TEREX | FINLAY

Crusher Wear Parts Reference Guide

60 YEARS
PASSION & INNOVATION

Contents

Introduction

Welcome to the First Edition of the Terex Finlay Crusher Wear Parts Reference Guide .
This Guide has been developed to help Dealers personnel to expand their knowledge of Crusher Wear part options & terminology and help relay this information to end users in a clear and logical manner.
The Guide is broken down into following sections :

1. Wear Parts Overview
2. Jaw Crusher Wear Parts
3. Cone Crusher Wear Parts
4. Impactor Crusher Wear Parts

Topics within these sections include metallurgy options , liner profiles available , application examples , case studies , wear part codes etc.
I hope this Guide provides an invaluable source of information that will assist you in selling Terex Finlay crusher wear parts.

Regards

Brendan Mc Anulla
Crusher Wear Parts Product Manager

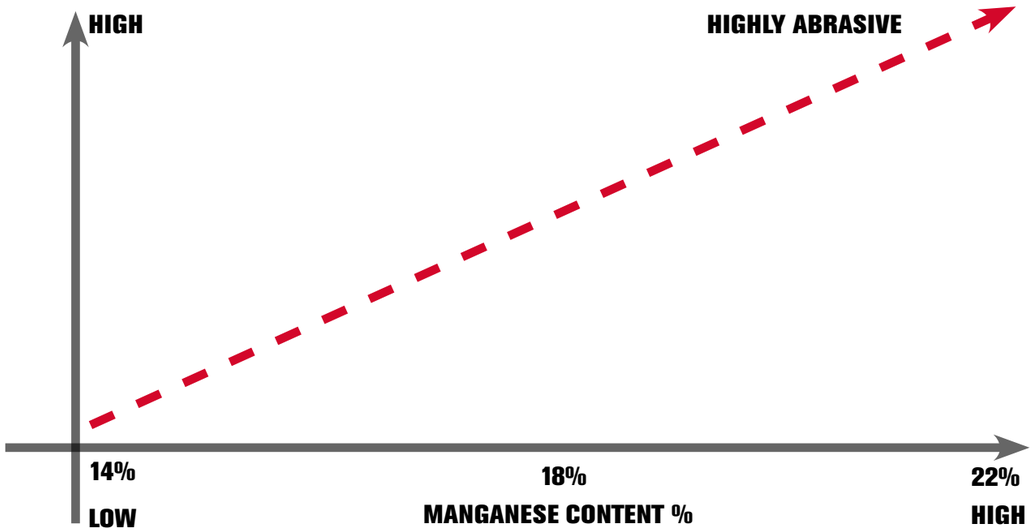
Metallurgy Options - Jaw Liners & Cone Liners

18% MANGANESE
Standard fit on all Jaw & Cone crushers.
A good all round liner for all applications.

22% MANGANESE
Optional fit for all Jaw & Cone crushers.
Work hardens quicker in abrasive applications.

14% MANGANESE
This is an option that & available if required although not generally stocked.
For use in soft low abrasion applications.

ROCK TYPES						
Manganese Content	Hard & Abrasive Rock	Hard & Non-Abrasive Rock	Medium & Abrasive Rock	Medium & Non-Abrasive Rock	Soft & Abrasive Rock	Soft & Non-Abrasive Rock
14% Manganese				✓		✓
18% Manganese		✓	✓	✓	✓	✓
22% Manganese	✓	✓	✓			



Manganese Facts

MANGANESE IS ADDED TO STEEL TO IMPROVE STRENGTH , DURABILITY & TOUGHNESS
The strength of a jaw liner is the ability to withstand crushing forces without failure, and is dependent on the metals microstructure. Manganese included in steel is stronger than the steel would be without manganese in the mix. Manganese steel has high-hardness properties and is wear resistant.

WORK HARDENING
Work hardening of a jaw liner, is the strengthening of the liner as it is pounded by the rock forces inside the crushing chamber. This strengthening occurs because of permanent changes within the microstructure of the material on the liner surface. Before work hardening, the molecular structure of the liner is a regular, defect-free pattern. As the liner is pounded by the rock the microstructure dislocates and the structure becomes denser. The denser structure provides more resistance to forces and is observed as strengthening or work hardening.

THROUGH HARDENING
Through hardening is when the core of the manganese loses its ductility. For manganese to work the skin has got to be very hard, and abrasive resistant, but the core needs to be as ductile and as soft as chewing gum.
If manganese is misapplied there is a serious risk of losing this innate ductility that must be at the core.

MANGANESE LINER FACTS:
- Manganese liners are used because of their ability to work harden while crushing, which extends its wear life dramatically.
- Liners work hardens by compressive forces and at any given time the work hardened face is only about 2-3mm.
- The speed at which the liner work hardens increases as the percentage manganese content increases; so12-14% work hardens slowest & 20-24% fastest.
- The work hardened face has a higher Brunel value if the percentage manganese content is lower; so once work hardened the 12-14% will be more wear resistant than the 16-18% etc.

OPTIMIZING LINER WEAR LIFE:
- Reduce the amount of fine and wet material allowed into the crushing chamber, by using correct choice of feeder.
- Run the Chamber at an optimum speed. Running it too fast will hinder the liners ability to ‘bite’ the material and pull it into the chamber and will result in the material rubbing against the liners excessively, promoting premature wear.
- Possibly running the Chamber at a larger CSS for a day or so, initially, as tight settings hinder the liners ability to sufficiently work harden.
- Rotating Jaw liners prematurely would also assist with allowing the crushing faces to work harden more effectively.

Wear Lifetime

WHAT IS WEAR?

Wear is produced by 2 elements pressing against each other E.G. Between a jaw liner and crushing material . During this process small materials from each element become detached .

Primary factor in wear for Crushing applications is **ABRASION** . Material fatigue is also a factor as the crusher tools E.G. Jaw liners are subject to numerous pressure and impact stresses.

Several other factors affect the wear lifetime of crusher wear parts as listed in below Diagram .

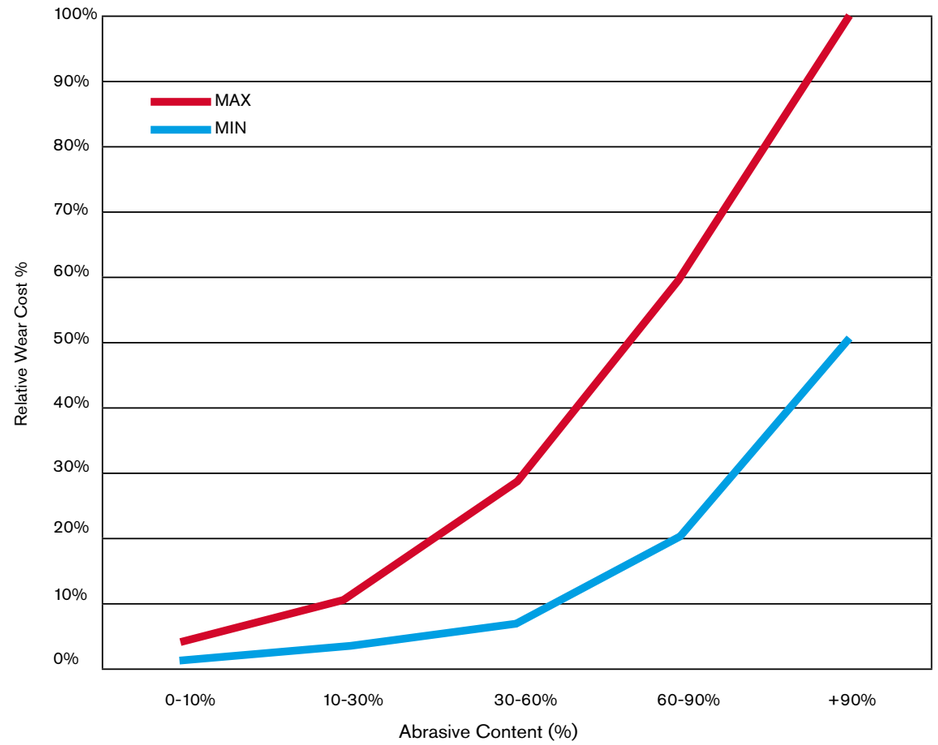
WEAR PARTS OVERVIEW

Wear Costs

Wear occurs in all crushers , however wear costs can be controlled by selecting the correct crusher type for the abrasive content of the material to be crushed. The table demonstrates how a relatively small increase in Abrasive content can result in wear costs spiraling. Exact wear cost is a function of feed size , reduction ratio , moisture content , capacity friability and grain size.

Same can be said when selecting correct Wear Liner for your application . EG. If it is highly abrasive application then 22%Mangnese would be considered best option over 18%.

RELATIVE WEAR COSTS AS A % IN RELATION TO ABRASIVE CONTECT OF MATERIAL



Total Abrasives					
Abrasive Content %	0 -10	10-30	30-60	60 -90	+90
Relative Wear Cost	1-3	3-7	7-22	20-55	50-100

The 3 Main Abrasives found in rocks are listed below:

SiO_2: ***Silica Dioxide*** Fe_2O_2: ***Iron Oxide*** Al_2O_3: ***Aluminium Oxide***

WEAR PARTS OVERVIEW

Test Methods & Terminology

CRUSHABILITY
How easy is product broken into smaller fragments?

ABRASIVENESS
It is very important to know the abrasive qualities of the material you are looking to crush. Materials can be soft but abrasive. The abrasive nature of the material will dictate the estimated wear life of your wear parts and what metallurgy should be utilized. The 3 main abrasives found in rock are listed below :

SIO_2: Silica Dioxide

FEO_2: Iron Oxide

AL_2O_3: Aluminium Oxide

HARDNESS OF MINERALS
Some minerals are very soft; others are very hard. The degree of hardness is an aid in identifying the minerals. Diamonds are harder than quartz and will therefore, scratch quartz; quartz will scratch calcite; calcite will scratch gypsum and so on. An easy way of estimating the hardness of a mineral in the field is by trying to scratch it with such common objects as a fingernail, a copper penny, a pocket knife blade, and a piece of window glass. Glass the hardest of the four, will scratch the most minerals, the knife is next in hardness; then in order comes the copper cent, and the fingernail.

BOND WORK INDEX
The amount of energy required by plant to crush material

LOS ANGELES VALUE
The Los Angeles test is commonly used to evaluate the hardness of aggregates to find the suitability of aggregates for use in road construction. Therefore, the road aggregates should be hard enough to resist abrasion.

UCS (UNIAXIAL COMPRESSIVE STRENGTH)
Predicting the strength and brittleness of rocks from a crushability index

FRENCH ABRASIVENESS TEST
The Abrasivity Coefficient (ABR) is defined as the ratio of the plates weight loss to the mass of tested material. The index is given in grams per ton and varies between 0 to over 2000, depending on whether the rock is respectively little or highly abrasive.

Material Properties Table

Crushability				
CLASSIFICATION	CRUSHABILITY (%)	BOND WORK INDEX (KWH/T)	LOS ANGELES VALUE	UCS (MPa)
Very Easy	50+	0 - 7	27+	0 - 90
Medium	40 - 50	7 - 10	22 - 27	90 - 150
Difficult	20 - 30	14 - 18	12 - 17	220 - 300
Very Difficult	10 - 20	18 +	5 - 12	300 +

Abrasiveness		
CLASSIFICATION	FRENCH ABRASIVENESS (G/TON)	ABRASION INDEX
Non Abrasive	0 - 100	0.0 - 0.1
Slightly Abrasive	100 - 600	0.1 - 0.4
Medium Abrasive	600 - 1200	0.4 - 0.6
Abrasive	1200 - 1700	0.6 - 0.8
Very Abrasive	1700 +	0.8 +

Material Properties		
ROCK NAME	CRUSHABILITY	ABRASIVENESS
Amphibolite	25 - 46	30 - 1600
Basalt	20 - 44	500 - 2300
Diabase	18 - 44	450 - 2300
Diorite	20 - 36	400 - 1700
Dolomite	30 - 56	20 - 450
Gabbro	27 - 34	800 - 1700
Gneiss	30 - 67	600 - 1600
Granite	28 - 90	900 - 1900
Gravel	30 - 55	300 - 2500
Limestone	30 - 62	0 - 500
Rhyolite	16 - 56	700 - 1900
Sandstone	32 - 60	300 - 2200
Quartzite	22 - 65	1400 - 2400

Test Methods & Terminology

The hardness of a material is a major consideration in the selection of the type of crusher to use. Hardness is a factor in the amount of wear and tear crushers and screens experience. In most cases, the hardest materials are :

- Igneous formations (granite) and Metamorphic formations (quartzite).
- The softer materials are usually the sedimentary formations (limestone).
- Because there are always exceptions, testing of the material is desired.

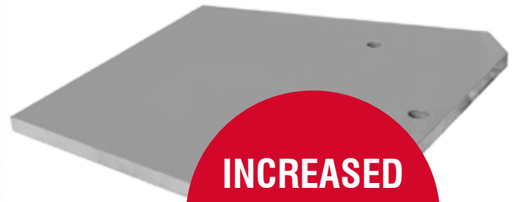
Compressive Strength

VERY SOFT	SOFT	MEDIUM	HARD	VERY HARD
4400 - 10,000 psi (27 - 69 MPa)	10,000 - 20000 psi (69 - 138 MPa)	20,000 - 30,000 psi (138 - 207 MPa)	30,000 - 40,000 psi (207 - 276 MPa)	> 40,000 psi (>310 MPa)
Lime Rock	Asbestos Rock	Limestone	Granite	Iron Ore
Caliche	Gypsum Rock	Dolomite	Quartzite	Granite
Diatomite	Slate	Sandstone	Iron Ore	Granite Gravel
Shale	Talc	Gneiss	Gravel	Trap Rock
Coquina	Gneiss	Quartzite	Basalt	Chert
	Conglomerate	Granite	Gabbro	Basalt
		Marble	Serpentine	

MOHS Scale Of Hardness

SCALE	MINERAL	EXAMPLES
1	TALC	Baby Powder
2	GYPSUM	Finger Nail , Gold
3	CALCITE	Concrete , Limestone
4	FLOURITE	Marble , Copper Penny
5	APATITE	Window Glass
6	FELDSPAR	Steel Blade Knife
7	QUARTZ	Granite , Sand
8	TOPAZ	Topaz
9	CORUNDUM	Ruby , Sapphire
10	DIAMOND	Diamond

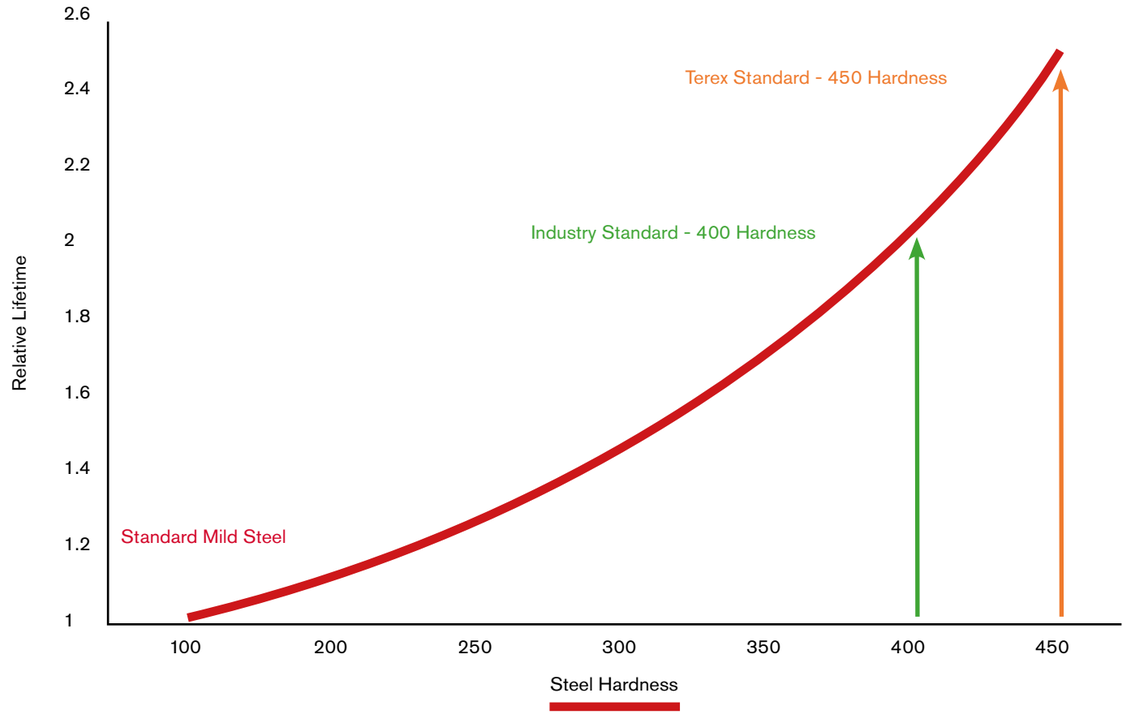
Side Liner / Cheek Plates



INCREASED WEAR LIFE

- Terex provides a full range of Jaw and Impactor side liners
- Manufactured to 450 Brinell steel hardness
- Industry standard 400 Brinell or less

WEAR LIFE COMPARED TO STEEL HARDNESS



JAW CRUSHER

JAWS

Terminology

OPEN SIDE SETTING
Maximum distance between jaw plates for a given setting. (this is the distance when the jaw is at rest)

CLOSE SIDE SETTING
Minimum distance between jaw plates derived from the OSS and the stroke.

DRIVE SIDE
Side of the crusher fitted with a grooved pulley couple to the crusher drive.

NON DRIVE SIDE
Opposite side of the crusher form the drive side.

FLYWHEEL
Large wheels used as part of the crusher drive and to store inertia.

NIP ANGLE
Inclusive angle between jaw plates indicative of the crushers ability to crush and draw rock.

JAW PLATES
Replaceable liner plates available with different profiles for certain applications to help achieve the required output grading whilst protecting the jaw stocks from wear.

FIXED JAW
Replaceable liner plate attached to the fixed frame.

SWING JAW
Replaceable liner plate attached to the jaw stock.

CHEEK PLATES
Wear plates used to protect the crusher frame side plates.

WEDGES
Some design of jaw crushers require wedges to ensure that the jaw plates are held firmly in position. There are also a wear part that can be replaced when worn down.

RECYCLED CONCRETE

PRIMARY LIMESTONE

SECONDARY LIMESTONE

Jaw Liner Selection

There are a few key points that you need to consider when selecting the correct liners for an application:

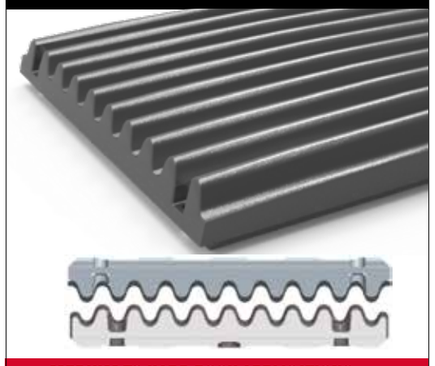
- Feed Material Type.
- Feed Material Hardness / Abrasiveness.
- Feed Size.
- Required output.
- Potential of uncrushable material in the chamber.
- Required throughput.

APPLICATIONS

Jaw Plate Profile	Recycling	Soft-Med Rock	Hard Rock	River Gravel	Asphalt
Super Tooth		✓	✓	✓	✓
Quarry Tooth		✓	✓		✓
Standard Tooth	✓	✓		✓	
Multi Tooth	✓				
Heavy Duty			✓	✓	

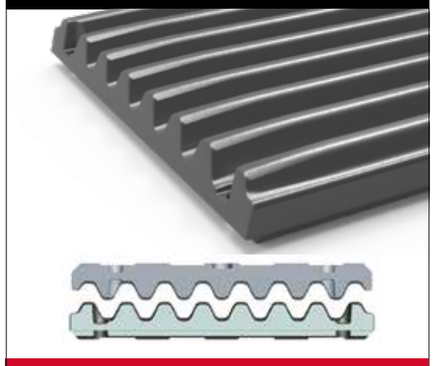
Jaw Plate Profiles

SUPER TOOTH



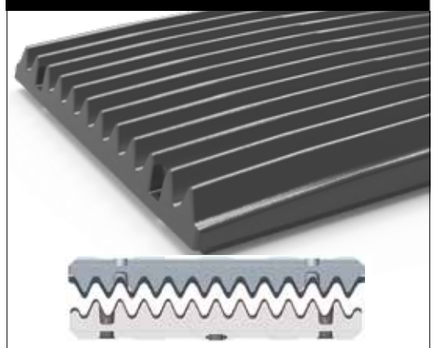
- MEDIUM TO HARD ROCK APPLICATIONS
- GRIPS MATERIAL TO ALLOW BETTER CRUSHING
- AVAILABLE 18% & 22%

QUARRY TOOTH



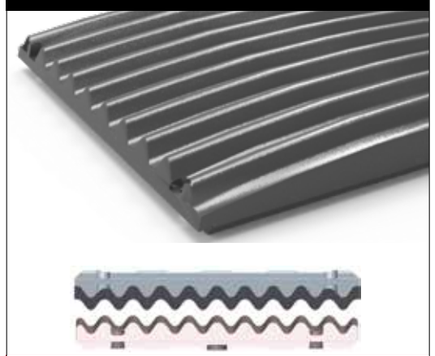
- HARD ROCK & HIGH ABRASIVE APPLICATIONS
- DEEPER TOOTH PROFILE ALLOWS FOR EXTRA WEAR
- AVAILABLE IN 18% & 22%

MULTI TOOTH



- RECYCLING APPLICATIONS
- GOOD GRIP ON SMOOTH FLAT SURFACES
- AVAILABLE IN 18%

STANDARD TOOTH



- RECYCLING & SOFT ROCK APPLICATIONS
- AVAILABLE IN 18%
- NOT AVAILBALE FOR ALL MODELS

Heavy Duty Fixed Jaw Liner

HEAVY DUTY FIXED JAW LINER

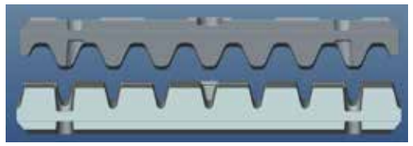
INCREASED WEAR LIFE — MARCH OFFER

- Designed for fixed side only
- Reduces the number of fixed liner changes
- Available in 18% & 22%

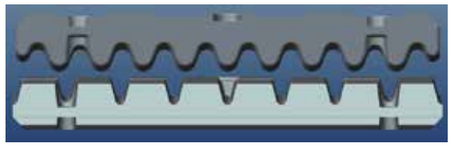
AVAILABLE FOR:

- J-1170
- J-1175
- J-1480

QUARRY TOOTH SWING & HD FIXED JAW



SUPER TOOTH SWING & HD FIXED JAW



JAW FITTED WITH FIXED HEAVY DUTY LINER & SUPER TOOTH SWING LINER

Case Study

IMPROVING JAW LINER WEAR LIFE WITH HEAVY DUTY FIXED JAW

THE CHALLENGE

Subedharji Grit based in India , were looking to improve Uptime on their Terex Static Jaw Plant. Processing extremely abrasive Gritstone the Terex Super tooth 18% Jaws liners where lasting 10,000MT before requiring a change. This was causing unnecessary downtime and lost production of the site .

THE SOLUTION

Heavy Duty Fixed Jaw – 18% & Swing Super tooth

This Heavy Duty Liner has been uniquely designed by Terex engineering to improve the wear life of fixed jaw liners, whilst maintaining throughput of the machine and output grading of the material. This allows the machine to maintain optimal performance whilst reducing the amount of downtime due to fewer number of liner changes.

MATERIAL SPECIFICATION

Extremely Abrasive Grit Stone

Abrasiveness	-	2000 g/tn
Crushability	-	40%

THE RESULTS

Standard 18% Super tooth liners were lasting 10,000MT. Newly designed fixed Heavy Duty liner with Swing Super tooth and wear life increased to 17,250MT.

This is an improvement in wear life of 70% which means a large improvement in machine uptime.

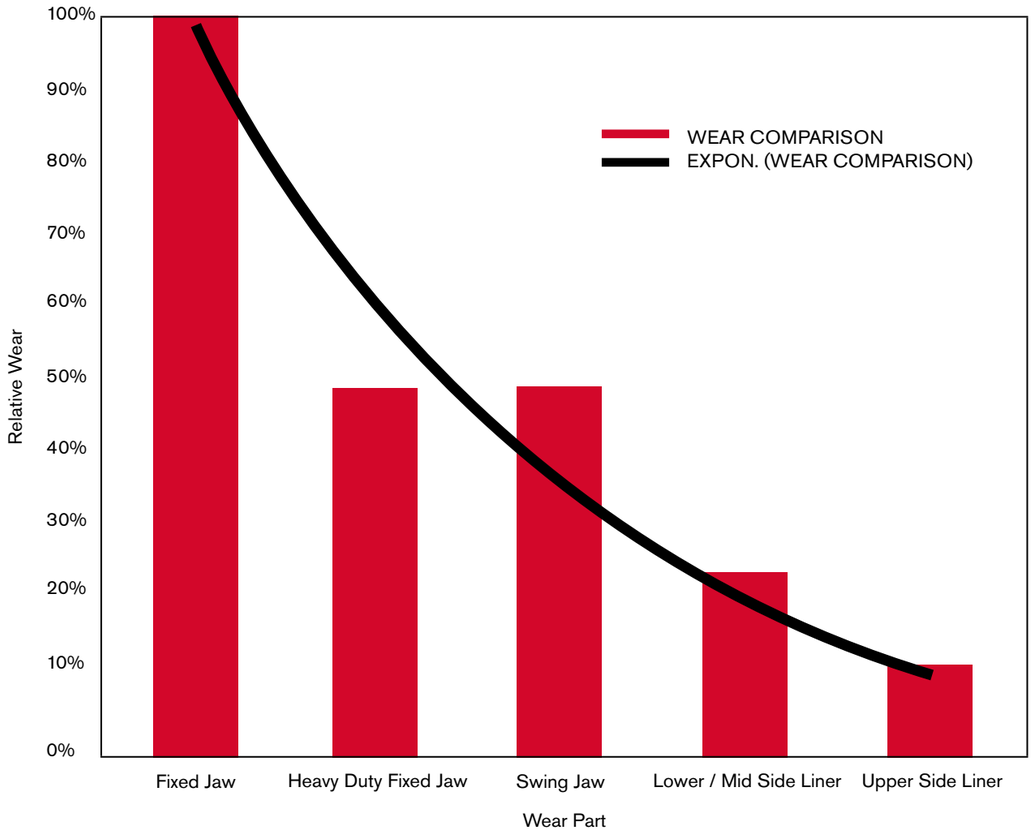
JAW CRUSHER

Jaw Wear Comparison

Guide below shows comparison of wear life between:

- Fixed Jaw
- Heavy Duty Fixed Jaw
- Swing Jaw
- Upper Liners
- Middle / Lower Liners

JAW WEAR COMPARISON %



Correct Setting Measurement

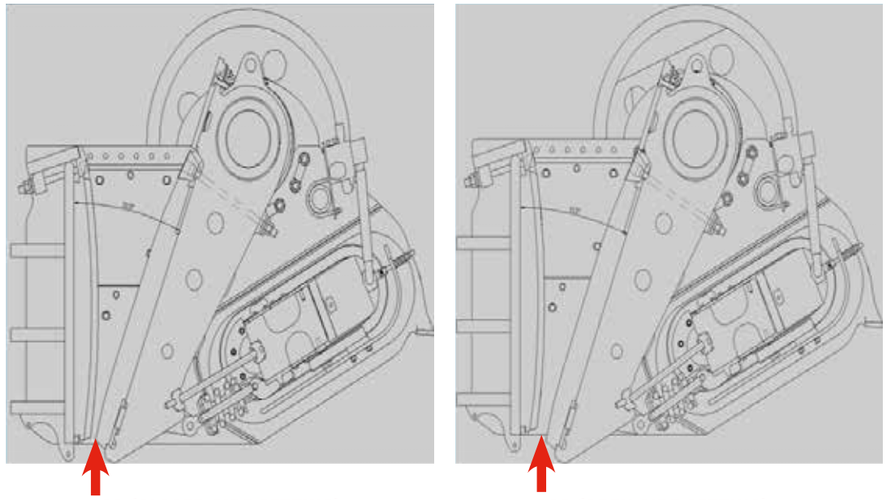
When a jaw is at rest, the setting that will be measured is the **OPEN SIDE SETTING (OSS).**

The Operations manual states the **CLOSED SIDE SETTING (CSS).**

To calculate the **CSS** for the measured **OSS**, the stroke must be deducted.

THE STROKE OF THE MACHINE IS STATED IN 'TECHNICAL INFORMATION' IN THE MANUAL.

A tight CSS will lead to higher wear on jaw plates.



CSS (CLOSED SIDE SETTING)

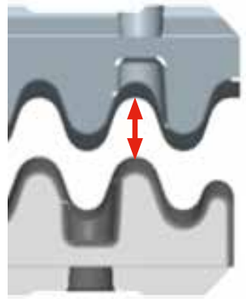
OSS (OPEN SIDE SETTING)

NB: The crusher must not be operated at a smaller CSS than what is stated in 'Technical Information' in the Operation manuals.

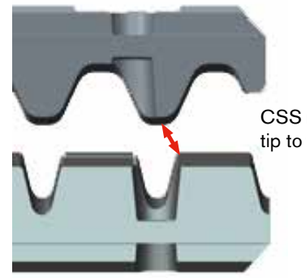
JAW CRUSHER

CSS Measurement & Limits

STANDARD PROFILES CSS



Current CSS measurement root to tip

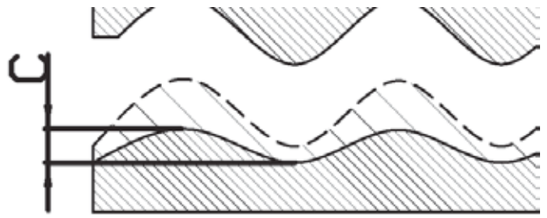


CSS measurement tip to tip

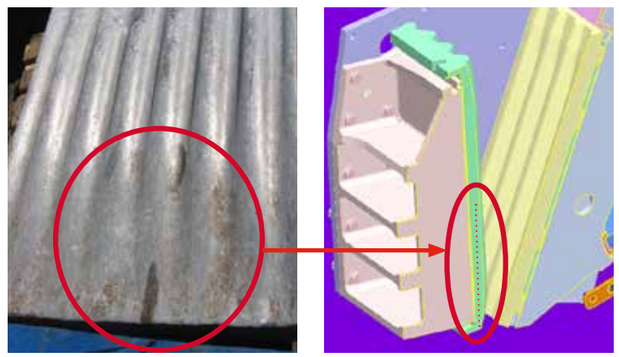
The minimum CSS for a heavy duty fixed jaw and each of the existing profiles is the same as when measured above.

Maximum Acceptable Wear

A jaw should not run any longer once the tooth profile has reduced to below 90% of its profile height (if the face is smooth this will result in high loadings) in the crushing zone.

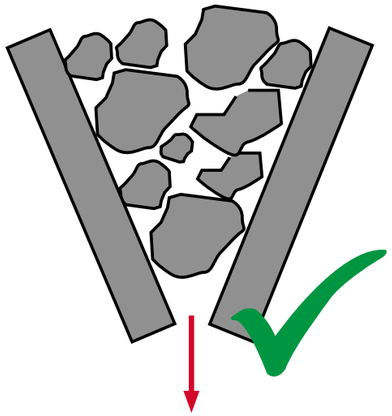


IN ALL CASES A MINIMUM OF 10MM VARIANCE BETWEEN THE PEAK AND VALLEY OF A SINGLE JAW FACE MUST BE PRESENT. IF ANY OF THE JAW FACE PRESENTS LESS THAN 10MM, THE JAW LINER MUST BE REPLACED.

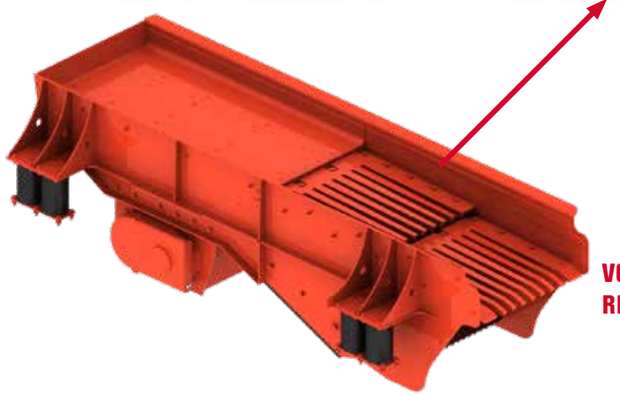


Feeding A Jaw Crusher

All crushers work best with a uniform feed gradation and a wide range of material size. Fines do not need to be crushed and so it is normal to use a Vibrating Grizzly Feeder (VGF) so that material smaller than the grizzly aperture bypasses the crushing chamber. This reduces wear on the jaw liners and can improve overall plant performance. However it is good practice not to have grizzly aperture any larger than jaw CSS. This is to ensure there are some smaller materials to help the jaw grip and crush the larger rocks.



TOO MANY FINES IN FEED



VGF TO REMOVE FINES

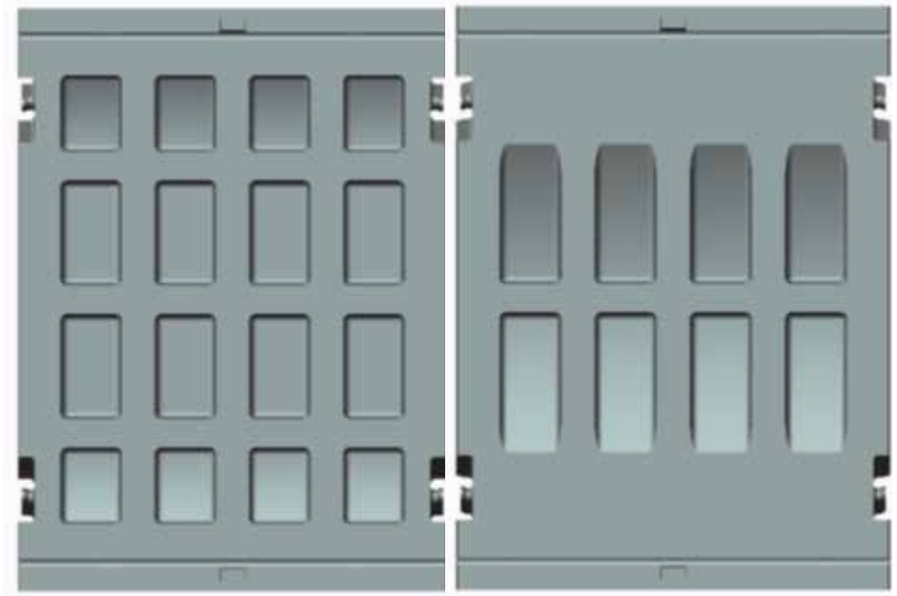
Jaw Liner Parts Codes

J960		SUPERTOOTH	QUARRY TOOTH	MULTI TOOTH	STANDARD TOOTH	HEAVY DUTY
18%	FIXED	600/8048E	N.A	600/8039E	600/8011E	N.A
	SWING	600/8049E	N.A	600/8040E	600/8012E	N.A
22	FIXED	600/8048TT	N.A	N.A	N.A	N.A
	SWING	600/8049TT	N.A	N.A	N.A	N.A
Wedges	FIXED	600/8056	N.A	600/8058E	600/8021M	N.A
	SWING	600/8057	N.A	600/8059E	600/8022M	N.A
J1160 up to TRX1160JAOMHB5652						
18%	FIXED	31.09.0100	31.09.0102	31.09.0103	N.A	N.A
	SWING	31.09.0101	31.09.0104	31.09.0105	N.A	N.A
22%	FIXED	N.A	31.09.0107	N.A	N.A	N.A
	SWING	N.A	31.09.0109	N.A	N.A	N.A
J1160 RE-VAMP from TRX1161JEOMH95090						
18%	FIXED	CW017-002-MN180	CW017-004-MN180	CW017-006-MN180	N.A	N.A
	SWING	CW017-001-MN180	CW017-003-MN180	CW017-005-MN180	N.A	N.A
22%	FIXED	CW017-002-MN220	CW017-004-MN220	N.A	N.A	N.A
	SWING	CW017-001-MN220	CW017-003-MN220	N.A	N.A	N.A
J1170						
18%	FIXED	CR005-068-001E	CR005-143-001E	CR005-072-001E	CR005-008-001E	CW005-167-MN180
	SWING	CR005-067-001E	CR005-141-001E	CR005-071-001E	CR005-007-001E	N.A
22%	FIXED	CR005-068-001TT	N.A	CR005-072-001TT	CR005-008-001TT	CW005-167-MN220
	SWING	CR005-067-001TT	N.A	CR005-071-001TT	CR005-007-001TT	N.A
14%	FIXED	CR005-068-001M	N.A	CR005-072-001M	CR005-008-001M	N.A
	SWING	CR005-067-001M	N.A	CR005-071-001M	CR005-007-001M	N.A
Wedges	FIXED	CR005-070-001	CR005-144-001 - RH CR005-145-001- LH	CR005-074-001	CR005-010-001	N.A
	SWING	CR005-069-001	CR005-142-001	CR005-073-001	CR005-009-001	N.A
J1175						
18%	FIXED	31.10.1174	31.10.0205	31.10.1171	N.A	CW024-001-MN180
Old Part Numbers	SWING	31.10.1173	31.10.0210	31.10.1170	N.A	N.A
18%	FIXED	CW024-003-MN180	CW024-006-MN180	CW024-005-MN180	N.A	CW024-001-MN180
New Part Numbers	SWING	CW024-002-MN180	CW024-007-MN180	CW024-004-MN180	N.A	N.A
22%	FIXED	31.10.1181	31.10.0207	N.A	N.A	CW024-001-MN220
Old Part Numbers	SWING	31.10.1179	31.10.0212	N.A	N.A	N.A
22%	FIXED	CW024-003-MN220	CW024-006-MN220	N.A	N.A	CW024-001-MN220
New Part Numbers	SWING	CW024-002-MN220	CW024-007-MN220	N.A	N.A	N.A
J1480						
18%	FIXED	31.07.0136	31.07.0006	N.A	N.A	CW020-001-MN180
	SWING	CR020-017-001-E	CR020-044-001-E	N.A	N.A	N.A
22%	FIXED	31.07.2136	31.07.0007	N.A	N.A	CW020-001-MN220
	SWING	CR020-017-001TT	CR020-044-001TT	N.A	N.A	N.A

J-1175 Jaw Plate Product Revision

The J1175 jaw pockets at rear of jaw have been re-designed to allow the jaw liners to be more durable in the field.

OLD POCKET **NEW POCKET**



JAW PLATE NEW PART CODES		
Description	Current Part Code	New Part Code
Fixed Jaw Quarry Tooth (18% Mn)	31.10.0205	CW024-006-MN180
Swing Jaw Quarry Tooth (18% Mn)	31.10.0210	CW024-007-MN180
Fixed Jaw Quarry Tooth (22% Mn)	31.10.0207	CW024-006-MN220
Swing Jaw Quarry Tooth (22% Mn)	31.10.0212	CW024-007-MN220
Fixed Jaw Multi Tooth (18% Mn)	31.10.1171	CW024-005-MN180
Swing Jaw Multi Tooth (18% Mn)	31.10.1170	CW024-004-MN180
Fixed Jaw Supertooth (18% Mn)	31.10.1174	CW024-003-MN180
Swing Jaw Supertooth (18% Mn)	31.10.1173	CW024-002-MN180
Fixed Jaw Supertooth (22% Mn)	31.10.1181	CW024-003-MN220
Swing Jaw Supertooth (22%Mn)	31.10.1179	CW024-002-MN220

NB : Old & New Design Jaw liners can be mixed Except for the Quarry Tooth Liners – See Next Page .

Quarry Tooth Jaws Re-Design

On the Quarry tooth jaws the old design there was no half tooth on the outside of the swing jaw plate it was on the fixed jaw. This causes increased wear on the cheek plates due to material being pushed out against the cheek plates during operation. On all other jaw plates in the range the half tooth is on the swing jaw so the decision was made to bring the quarry tooth profile in line with the rest of the jaw range.

NB : THE OLD DESIGN & NEW DESIGNED QUARRY JAWS CANNOT BE MIXED

QUARRY SWING JAW – OLD DESIGN – 7 FULL TEETH

QUARRY SWING JAW – NEW DESIGN – 6 FULL TEETH & 2 HALF TEETH

CONE CRUSHER

CONES

Terminology

MANTLE
Covers the cone head of the crusher to protect it from wear. It is the inner sacrificial wear liner that sits on the cone head.

CONCAVE
Sits in the upper frame of the crusher to protect it from wear. It is the outer sacrificial wear liner that sits inside the upper frame.

BACKING COMPOUND
A resin that is poured behind the manganese liners to fill the void and secure the manganese liners.

OPEN SIDE SETTING (OSS)
The maximum distance between concave and mantle at a given close side setting.

CLOSE SIDE SETTING (CSS)
The minimum distance between concave and mantle to give the required output and grading for a machine.

MANTLE NUT
Used on the top of the mantle to secure the mantle in place on the cone head.

** Metallurgy Options for Cone Liners – See Wear Parts Overview **

Cone Liner Selection

There are a few key points that you need to consider when selecting the correct crushing chamber:

1. FEED SIZE
Each chamber configuration has a maximum feed size that it can accept.

2. FEED GRADING
The maximum feed size is important as if there are a lot of fines in the feed or a lot of single size in the feed, it can cause issues with wear and output.
Attention should also be given to recirculating stone for the following reasons:
- It has a tendency to be a lot more abrasive and harder than virgin stone
- Depending on the amount recirculating, it can cause issues with segregated feed

3. OUTPUT REQUIRED
This takes into account output and grading required, which can affect which crushing chamber you should select

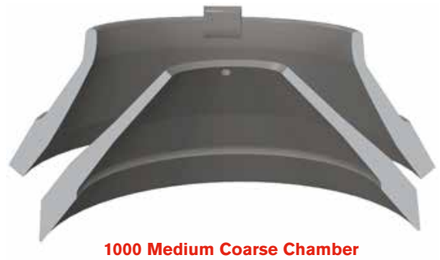
LINER OPTIONS & MAX FEED SIZE

Chamber	C-1540	C-1545	C-1550	C-1554
Auto Sand	63mm	N/A	63mm	See Page 33
Fine	N/A	110mm	N/A	
Medium Coarse	160mm	180mm	220mm	
Coarse	175mm	N/A	N/A	
Extra Coarse	195mm	210mm	N/A	
Heavy Duty	160mm	180mm	220mm	

See next page for Cone Chamber Configurations by Model

C-1540


1000 Auto Sand Chamber


1000 Medium Coarse Chamber

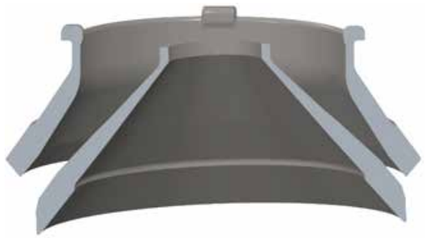

1000 Coarse Chamber


1000 Extra Coarse Chamber


1000 Heavy Duty Chamber

(Medium coarse standard fit from factory)

C-1545



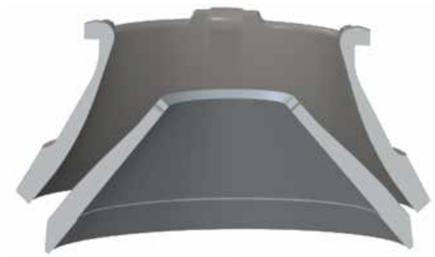
1150 Fine Chamber

1150 Medium Coarse Chamber

1150 Heavy Duty Chamber

C-1550

1300 Auto Sand Chamber



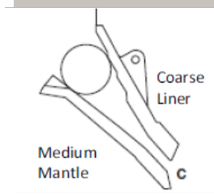
1300 Medium Coarse Chamber

1300 Heavy Duty Chamber

(Medium coarse standard fit from factory)

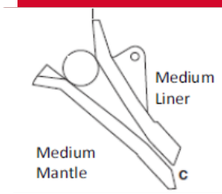
C-1554

Coarse - Medium
(Bowl Liner - Mantle Liner)



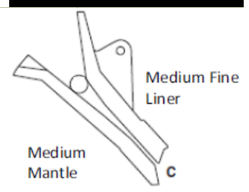
CSS (mm)	Max Feed Size (mm)
50	255
38	245
25	230
19	225

Medium - Medium
(Bowl Liner - Mantle Liner)



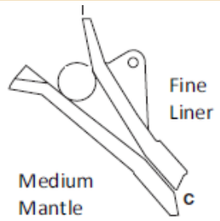
CSS (mm)	Max Feed Size (mm)
50	220
38	205
25	190
16	175

Medium Fine - Medium
(Bowl Liner - Mantle Liner)



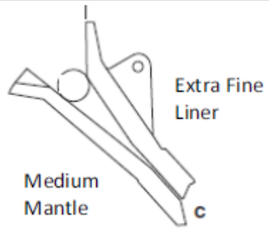
CSS (mm)	Max Feed Size (mm)
50	155
38	140
25	125
13	105

Fine - Medium
(Bowl Liner - Mantle Liner)



CSS (mm)	Max Feed Size (mm)
50	210
32	185
25	175
13	160

Fine - Medium
(Bowl Liner - Mantle Liner)



CSS (mm)	Max Feed Size (mm)
50	180
25	155
13	140
6	135

Standard configuration is the Coarse-Medium

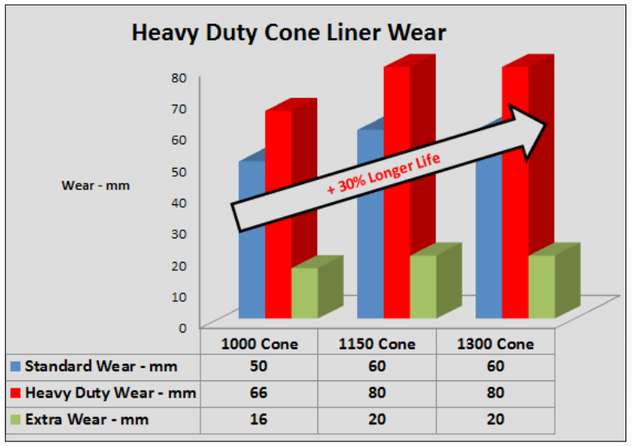
Heavy Duty Medium Coarse V Standard Medium Coarse

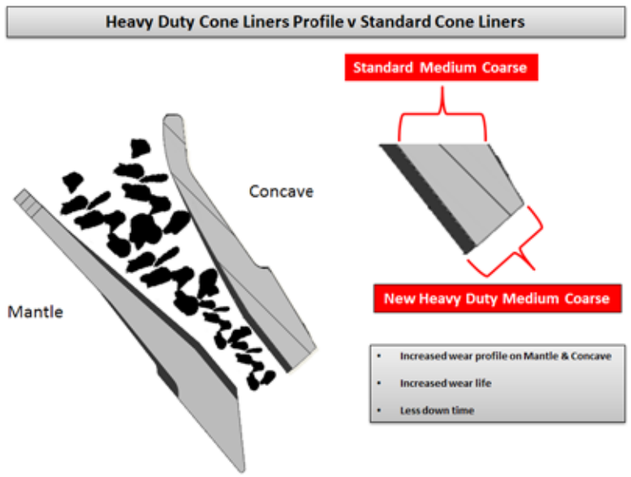
INCREASES WEAR LIFE BY +30%

- Reduces the number of liner changes
- Available in 18% or 22% manganese

Available for the following machines:

- C1540 Cone
- C1545 Cone
- C1550 Cone



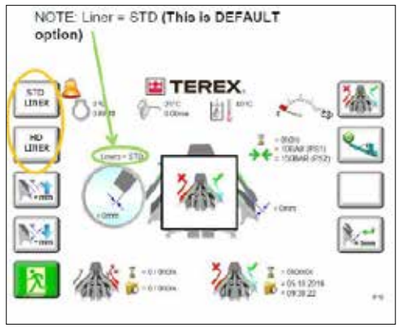


Increased Wear Available Heavy Duty Liners v Standard Liners

Pin Centre Measurement	C-1540		C-1545		C-1550	
	Standard	Heavy Duty	Standard	Heavy Duty	Standard	Heavy Duty
New	765 mm	788 mm	869 mm	897 mm	907 mm	927 mm
Worn	680 mm	680 mm	775 mm	775 mm	805 mm	805 mm
Vertical Travel	85 mm	108 mm	94 mm	122 mm	102 mm	122 mm
Wear	50 mm	66 mm	60 mm	80 mm	60 mm	80 mm
Increased Wear	+ 16 mm		+ 20 mm		+ 20 mm	

- Cone liners must be changed when the hydraulic rams cannot be fully closed. The pin to pin centre distance is detailed below and worn pin centre measurements are outlined in the table above.

PIN CENTRE MEASUREMENT



The latest crusher models have the option to select heavy duty liners on the control panel navigation screen when changing the liners. This way the wear limits can be determined automatically with alarms in the control panel system.

Chamber Profile and Dump Clearance

The new Heavy Duty cone liners have been designed around the popular medium coarse chamber and as such accepts the same feed size as the medium coarse chamber. Due to the thicker liners there is a **REDUCTION IN DUMP CLEARANCE** on all the crushing chambers. This clearance will increase proportionally as the Liners wear.

The reduction in dump clearance means that the machines need to have a metal detector working to ensure that no uncrushable material can enter the chamber.

Case Study

IMPROVING CONE LINER WEAR LIFE WITH HEAVY DUTY LINERS

THE CHALLENGE

A company based in the Midlands in the UK, were experiencing wear issues on their Mobile cone crusher . Processing approximately 150tph of very Abrasive River Gravel the Standard 18% Terex Cone liners were lasting only a maximum of a week before requiring a change. This was reducing planned productivity and affecting the financial performance of the site.

THE SOLUTION

Heavy Duty Cone liners – 18%

These are based on the popular Medium Coarse chamber configuration and re-engineered and modelled by specialist engineers within the Terex Chamber Design team to improve wear life. The enhanced liners have been uniquely designed by Terex to deliver optimal performance for abrasive applications in accordance with the design parameters of the cone chamber.

MATERIAL SPECIFICATION

Abrasive Material 96.5% silica

Aggregate Crushing Value (%) - 14

Aggregate Impact Value (%) - 18

SiO_2 - 96.52%

Al_2O_3 - 1.23%

Fe_2O_3 - 0.46%

THE RESULTS

Standard 18% Manganese liners were lasting on average 42hrs in this application. Newly designed 18% Heavy Duty cone liners and the wear life increased to 62hrs on the same application.

This is an improvement of + 45 % over the standard liners which made a massive difference to the Site productivity.

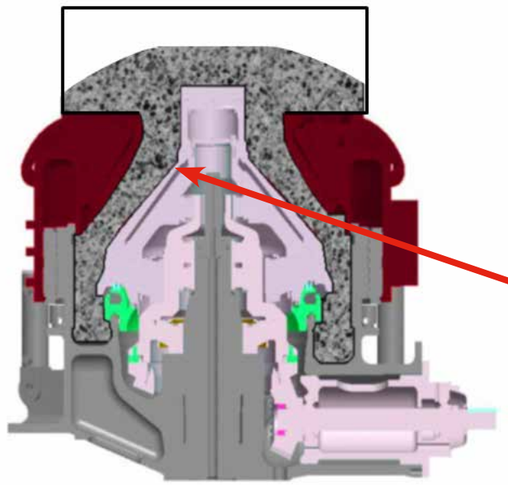
Wear Performance

Machine factors that affect Wear Part performance:

- Speed
- Stroke
- Closed Side Setting
- Feed Arrangement (Choke Fed)

CHOKE FED (CORRECT METHOD)
Result = Uniform Liner Wear

TRICKLE FED (INCORRECT METHOD)
Result = Irregular Liner Wear



WHAT IS CHOKE FED?
Feed material always filled above Mantle Nut

Note : Feed Grading

- If there are a lot of fines in the feed or a lot of single size product in the feed – this can cause issues with wear and throughput.
- Can also cause “OUT OF ROUND” issues with liners

Cone Wear Parts Codes

C1540		Medium Coarse	Coarse	EXTRA COARSE	Fine	Auto Sand	Heavy Duty
18%	Mantle	31.12.0252	31.12.0252	31.12.0252	N.A	31.12.0252	603/9273E
	Concave	31.12.0316	31.12.0315	603/9053E	N.A	31.12.0317	603/9274E
22%	Mantle	31.12.0355	N.A	31.12.0355	N.A	31.12.0355	603/9273TT
	Concave	31.12.0358	N.A	603/9053TT	N.A	603/9071TT	603/9274TT
C1545							
18%	Mantle	CW023-006-MN180	N.A	CW023-006-MN180	CW023-006-MN180	N.A	CW023-007-MN180
	Concave	CW023-003-MN180	N.A	CW023-005-MN180	CW023-002-MN180	N.A	CW023-008-MN180
22%	Mantle	CW023-006-MN220	N.A	CW023-006-MN220	CW023-006-MN220	N.A	CW023-007-MN220
	Concave	CW023-003-MN220	N.A	CW023-005-MN220	CW023-002-MN220	N.A	CW023-008-MN220
C1550							
18%	Mantle	603/1508E	N.A	N.A	N.A	603/1508E	603/1617E
	Concave	603/1416E	N.A	N.A	N.A	603/1407E	603/1618E
22%	Mantle	603/1508TT	N.A	N.A	N.A	603/1508TT	603/1617TT
	Concave	603/1416TT	N.A	N.A	N.A	603/1407TT	603/1618TT
C1554							
18%	Mantle	054003002001E	054003002001E	054003002001E	054003002001E	054003002001E	N.A
	Concave	0540030015E	0540030016E	0540030018E	0540030018E	0540030019E	N.A
22%	Mantle	054003002001TT	054003002001TT	054003002001TT	N.A	N.A	N.A
	Concave	0540030015TT	0540030016TT	0540030017TT	N.A	N.A	N.A
When describing MVP liners, the Bowl Liner is stated first with the Mantle Liner stated second							

IMPACT CRUSHER

IMPACTORS

Terminology

ROTOR
This is the main part of the HSI crusher. It holds the blow bars and rotates at a high speed, being driven by a pulley connected directly to the engine.

BLOW BAR / HAMMERS
Wear parts inserted into the rotor which impact the rock to cause breakage. These can be replaced when they are worn down.
There are two different options:
- 4 high blow bars
- 2 high and 2 low blow bars

Some older design crushers had a 3 bar rotor.

APRONS
Primary and Secondary aprons are used to reduce rock down to the required product size.

APRON SETTINGS
This is the measurement the aprons are set at to achieve the product gradings. There are general rules of what the settings should be.

APRON LINERS
Liners that are generally fitted to the end of aprons (which are replaceable wear parts) to ensure the apron settings can be maintained.

SIDE LINERS
Sometimes called frame liners, these are used on the inside of the impactor body to protect it from wear.

Metallurgy Options - Blow Bars

MARTENSITIC
- Good for hardness and impact resistance
- Used in primary and recycling applications
- Can accommodate large feed size
- Can tolerate steel in feed
- Used in primary & recycling applications

MARTENSITIC CERAMIC
- Martensitic bar that has a got a ceramic matrix running through the blow bar for extra wear life
- Maintains impact resistance of martensitic bar
- Increases wear life
- Used in primary & recycling applications

CHROME
- High Wear resistance
- Feed size needs controlled due to risk of breakages
- Will not tolerate steel in feed
- Available as Medium chrome and High chrome
- Used in secondary , tertiary & asphalt applications (as long as no unbreakable in feed)

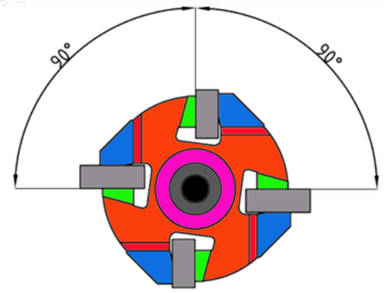
CHROME CERAMIC
- Chrome bar that has a got a ceramic matrix running through the blow bar for extra wear life
- Feed size needs controlled due to risk of breakages
- Will not tolerate steel in feed
- Used in secondary , tertiary & asphalt applications (as long as no unbreakable in feed)

NOTE – MEDIUM CHROME
- Medium Chrome & Medium Chrome Ceramic will offer better Impact Resistance over High Chrome variants but will have less Wear Resistance for more abrasive applications.
- They will therefore accommodate larger feed sizes than High Chrome .
- They lie between Martensitic variants and high chrome variants as an added option.

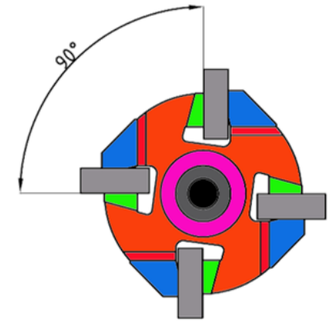
Rotor Configurations

- 2 Bar is Standard fit from the Factory
  4 Bar is an option – Only used when feed size small
- Some older Models have 3 bar Rotor

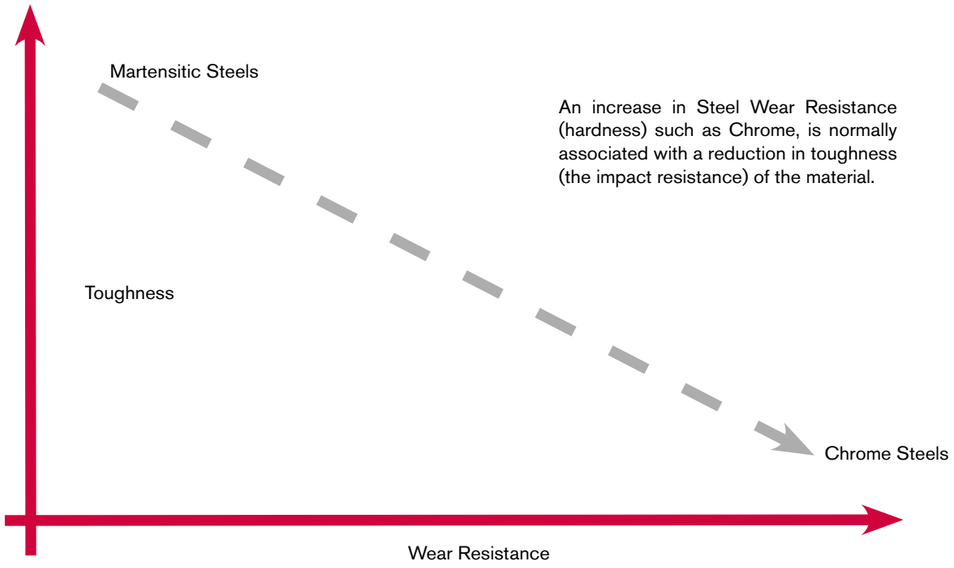
X2 SHORT X2 LONG BLOW BARS
- Better penetration
- Higher Tonnage for a given speed.
- Reduced Blow Bar Wear.
- Less Fines Producted.
- Suitable for most Applications.
- Time between Blow Bars is Doubled improving penetration on material.



X4 LONG BLOW BARS
- Reduced oversize
- More fines produced
- Good for secondary applications where shape and size outweigh throughput.
- High reduction on softer feed materials



Metallurgy Options - Blow Bars



An increase in Steel Wear Resistance (hardness) such as Chrome, is normally associated with a reduction in toughness (the impact resistance) of the material.

Ceramic Inserts

Ceramic inserts can be provided for both Martensitic and Chrome Blow bars

EXAMPLES OF CERAMIC INLAYS IN THE BASIC MATERIAL OF MARTENSITIC OR CHROME

ADVANTAGES:

- High wear resistant over standard blow bars
- Increased service life
- Increased uptime

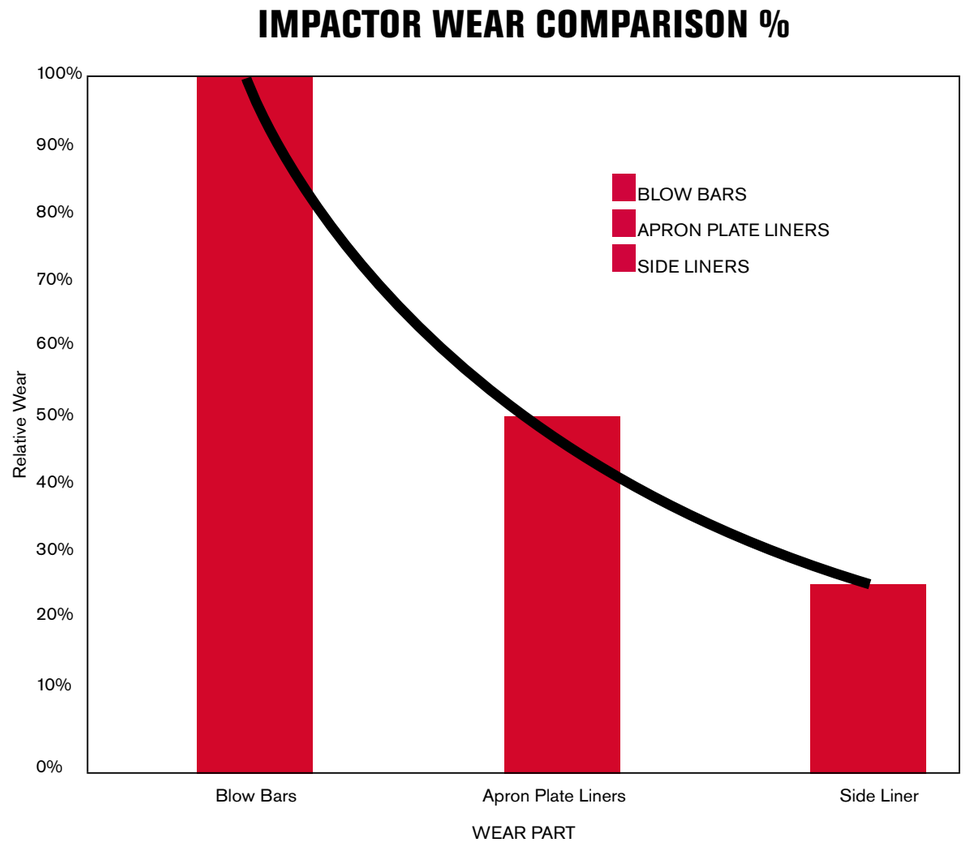
NB: The ceramic inlay will not be visible when the blow bar is new

IMPACT CRUSHER

Impactor Wear Comparison

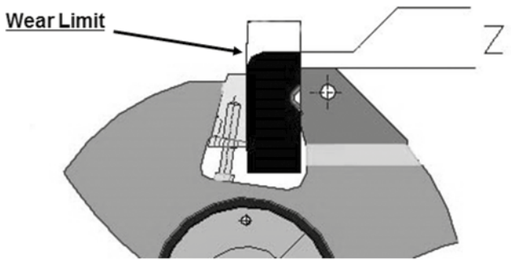
Guide below shows comparison of wear life between :

- Blow Bars
- Apron Plate Liners
- Side Liners

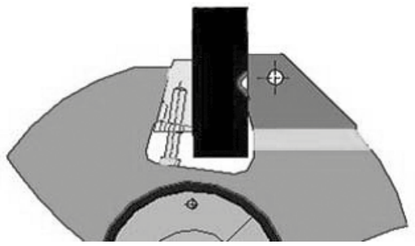


IMPACT CRUSHER

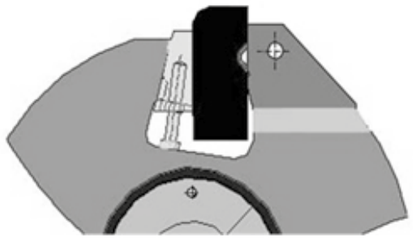
Wear Limits



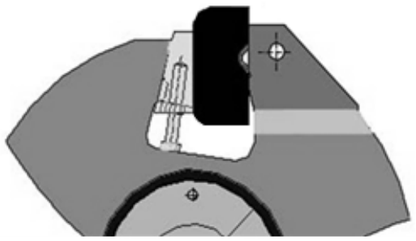
Blow bar needs changed or rotated when the wear limit **"Z"** is reached otherwise considerable damage will occur to rotor .



NEW BLOW BAR, FULL WEAR LIFE



HALF WORN, TURN NEEDED



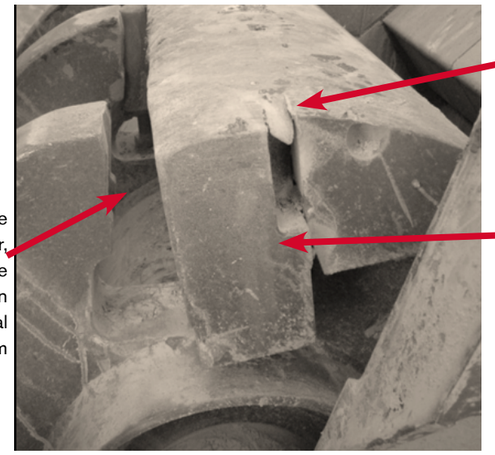
FULLY WORN, REPLACEMENT REQUIRED

***ALWAYS REFER TO A MACHINE OPERATIONAL MANUAL FOR WEAR LIMITS.**

Excessive Wear

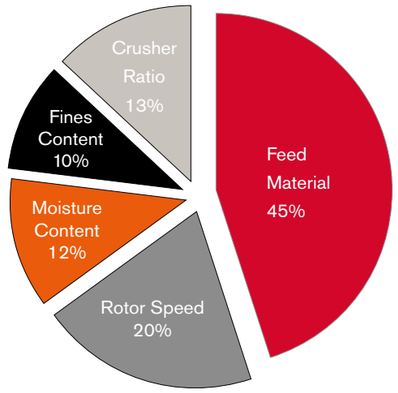
- In the case of excessive wear on the blow bars, there can be detrimental effects on the rotor.
- If the bar is not turned before the recommended specified limit , then once changed the bar will not be in a stable position when working.
- This may lead to the bar becoming loose and falling out of the rotor.
- The figure below shows how a blow bar has been worn excessively past its recommended limit.

Due to excessive wear to the blow bar, the locking wedge has now come in contact with material and dislodged from its seat



- The result of this negligence has led to the blow bar not being able to be turned.
- More severely is the fact that the machine will now need a new rotor.

Influencing Factors on Blow Bar Wear

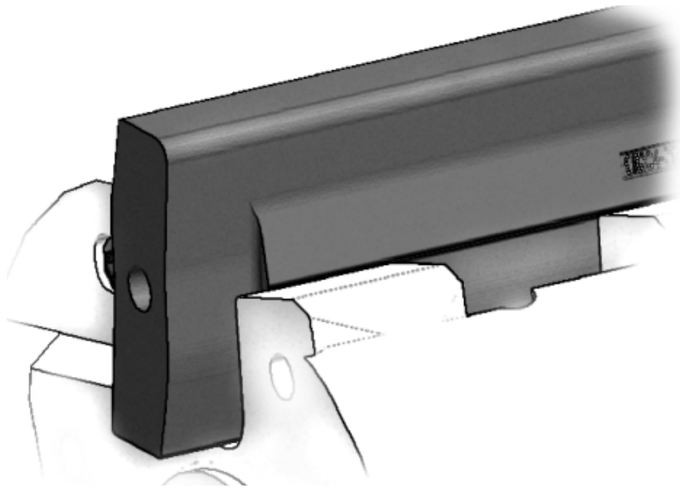


FEED MATERIAL IS THE MOST IMPORTANT FACTOR FOR SELECTING THE CORRECT BLOW BAR.

To increase the life of blow bars the following guidelines should be adhered to:

- Maintain and clean chamber daily.
- Inspect blow bars for premature wear or damage.
- Select correct blow bars depending on application.
- Adjust machine parameters.

Ideal Wear Pattern



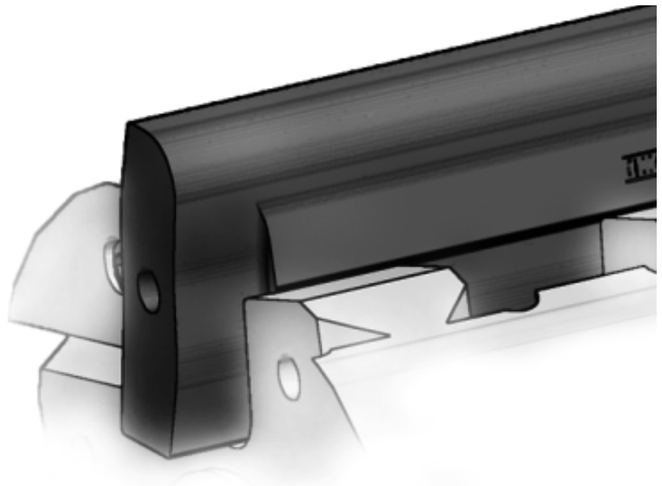
- A gentle radius on the blow bar shows that the feed material is the correct size.
- It shows that the rotor penetration and rotor speed are correct.
- The correct blow bar for the feed material is being used.
- The machine parameter is correctly set up.

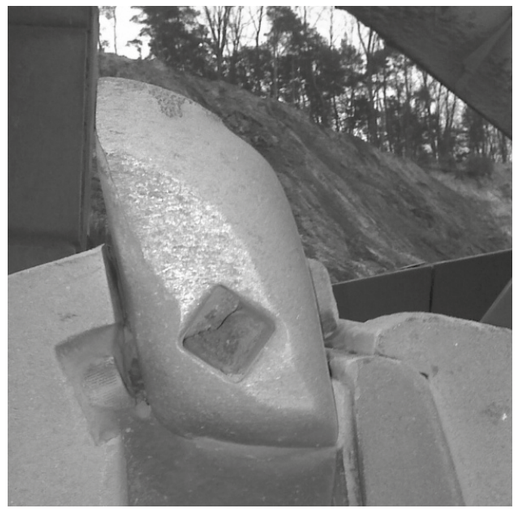
THE RESULT OF ALL THIS?

The blow bar life is optimized.

OVER PENETRATION

Over Penetration





PROBLEM

- Excessive penetration on the blow bar.

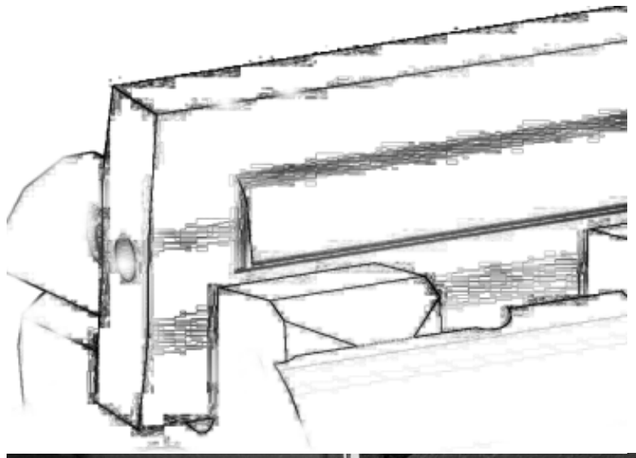
SOLUTION

- Increase the rotor speed.
- Change to 4 high blow bars.

CAUSES & ISSUES

- The rotor speed is too slow.
- Increases risk of blow bar breakage.
- The blow bar is under-utilized before changing. Increased rotor wear.

Poor Penetration



PROBLEM

- Poor penetration on the blow bar means the top of the blow bar is worn down flat.

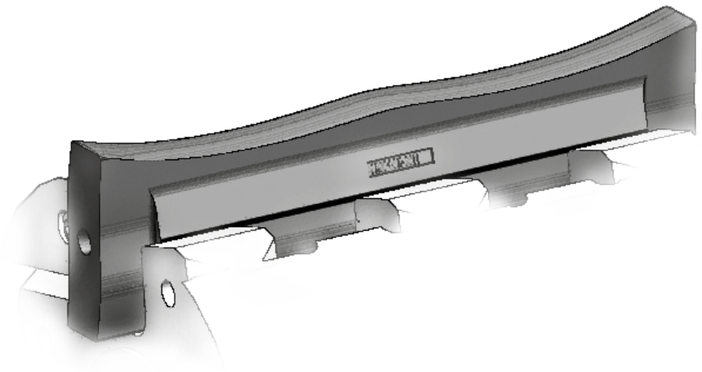
SOLUTION

- Reduce the rotor speed.
- Change configuration to 2 high and 2 low blow bars.

CAUSES & ISSUES

- The rotor speed is too high.
- Wear rates will be excessive.
- Reduced output.
- Creates lot of fines.

Excessive Wear at Centre of Blow Bar



PROBLEM

- The blow bar is wearing towards the centre.

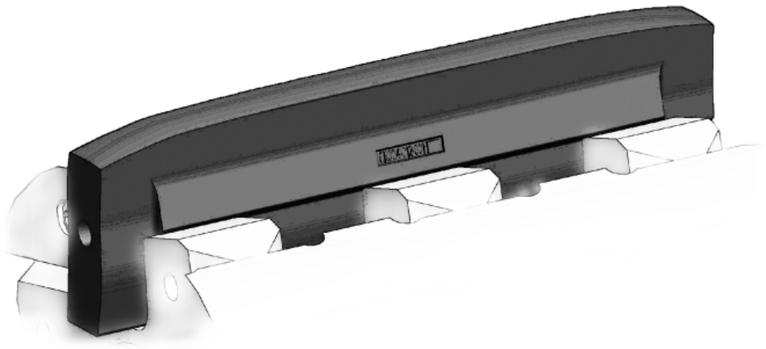
SOLUTION

- Increase feed to crusher. (e.g. A larger excavator is required to feed machine)
- Increase the speed on the feeder.

CAUSES & ISSUES

- A trickle feed gives uneven wear.
- Reduces the life of the blow bar.

Excessive Wear at Both Ends



PROBLEM

- Wear on the sides of the blow bar.

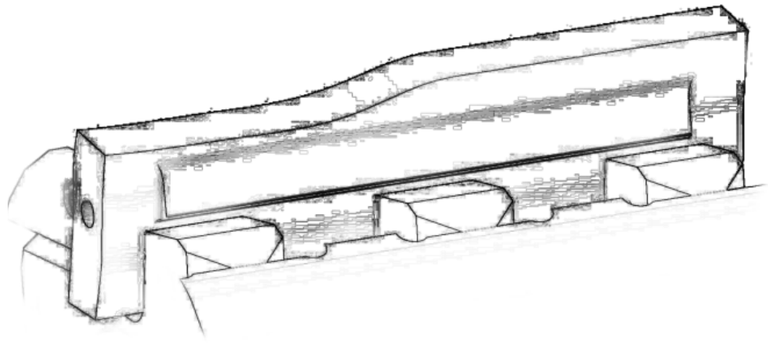
SOLUTION

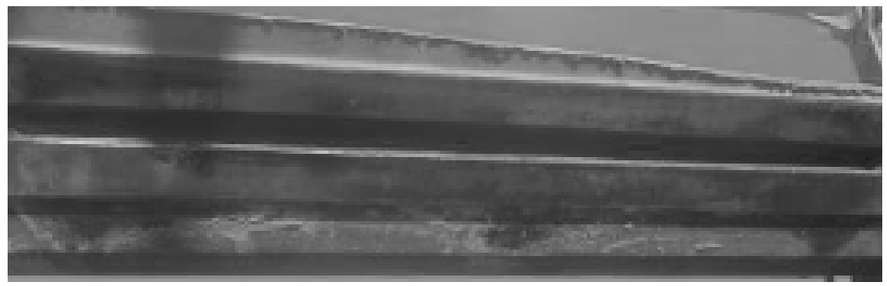
- Reduce speed of feeder so wear becomes even across the surface of the blow bar.
- Clean chamber daily after each shift.

CAUSES & ISSUES

- High percentage of fines in the feed or overfeed causing fines to be pushed to outside.
- Crusher chamber contaminated with caked material causing friction wear.

Excessive Wear at Both Ends





PROBLEM

- Blow bar wearing excessively to one side.

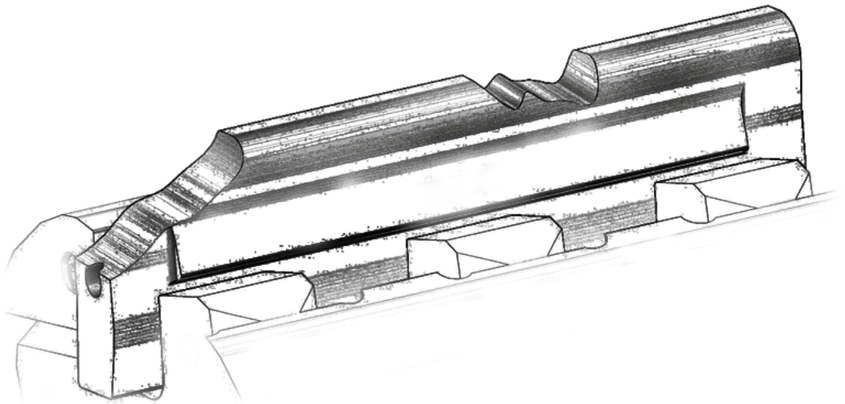
SOLUTION

- Ensure the machine is on level ground.
- Continuous loading.

CAUSES & ISSUES

- Machine on uneven ground – material falling to one side.
- Machine isn't choke fed.
- Feed dropped onto one side of feeder when using recirculating option.

Blow Bar Damage



PROBLEM

- Blow bar is damaged or broken.

CAUSES & ISSUES

- Incorrect blow bar for application. (E.g. Chrome)
- There is steel or rebar in feed.
- Feed size is too large.

SOLUTION

- Select correct blow bar.
- Control feed size.
- Remove steel or rebar.

Increased Wear Available
Heavy Duty Liners v Standard Liners

- Make sure all blow bars are in matched pairs pertaining to weight.
- The weight difference of paired blow bars should not exceed 0.5kg and matched pairs should be installed on opposite sides of the rotor.
- Ensure that all the mounting surfaces of the blow bar are cleaned of any debris and build-up, as well as the rotor backing bar and locating key.
- Check and ensure that any deformities found on the blow bar mounting area are dressed properly. to allow the blow bars to sit square in the rotor.
- Ensure that all blow bars are pulled up square in the rotor.

Blow Bar Selection

There are a few key points that you need to consider when selecting the correct blow bar for an application:

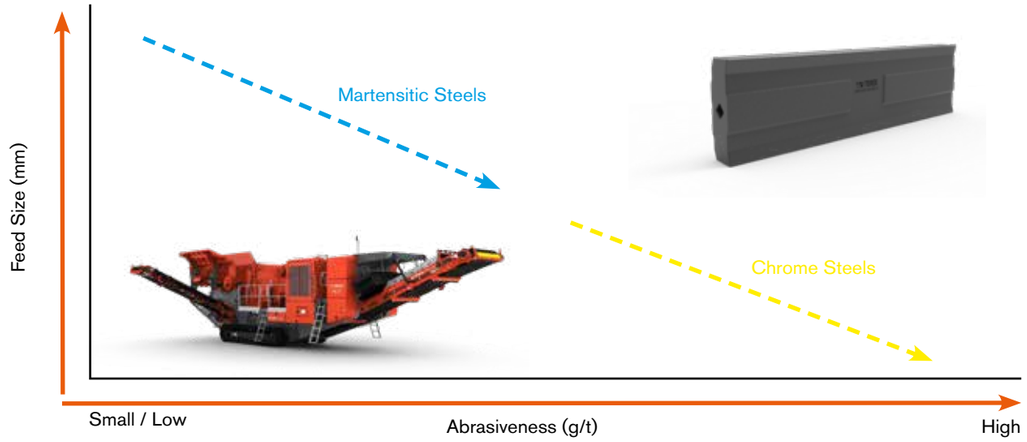
1. FEED SIZE
This has a direct link to what blow bars should be selected for each application.

2. UNCRUSHABLE MATERIAL
This is material such as steel or rebar that can cause blow bar breakages.

3. FEED MATERIAL
The type of feed material can have a large impact due to the different abrasiveness of materials.

Blow Bar Type	Recommended For	Recommended For	Risk Of Breakage
Martensitic	▪ Primary blasted quarry rock ▪ Buidling rubble & Concrete ▪ Limestone ▪ Larger feed sizes	▪ High Abrasive Material	▪ Very large feed size
Chrome	▪ Secondary Crushing ▪ Smaller feed sizes ▪ Abrasive Materials	▪ Low Abrasive Material	▪ Large feed size ▪ Steel content
Martensitic Ceramic	▪ Asphalt ▪ Natural stone ▪ Building rubble & concrete with small to medium iron content ▪ Medium Abrasive material	▪ Low Abrasive Material	▪ Large feed size
Chrome Ceramic	▪ Secondary crushing with natural stone ▪ Asphalt in the case of small feed size without any iron content	▪ Low Abrasive Material	▪ Large feed size ▪ Steel content

Blow Bar Guide



ALWAYS REFER TO OPERATIONS MANUAL FOR MAXIMUM FEED SIZE LIMITATIONS PER CRUSHER MODEL

NOTE

- Martensitic Steels - Good for Impact / Large Feed Size . High Wear in Abrasive Applications
- Chrome Steels - Good for Abrasive Applications . Risk of breakage in Larger feed sizes (over 300mm) & Steel in feed.
- Ceramic Inlays - Available in both Martensitic & Chrome Steels - Provides Longer Wear Life

KEY FACTORS TO CONSIDER

- The type of material being crushed.
- The size of the feed.
- Material shape – Cubic or Plate like.
- Abrasiveness.

Examples of Applications for Chrome / Chrome Ceramic

CERAMICS, TILES, BASINS, PANS ETC

SECONDARY QUARRY, LIMESTONE, BASALT, GRANITE, LIMITED FEED SIZE.

ASPHALT

IMPACT CRUSHER

Examples of Applications for Martensitic/ Martensitic Ceramic

CONCRETE RECYCLE WITH STEEL

PRIMARY LIMESTONE

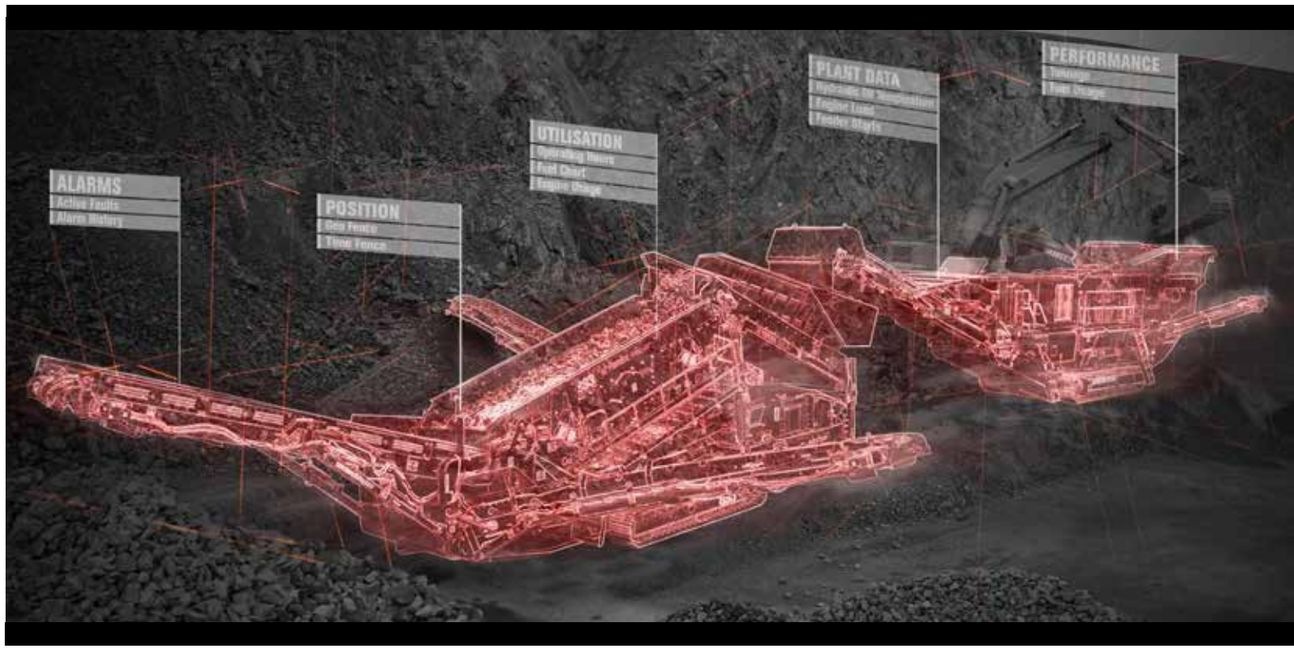
LIGHT DEMOLITION, BRICKS, BLOCKS ETC.

Wear Part Codes

Machine	Martensitic	Medium Chrome	High Chrome	Medium Chrome/ Ceramic	Martensitic/Ceramic	High Chrome/Ceramic	Low Bar
1-100 Old Part Code	CR004-012-001	CR004-001-042	CW002-001-CR27	N.A	CR004-076-001	N.A	CR004-028-001
1-100 New Part Code	CW004-001-MA500	CW004-001-CR18	CW004-001-CR27	CW004-001-CR18C	CW004-001-MAC	CW004-001-CR27C	CW004-002-MA500
1-110 (Same as 1-1310)	12.99.1102	12.99.1103	12.99.1104	N.A	12.99.0103	12.99.0010	12.99.0105
1-120	CW027-001-MA500	CW027-001-CR018	CW027-001-CR027	CW027-001-CR18C	CW027-001-MAC	CW027-001-CR27C	CW027-002-MN180
1-130 (Same as 1-1312)	31.11.2040	31.11.2260	31.11.2258	N.A	443170415	31.11.1260	31.11.1265
1-140	CW032-001-MA500	CW032-001-CR18	CW032-001-CR27	CW032-001-CR18C	CW032-001-MAC	CW032-001-CRC	CW032-002-MA500

T-LINK

Monitor Wear Life in your Crusher



T-LINK RETROFIT KITS

Now available as a retrofit kit, the innovative T-Link telematics system can help you plan, run and manage your fleet. The system can be fitted to older model Terex|Finlay machines and other mixed fleet equipment.

From the fleet management fundamentals of knowing the hours and location of your machine to sending machine specific alerts and tracking machine production, T-link can help you remotely monitor and manage your Terex|Finlay fleet and grow your business.

To find out more about T-link Telematics contact your local Terex|Finlay Dealer or visit:

www.terexfinlay.com

NOW AVAILABLE · NOW AVAILABLE
RETROFIT KITS
TLINK
NOW AVAILABLE

Compatible with your Terex Finlay or Mixed Fleet

Follow us on:

www.terexfinlay.com