-18-SL1'

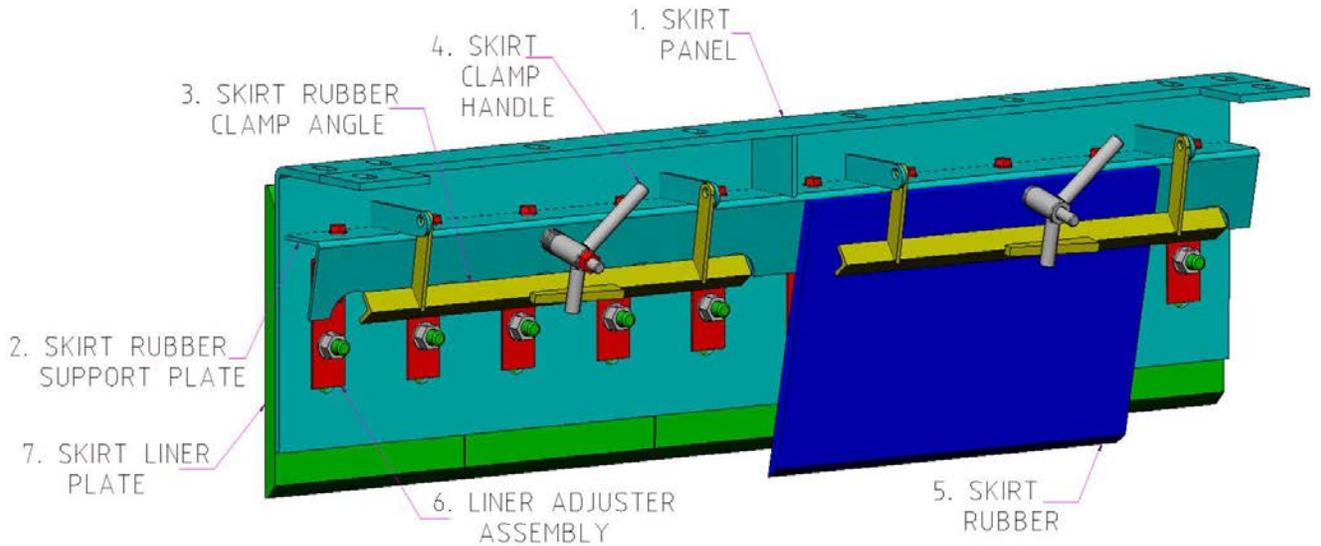
- 300 x 32 thick x 300 long ni-hard 4. (c/w 45° chamfered edges top and bottom)
- Holes located centrally to allow liner to be turned 180°.
- Three M20 class 8.8 commercial hex head bolts c/w hex nut and flat washer per liner.



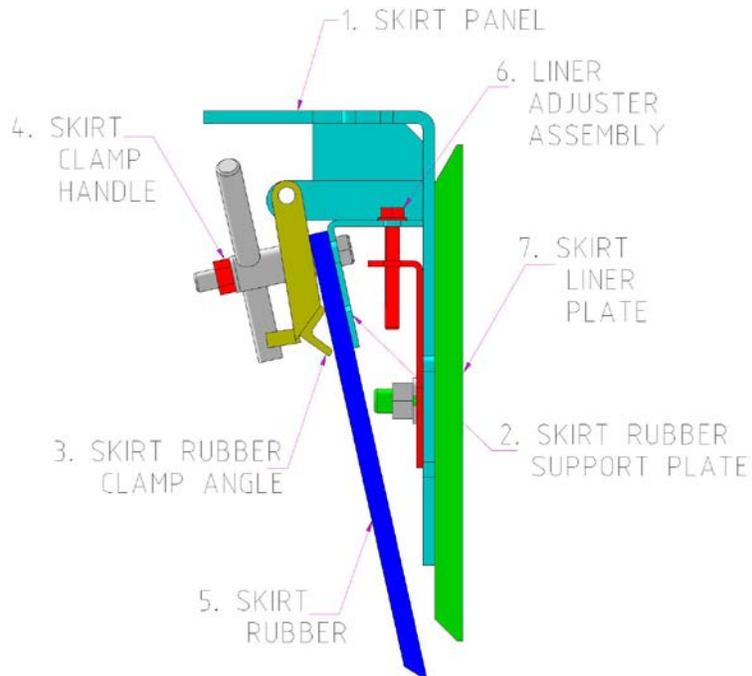
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EASY MAINTENANCE SKIRT COMPONENTS

CONVEYOR SKIRT FITTED WITH STRAIGHT SLOPING SKIRT RUBBER



SECTION THROUGH SKIRT





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INSTALLATION

- (a) All of the E.M.S. skirt panels are supplied to site fully assembled with the E.M.S. handles, E.M.S. clamp assemblies, liner adjusters and liner plates.
- (b) The skirt rubber is supplied in 30m long rolls. This should be installed in one continuous length of the transfer where possible.
- (c) Easy maintenance skirt panels are to be fixed to installed guard posts via skirt outriggers. Use M20 hex head grade 8.8 bolts x 50 long.
- (d) Bolt interconnecting skirt panels together using M20 x 50 long class 8.8 hex head bolts.
- (e) All care has been taken during the shop assembly stage of the skirt panels to ensure that the clamp handle and clamp angle hinge bolts are correctly tightened. The handles and clamp angles should be reasonably stiff to move by hand. If they have become loose during transportation, refer to the "operation/maintenance" section of this manual for the correct adjustment procedure.
- (f) Adjust the skirt liner plate height prior to installing the skirt rubber, as described in the "operation/maintenance" section of this manual.
- (g) For further installation procedures of liner plates and skirt rubber refer to the "operation/maintenance" section of this manual.
- (h) Skirt panels should be lifted via the holes in the skirt top flange, the end plates or by placing hooks under clamp assembly support plate.



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SKIRT PANEL MASSES FOR ERECTION PURPOSES		
PANEL TYPE	LINER TYPE FITTED	TOTAL MASS PER PANEL (WITH LINER)
EMS SKIRT x 3m LONG	EL-PC-18-SL1	310 Kg



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SECTION 2 OPERATION & MAINTENANCE

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OPERATION AND MAINTENANCE

SKIRT LINER PLATE ADJUSTMENT

IMPORTANT SAFETY NOTICE!

Prior to commencing any installation, operation or maintenance of the E.M.S. skirt panels and associated components – all site standard inductions, access permits, shut down permits, JHA's take five check lists, conveyor/equipment isolation and lock-out procedures must be completed and adhered to for duration of the task.

Slotted holes are provided in the E.M.S. skirt panels to allow vertical adjustment of the liner plates up or down. Maximum 25mm upward, 40mm downward adjustment.

Two liner adjuster assemblies are provided per liner plate to ensure that the liner plates cannot slip down to the bottom of the slotted holes, should the skirt liner bolts become loose.

The liner adjuster assemblies also provide the means of raising and lowering the liner plates from the outside of the skirts.

To adjust the skirt liner plates:-

1. Remove the skirting rubber as described on page 14.
2. Using a standard impact socket on an extension bar, loosen the M20 skirt liner bolt nuts.
3. Vertical height of liner can be adjusted via rotating the M12 set screw in the appropriate direction. See page 13.
IMPORTANT: Main liner bolt nuts must be loosened to achieve vertical movement.
4. Use a 3mm spacer to determine the gap between the liner and the conveyor belt. The spacer should be inserted below the liner at a point above a carry idler.
5. Once the liner is at the correct height, retighten the liner bolts and check that the liner has remained at the required height.
6. Reinstall the skirt rubber.



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OPERATION AND MAINTENANCE

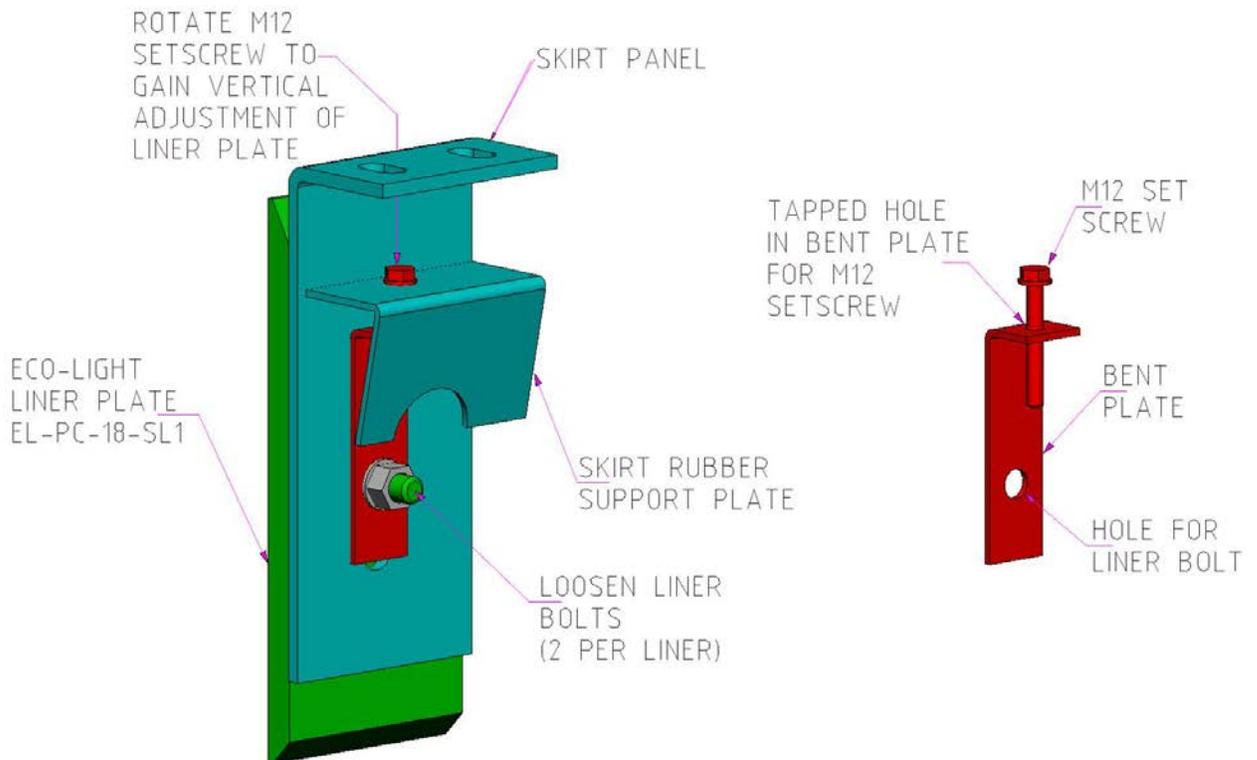
SKIRT LINER PLATE ADJUSTMENT

IMPORTANT SAFETY NOTICE!

Prior to commencing any installation, operation or maintenance of the E.M.S. skirt panels and associated components – all site standard inductions, access permits, shut down permits, JHA's take five check lists, conveyor/equipment isolation and lock-out procedures must be completed and adhered to for duration of the task.

A gap of 3mm should be maintained between the skirt liner plates and an empty running belt.

LINER ADJUSTER



Removal of skirt rubber will allow access to inspect condition of skirt liners and gap between liner and conveyor belt.



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OPERATION AND MAINTENANCE

SKIRT RUBBER ADJUSTMENT/REPLACEMENT

IMPORTANT SAFETY NOTICE!

Prior to commencing any installation, operation or maintenance of the E.M.S. skirt panels and associated components – all site standard inductions, access permits, shut down permits, JHA's take five check lists, conveyor/equipment isolation and lock-out procedures must be completed and adhered to for duration of the task.

The E.M.S. skirt panels supplied for the conveyors are designed to facilitate a continuous 220 x 16 thick 50/60 duro skirt rubber held in a straight rigid profile. The chamfered bottom edge of the rubber forms the seal between belt and skirt rubber.

Whilst providing a secondary seal for the skirting system the straight rigid skirt rubber maintains its profile allowing any poor tracking belt to move past it without any interference.

To replace the skirt rubber the following procedure should be adopted: (see also page 16)

- Loosen all skirt clamp handles, disengaging handle from clamp wedges.
- Pivot all clamp angles away from the skirt rubber (the M12 hinge bolts and nyloc nuts should allow movement by hand yet be sufficiently tight as to allow the clamp angle to remain in the upper position without support).
- Remove and discard existing worn skirt rubber.
- Lay new skirt rubber along belt (skirt rubber should be continuous for full length of transfer).
- Starting at one end, lift the skirt rubber into place and hold there by lowering the first clamp angle to contact with the skirt rubber.
- Continue lowering the clamp angles for the entire length of the transfer. (The small gaps between the clamp angles allow the skirt rubber to be temporarily held in place with one hand, whilst lowering the clamp angles with the other hand). The procedure therefore becomes a one man operation.



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- Once the skirt rubber is in position and all clamp angles are lowered, engage all the clamp handles with the wedges and hand tighten.
- If a firmer clamping force is required, the handles may be tapped with a hammer.

To adjust the vertical height skirt rubber:

- Loosen all skirt clamp handles so they are disengaged from the clamp wedge.
- Pivot all clamp angles SLIGHTLY away from the skirt rubber. This slight movement of the clamps should allow the skirt rubber to drop down onto the belt creating the secondary seal. If not then manually push the skirt rubber down onto the belt.
- Starting at one end push the clamp hard up against the skirt rubber and rotate the handle so it engages with the clamp wedge.
- Perform this task on all clamps ensuring that the skirt rubber is fixed firmly in place.

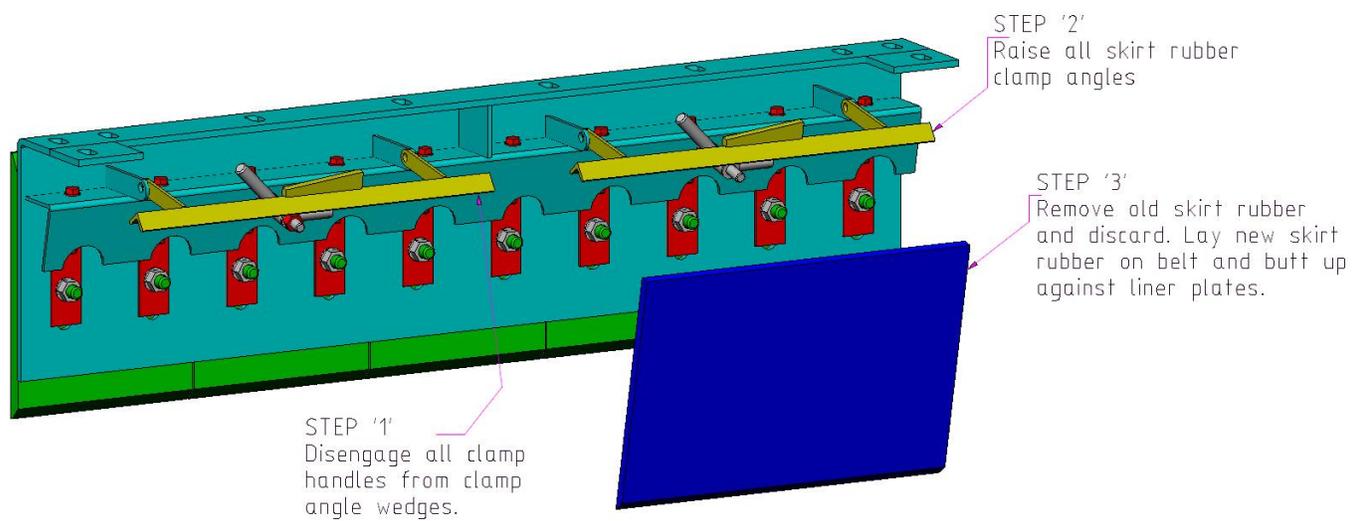
The clamp handles are assembled in the workshop to ensure that they can be operated with a firm hand. Should the nyloc locknuts become loose during transportation or operation, refer to the handle and clamping angle assembly section in this manual.



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SKIRT RUBBER ADJUSTMENT / REPLACEMENT

REPLACEMENT OF SKIRT RUBBER





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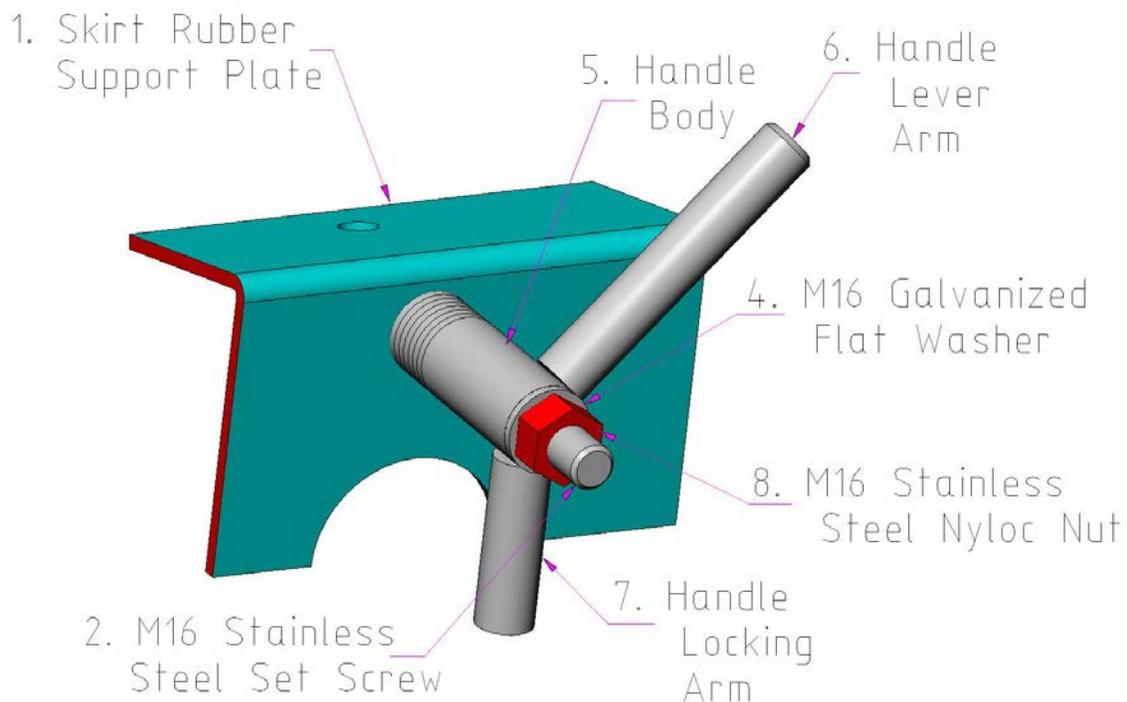
OPERATION AND MAINTENANCE

CLAMP HANDLE AND CLAMPING ANGLE ASSEMBLIES

The E.M.S. skirt clamp handle assembly consists of the following components:

1. Skirt Rubber Support Plate
2. M16 x 105 long stainless steel hex head set screw bolt
3. M16 galvanized flat spacer washers
4. M16 galvanized flat washer
5. Handle body
6. Handle lever arm
7. Handle locking arm
8. M16 galvanized nyloc locknut

CLAMP HANDLE ASSEMBLY





OPERATION AND MAINTENANCE

CLAMP HANDLE AND CLAMPING ANGLE ASSEMBLIES

IMPORTANT SAFETY NOTICE!

Prior to commencing any installation, operation or maintenance of the E.M.S. skirt panels and associated components – all site standard inductions, access permits, shut down permits, JHA's take five check lists, conveyor/equipment isolation and lock-out procedures must be completed and adhered to for duration of the task.

The E.M.S. skirt panels for the conveyors are delivered to site ready to accept a 220 x 16 thick skirting rubber.

Skirting rubber of varying thickness can be installed simply by reducing or increasing the amount of galvanized spacer washers used.

Below is a table indicating the number of washers required for varying thicknesses of skirting rubber.

SKIRTING RUBBER THICKNESS	NUMBER OF SPACER WASHERS REQUIRED
10mm	One
12mm	Two
16mm	Three
20mm	Four

* These quantities are a guide only. Rubber hardness, washer thickness and required clamping force can all affect the number of washers necessary.

The E.M.S. skirt handles are factory assembled to ensure they can be operated with a firm hand.

Should the assemblies have become loose during transport or in the unlikely event they become loose during operation, simply tighten the M16 nyloc locknut. Replace the nut if the nylon insert is worn.

In rare cases the E.M.S. handles may have been knocked out of alignment during transportation or installation. If sufficient pressure can not be exerted on the wedge to hold the skirt rubber tightly in place, a few "controlled" blows with a hammer to the handle spindle will generally rectify the problem. (The M16 nyloc nut will have to be re-tightened after this procedure).

If the problem persists the quantity of M16 galvanised flat washers under the body of the handle can be reduced to gain greater clamping pressure.



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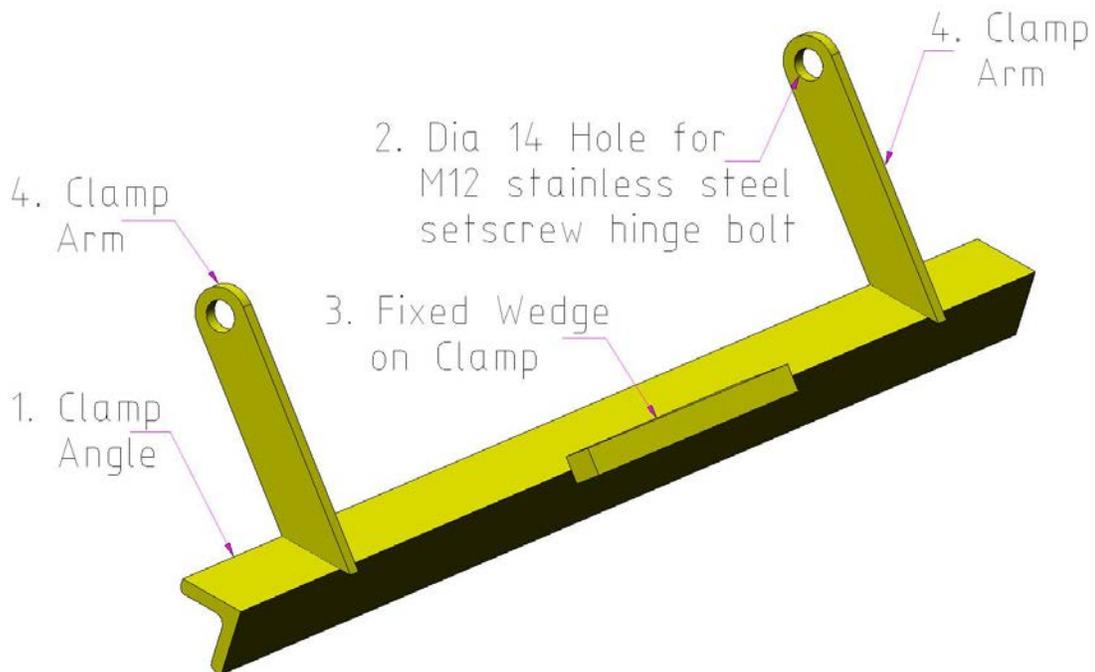
OPERATION AND MAINTENANCE

CLAMP HANDLE AND CLAMPING ANGLE ASSEMBLIES

The E.M.S. skirt clamping angle assembly consists of the following components:

1. Clamp Angle
2. M12 x 35 long stainless steel setscrew hinge bolts complete with hex nut and flat washer
3. Fixed Wedge on Clamp
4. Clamp Arm

CLAMPING BAR ASSEMBLY



The E.M.S. skirt clamping angles are factory assembled to ensure they can be operated with a firm hand. Should the assemblies have become loose during transport or in the unlikely event they become loose during operation, simply tighten the M12 nyloc locknuts. Replace the nuts if the nylon insert is worn.



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EASY MAINTENANCE SKIRTING DATA**

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EASY MAINTENANCE SKIRTING DATA

E.M.S. SKIRT PANELS – RECOMMENDED SPARE PARTS LIST

COMPONENT	SPECIFICATION	QUANTITY
ECO LIGHT STANDARD Ni-HARD LINER TYPE EL-PC-18-SL1	300 x 32 x 300 LG NI-HARD 4 LINER TYPE 'EL-PC-18-SL1'	40
SKIRT LINER BOLT	M20 HEX HEAD GRADE 8.8 BOLT x 60 LONG	80
LINER ADJUSTER	H&B MARK No: - 'HB730-L1'	80
SKIRT RUBBER	220 x 16 THK 50/60 DURO RUBBER	120m
E.M.S. HANDLE	H&B MARK No:- 'HB730-H1'	40
HANDLE SPACER	M16 GALVANIZED FLAT WASHER	40
HANDLE WASHER	M16 GALVANIZED FLAT WASHER	120
HANDLE LOCKNUT	M16 GALVANIZED NYLOC NUT	40
E.M.S. SKIRT CLAMP ANGLE	H&B MARK No: - 'HB730-C1'	40
CLAMP ANGLE HINGE BOLT ASSEMBLY	M12 x 35 LONG STAINLESS STEEL OR GALVANIZED SET SCREW, NYLOC NUT & 2 FLAT WASHERS.	80



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SECTION 4 H&B MINING SERVICES INFORMATION

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H & B MINING SERVICES

SERVICES PROVIDED BY H & B MINING

H&B Mining Services can offer full engineering, design and detailing services for either new or upgrading of existing transfer areas.

Our areas of expertise include:-

- Design and supply of conveyor Easy Maintenance Idler Drop Down Frames
- Design and supply of conveyor Easy Maintenance Idler Tilt (roll over) Frames
- Design and supply of conveyor Easy Maintenance Skirting Systems
- Design and supply of Easy Maintenance Dust Covers
- Design and supply of D.I.L.O. (drop in, lift out) Guards
- Design and supply of Easy Maintenance Modular Design
- Design and supply of Transfer chute/impact plate design
- Design and supply of Microledge chute lining technology
- Design and supply of Carry Belt Diversion Plow
- Mechanical and Structural Engineering
- Mechanical and Structural Design/Detail Drafting



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H & B CONTACT DETAILS

Should you require any further data for your existing easy maintenance skirting panels or if you have any enquiries about future easy maintenance skirting/idler installations and or engineering/drafting services. Please contact:-

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Fax No: (08) 9243 1993
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Email: ems@webace.com.au

POSTAL ADDRESS

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SORRENTO WA 6020



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SECTION 5 DRAWINGS AND DRAWING REGISTER

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DRAWING REGISTER

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>TEAM 45 DRG No</u>
1.	GENERAL ARRANGEMENT OF EASY MAINTENANCE SKIRT PANEL	00010-ME-DR-1805



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H & B Mining: “The Experts in Conveyor Skirts”

H & B Mining design and supply a range of “Easy Maintenance” conveyor transfer products to the Australian mining industry with the aim of providing a safer, easier to maintain and more efficient working environment at conveyor transfer points.

H & B Mining was established in April 1993 with the promise of providing a standalone conveyor design service tailored to accommodate the mines of Australia. After witnessing maintenance crews struggling to maintain and change out poorly designed products for conveyor transfers H & B decided to expand its portfolio by developing its own range of ‘Easy Maintenance Products’ for conveyor transfer points including: conveyor idlers, conveyor skirting systems, hinged dust covers, conveyor guards, conveyor diversion plough, streamline conveyor transfer design and the retractable loading boot.

The “Easy Maintenance” conveyor product range harnesses H & B’s vast experience in the field along with the innovative design technology nurtured over the years within the H & B design team. The Australian mining industry has benefited from H & B’s toil, witnessing enhanced overall productivity, reduced shutdown time and improved safety whilst gaining cost effective mining conveyor operations. H & B Mining products have been installed as mine standard by Rio Tinto, BHP Billiton, Roy Hill and FMG, amongst others.

Easy Maintenance Skirt System designed for mining conveyors

The easy maintenance skirting system is designed with an adjustable primary and secondary seal which allows easy access for inspection and maintenance to the skirt liners along a conveyor. A single person can remove skirt rubber and inspect the skirt liners without having to get inside the chute and/or the skirting area.

Once the inspection is complete, the operation to adjust the vertical height of the skirt liners and maintain the all important sealing gap between the skirt liner and conveyor belt still only requires one person. The easy maintenance skirting system allows for simple, quick and safe maintenance of skirt liners. This reduces spillage from the belt down to an absolute minimum and eliminates build up of material around transfer areas.

The easy maintenance skirting system is designed to suit each client's requirements and can be supplied in complete skirt panel units or simply as loose components ready to be retrofitted to existing skirt boards.