

MACHINERY RISK ASSESSMENT

Hazard Identification, Risk Evaluation & Control Measures

Terex

200 Coalisland Road
Dungannon
N.Ireland, BT71 4DR

Powerscreen Warrior 600

Version: Tracked

<i>Assessment By:</i> D. Burns– Design Engineer		<i>Dated:</i> 05/09/14		<i>Issue No.</i>	<i>Review Date:</i>		<i>Assessment Ref.</i>		
S = Severity		LH = Likelihood		R = Risk Rating		RR = Residual Risk		L = Low M = Medium H = High	
Machine Area	Hazard Location / Activity	Hazard	Persons Affected	S	LH	R	Control Measures / Remedial Action		RR

All Areas	Operator Competence	Various	Operator, Others	5	4	20	<p>Prior to the operation of this equipment the operator(s) must have received specific and adequate training in the task to be carried out, having read and understood the Operation Manual and the Safety Signs. The operator must know the location and function of the controls including the safety features incorporated on the machine. The operator should be aware of the potential hazards associated with the maintenance, repair, transportation and operation of this equipment. Further details on the safe operation of this machine are contained in the Operation Manual (and the Engine Manual if applicable) supplied with this equipment. A decal has been fitted “Read and Understand Operators Manual”.</p>	L
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	All areas	Noise	Operator	4	5	20	Operators advised of typical sound levels at various distances from the machine. Operators instructed to wear correct fitting approved ear protection in the vicinity of the machine. Decals fitted around the machine, ' Hearing Hazard. '	L
	All areas	Burrs, Sharp Edges	Operator	2	5	10	Personnel instructed to wear approved rigger gloves while working at machine.	L
	All areas	Poor Lighting	Operator	3	4	12	Machine should only be operated in daylight or in conditions of good lighting; sufficient artificial lighting should be provided in poor light conditions	L
	All areas	Falling	Operator	4	2	8	Secure platform to be used for adjustments/maintenance over 2m - approved PPE and harness to be worn	L
	Components shipped with machine	Back injury	Operator	3	2	6	Personnel instructed to use correct manual handling techniques.	L
Feed Hopper	Mechanical Lifting	Crush	Operator	4	3	12	The Feeder has been fitted with lifting eyes to help facilitate the positioning of slinging equipment if for any reason the unit needs to be removed. Do not attempt to lift the entire machine with these eyes. Certified mechanical lifting equipment suitable for the task in-hand must be used to lift the Feeder. All slinging should be undertaken or supervised by a competent, suitably qualified person.	L

	Falling material	Impact	Operator	4	3	12	Due to the risk of falling debris, “ Falling Material Hazard ” decals are fitted around the Feeder.	L
	Skirting Rubbers	Nipping	Operator	2	2	4	A low abrasion hazard is presented by the skirting rubbers on the conveyor due to its fairly inaccessible location. Personnel are instructed to switch off, lockout & tag out machine before carrying out various maintenance procedures,	L
Hopper Access	Confined Space Entry	Entrapment	Operator	4	3	12	Due to the risk of falling debris and possible entrapment in the confined area of the Hopper, an on-site “Lockout and Tag Out” procedure should be put in place and a “Permit to Work” issued. All material process to the hopper must be prohibited, if persons are to enter the Hopper for inspection, repair or maintenance.	L
Feed Conveyor	Belt support rollers	Entanglement	Operator	4	3	12	Fully enclosed within conveyor frame and inspection guards/carrier - bolted, tool required for removal - Decal Fitted: ‘ Entanglement hazard ’	L
	Belt return rollers	Entanglement	Operator	4	3	12	All Return Rollers are guarded to address potential nip hazard presented by return rollers.	L
	Drive Drum	Entanglement	Operator	5	1	5	Drive Drum is enclosed by Feeder Frame, Hopper Outlet and underside guard. Personnel instructed not to reach into machine when unguarded and to switch off, lockout & tag out machine before opening or removing guards. ‘ Entanglement Hazard ’ decals located at head of the Feeder Conveyor.	L

Tail drum	Entanglement	Operator	5	1	5	Access to Tail drum nip point is restricted by side, back and underside guards. 'Entanglement Hazard' decals located at tail of the Feed Conveyor. All Inspection Guards require a tool in order to gain access.	L
Belt scraper	Abrasion	Operator	2	3	6	A low abrasion hazard is presented by the Belt Scraper on the Feed Conveyor. Due to its justly inaccessible location, there is a low risk of injury, however, personnel are instructed to switch off, lockout & tag out machine before carrying out various maintenance procedures as instructed in operational manual	L
Belt Tension/ tracking	Entanglement	Operator	3	1	3	The need to remove or open guards in order to Tension or Track Belts is not required. Belt tensioning/tracking can be carried out from ground level; viewing holes have been incorporated into Tail Drum and Side guards. 'Entanglement Hazard' decals located at Tail of the Feeder Conveyor.	L
Lubrication	Entanglement / falling	Operator	3	1	3	Extended grease points have been used to bring inaccessible lubrication points outside the guards to areas accessible from ground level, removing the necessity to open or remove guard doors for re-lubrication.	L

Tail Drum Scraper / Plough Scraper	Abrasion	Operator	2	3	6	A low abrasion hazard is presented by the Plough scraper on the Feed Conveyor. Due to its justly inaccessible location, there is a low risk of injury, however, personnel are instructed to switch off, lockout & tag out machine before carrying out various maintenance procedures as instructed in operational manual.	L
Feeder Raise Wheel	Entanglement	Operator	4	2	8	An entanglement hazard exists at the location of the feeder Raise wheel. 'Entanglement & Crush Hazard' decal is fitted to feeder lifting frame.	L
Folding linkage	Crushing / shearing	Operator	4	2	8	A number of crush/shear hazards exist between the moving members of the hopper fold linkage, screen blanket arrangement, fold cylinder and the feed conveyor frame. 'Crush Hazard' decals are fitted to the conveyor.	

Screen Box	Access	Falling	Operator	3	2	6	A Step is fitted to the machine as standard. . 'Falling Hazard' Decals fitted.	L
	Vibrator Weights	Impact	Operator	4	3	12	The rotating Vibrator Weights have been fitted with Cover Guards. Operating the machine with these guards removed exposing the rotating counter weights is very hazardous. For this reason 'Entanglement Hazard' decals have been fitted warning of the potential hazard of opening / replacing guards and operating an unguarded machine.	L
	Springs	Nip	Operator	3	3	9	The coil springs on the Screen Box should be guarded to help prevent inadvertent access to nip hazard between the spring coils when they compress during start-up and shut down of the Screen. 'Entanglement & Crush Hazard' decal fitted to this area warning of the danger.	L
	Vibrating Screen	Whole Body Vibration (WBV)	Operator	3	2	6	This unit is designed to vibrate therefore it is important that you do not attempt to work or walk on the Screen Box while it is operating. You could be exposed to excessive whole body vibration (WBV) Prolonged exposure to WBV could lead to serious back pain. Stop the machine, tag out and lock out the machine before any inspection, repair or maintenance.	L
	Lubrication	Entanglement / falling	Operator	3	2	6	Extended grease points have been used to bring inaccessible lubrication points outside the guards to areas accessible from ground level, removing the necessity to open or remove guard doors for re-lubrication.	L

	Outlet chutes	Crush hazard	Operator	4	3	12	Potential crush hazard between Vibrating Screen Box components and static machine components, feedboots, support frames etc. Personnel instructed to keep clear of screen box while machine is in operation. 'Crush Hazard' decal fitted.	L
Changing Screen Box Media	Manual Handling	Cut / Back Injury	Operator	3	3	9	Personnel instructed to wear approved rigger gloves while working at machine Personnel are instructed not to reach into machine and to switch off, lockout & tag out machine before carrying out various maintenance procedures. Never allow anyone to remove large or heavy components without adequate lifting equipment. Decal 'Falling Hazard.'	L
Over-Size Conveyor - (Tail Conveyor)	Tail Drum	Entanglement	Operator	5	1	5	Access to this area is restricted with a Tail Drum Cover Guard preventing access from the top and access to the sides is restricted by side guards. The underside is fitted with Deflector Plate Guards preventing access and helps reduce the necessity to remove guards to clear spillage. . 'Entanglement Hazard' decals located on Tail conveyor.	L
	Slide Rams	Crush	Operator	4	2	8	The Tail Conveyor Slide Rams offer a potential crush hazard both due to exposed hydraulic rams and when Tail Conveyor has been repositioned to access screen mesh and movement between 2 & 3 way split. Personnel instructed to stay clear of moving equipment. 'Crush Hazard' decal on Tail conveyor.	L
	Return Rollers (Disc)	Nip	Operator	4	2	8	A return roller guard has been fitted	L

Drive Drum	Entanglement	Operator	5	1	5	The Drive Drum in-running nip points have been fitted with a Drive Drum Nip Guard. 'Entanglement Hazard' decals located at head of Tail conveyor.	L
Inspection guards	Crushing/nipping	Operator	2	3	6	Decals Fitted: 'Entanglement hazard' & 'Crush hazard' to tail conveyor.	L
Drive Coupling	Entanglement	Operator	4	2	8	All Drive Couplings have been guarded. 'Entanglement Hazard' decals located at head of the Tail Conveyor.	L
Beater roller	Nipping	Operator	3	3	9	The nip hazard presented by the Tail Conveyor Beater Roller is addressed by the fitting of Beater Roller guards to both sides of the Conveyor prohibiting access to potential nip points. 'Entanglement Hazard' decals located at head of the Tail Conveyor.	L
Belt Tension	Entanglement	Operator	3	1	3	The need to remove or open guards in order to Tension or Track Belts is not required. Belt tensioning/tracking can be carried out from ground level; viewing holes have been incorporated into Tail Drum Side guards. 'Entanglement Hazard' decals located at Tail of the Conveyor.	L
Belt scraper	Abrasion	Operator	3	2	6	A low abrasion hazard is presented by the Belt Scraper on the Tail Conveyor. Due to its justly inaccessible location, there is a low risk of injury, however, personnel are instructed to switch off, lockout & tag out machine before carrying out various maintenance procedures,	L

Lubrication	Entanglement / falling	Operator	3	1	3	Extended grease points have been used to bring inaccessible lubrication points outside the guards to areas accessible from ground level, removing the necessity to open or remove guard doors for re-lubrication.	L
Skirting rubbers	Nipping	Operator	2	2	4	A low abrasion hazard is presented by the skirting rubbers on the conveyor due to its fairly inaccessible location. Personnel are instructed to switch off, lockout & tag out machine before carrying out various maintenance procedures	L
Tail drum scraper / plough	Entanglement	Operator	3	2	6	Tail Drum Plough Scraper is fully enclosed within guarding structure. Personnel instructed not to reach into machine when unguarded and to switch off, lockout & tag out machine before opening or removing guards. 'Entanglement Hazard' decals located at Tail of the Conveyor.	L
2/3 Way Split Conversion	Crushing/ Shearing	Operator	4	3	12	A number of crush/shear hazards exist between the moving section of the oversize conveyor when transitioning between 2 & 3 way split. 'Crush Hazard' decal added conveyor..	

**Side
Conveyors**

Drive Drum	Entanglement	Operator	5	1	5	The Drive Drum in-running nip points have been fitted with a Drive Drum Nip Guard. 'Entanglement Hazard' decals located at head of Side conveyor.	L
Tail Drum	Entanglement	Operator	5	1	5	Access to this area is restricted with a Tail Drum Cover Guard preventing access from the top and access to the sides is restricted with side guards. 'Entanglement Hazard' decals located on chassis .	L
Wing rollers / Feedboot	Entanglement	Operator	4	2	8	Wing rollers of feedboot guarded. 'Entanglement Hazard' decals located on chassis .	L
Folding points	Crushing	Operator	4	2	8	A number of crush/shear hazards exist between the moving sections of the side conveyors. 'Crush Hazard' decals added to side of conveyor frame.	L
Return Rollers	Entanglement	Operator	4	3	12	The Return Rollers have been fitted with Nip guards.	L
Belt scraper	Abrasion	Operator	3	2	6	A low abrasion hazard is presented by the Belt Scraper on the Side Conveyor. Due to its justly inaccessible location, there is a low risk of injury, however, personnel are instructed to switch off, lockout & tag out machine before carrying out various maintenance procedures,	L
2/3 Way Split Conversion	Crushing/ Shearing	Operator	4	3	12	A number of crush/shear hazards exist between the moving sections of the mid fines side conveyor when transitioning between 2 & 3 way split. 'Crush Hazard' decal added to side link arm.	

Beater roller	Nipping	Operator	3	3	9	The nip hazard presented by the Side Conveyor Beater Roller is addressed by the fitting of Beater Roller guards to both Sides of the Conveyor prohibiting access to potential nip points.	L
Drive Coupling	Entanglement	Operator	4	2	8	All drive couplings have been guarded. 'Entanglement Hazard' decals located at head of the Side Conveyor.	L
Belt Tension	Entanglement	Operator	3	1	3	The need to remove or open guards in order to Tension or Track Belts is not required. Belt tensioning/tracking can be carried out from ground level; viewing holes have been incorporated into Tail Drum and Side guards. 'Entanglement Hazard' decals located on the chassis.	L
Lubrication	Entanglement / falling	Operator	3	1	3	All Side Conveyor bearings can be greased from low level accessible remote greasing points without the need to open or remove guards. All machine grease points are highlighted with stickers.	L
Skirting rubbers	Nipping	Operator	2	2	4	A low abrasion hazard is presented by the skirting rubbers on the conveyor due to its fairly inaccessible location. Personnel are instructed to switch off, lockout & tag out machine before carrying out various maintenance procedures	L
Tail drum scraper / plough	Entanglement	Operator	4	2	8	Tail Drum Plough Scraper is fully enclosed within guarding structure. Personnel instructed not to reach into machine when unguarded and to switch off, lockout & tag out machine before opening or removing guards. 'Entanglement Hazard' decals located on the chassis.	L

Powerunit	General Maintenance	Various	Operator	5	2	10	Prior to any inspection, repair or maintenance to the Engine, the operator(s) must have received specific and adequate training in the task to be carried out having read and understood the Engine Manual and the safety signs in the manual and on the machine. Further details on the safe operation of this machine are contained in the Operations, Maintenance & Spare Parts Manual and the Engine Manual supplied with this equipment. A decal fitted ' Read and Understand Operators Manuals and Safety Signs.... ' is fitted to the Power Unit.	L
	Drive belts	Entanglement	Operator	4	2	8	All Drive Belts are enclosed with Engine guards. Personnel are instructed to switch off, lockout & tag out machine before carrying out various maintenance procedures	L
	Fuel system	Burning		4	2	8	Personnel advised of the fire hazard associated with diesel fuel. And are instructed to wear the correct fitting protective clothing. Personnel are also advised not to allow naked flames in the vicinity of any diesel fuel on the machine. Never allow unqualified personnel to attempt to operate, maintain, remove or replace any part of the machine. Decals fitted ' Read and Understand Operators Manuals and Safety Signs.... ,' ' Explosion/Burn Hazard. '	L

Hydraulic pumps and valves	Burning	Operator	3	2	6	Hydraulic Pumps and Valves present a burn and high pressure skin injection hazard. Control Valves are located in such a way to minimise exposure to heat and high pressure hydraulic hoses. Never allow unqualified personnel to attempt to operate, maintain, remove or replace any part of the machine. Decals fitted ' Skin Injection Hazard ' and ' Explosion/Burn Hazard. '	L
Control panel	Burning	Operator	2	2	4	Personnel instructed, in manual keep control box and other electrical connections/wiring clean and properly maintained to prevent possibility of short circuit or circuit overload.	L
Exhaust outlet / Piping	Respiratory	Operator	4	2	8	The Exhaust Outlet offers a burn and respiratory hazard. In Manual personnel instructed not to operate machine in areas of poor ventilation unless adequate extraction is present and properly used and maintained. Decals fitted, ' Explosion/Burn Hazard ' and ' Inhalation Hazard. '	L
Battery	Various	Operator	4	2	8	Personnel instructed in manual to keep Battery Terminals/Electrical Components/Switches and other electrical components clean and maintained. Personnel instructed to disconnect any power source before carrying out work on any electrical components. Battery gas emissions can pose explosive, corrosive and respiratory hazards. Decals fitted, ' Explosion/Burn Hazard ' and ' Inhalation Hazard. '	L

Hazardous Material

Disposal	Environmental	Operator	3	2	6	Personnel instructed to dispose of waste oils, fuels, coolants and lubricants in accordance with regulations in force at respective sites.	L
Diesel fuel oil	Various	Operator	3	2	6	Personnel advised of dangers associated with handling of diesel fuel.	L
Hydraulic oil	Various	Operator	3	2	6	Operators are instructed to wear the correct fitting protective clothing.	L
Engine oil	Various	Operator	3	2	6	Operators are instructed to wear the correct fitting protective clothing.	L
Gear oil	Various	Operator	3	2	6	Operators are instructed to wear the correct fitting protective clothing.	L
Grease	Various	Operator	3	2	6	Operators are instructed to wear the correct fitting protective clothing.	L
Coolant	Various	Operator	3	2	6	Operators are instructed to wear the correct fitting protective clothing.	L
Battery Electrolyte	Various	Operator	4	2	8	Personnel advised of dangers associated with handling battery electrolyte. Decals fitted, 'Explosion/Burn Hazard' and 'Inhalation Hazard.'	L

Operation	Accidental start up	Various	Operator	5	2	10	Incorporated in the starting procedure of the machine is a time delay mechanism, with both an acoustic warning signal and a visual flashing beacon to make any persons in the vicinity of the machine aware of machine start-up. Time delay and Warning sound also occurs on starting the conveyors. Emergency Stops are strategically fitted around machine. Personnel are instructed to switch off, lockout & tag out machine before carrying out any maintenance or adjustment procedures.	L
	Tracks	Crush	Operator	5	2	10	Exposed tracks present a potential crush hazard. Machine is equipped with audible siren and flashing beacon which operate when tracks are in motion. Operators are instructed to ensure all personnel are clear from machine when tracking. Emergency Stops are strategically fitted around including an Emergency stop on the tracking Remote Control. Decals fitted ' crush hazard – tracks '	L
	Control valves and pressurized hydraulic system	Burning / Fluid injection	Operator	4	2	8	Hydraulic Pumps and Valves present a burn and high pressure skin injection hazard. Control Valves are located in such a way to minimise exposure to heat and high pressure hydraulic hoses. Never allow unqualified personnel to attempt to operate, maintain, remove or replace any part of the machine. Decals fitted ' Skin Injection Hazard ' and ' Explosion/Burn Hazard. ' Personnel instructed never to use hands or fingers to check for hydraulic leaks.	L

Transportation	Various	Operator	5	2	10	Personnel instructed of correct procedure prior and during transportation, remove loose debris, fold into correct transport position etc. Decals fitted, ' Falling Hazard, ' ' Electrical Shock Hazard ' and ' Falling material Hazard. '	L
Overhead Power Lines	Electrocution	Operator	5	2	10	Personnel instructed Warning of special dangers (Electrical Energy),' to keep all parts of machine, a minimum safe distance from overhead electric power lines at all times. Safe minimum distance may increase depending on power line voltage and weather conditions. Personnel should check with relevant electricity provider to determine voltage and minimum distance. Decals fitted ' Electrical Shock Hazard. '	L
Machine Electrical Earth	Electrocution	Operator	5	2	10	Tracks and/or jacking legs earth machine to ground under normal circumstances. Personnel instructed that if machine is placed on rubber mats, wood etc. an alternative earth will be required.	L
Silica Dust	Various	Operator	4	3	12	Personnel advised of the risk of silicosis and other respiratory problems as a result of breathing dust produced during dry weather conditions when screening/crushing dry sand/stone. Personnel also advised to wear appropriate approved respiratory protection when screening/crushing dry sand/stone.	L
Screening	Various	Operator	5	2	10	Personnel instructed to wear correct fitting approved protective clothing (including respiratory protection when appropriate) and to wash hands and face before consuming any food or drink.	L

CONTAINER

Note: See the “Risk Assessment Programme” for definition of Risk Ratings.

‘Residual Risk’, means the level of risk remaining after any control measures have been introduced or implemented.

‘Operator’ means the person(s) given the task of installing, operating, adjusting, maintaining, cleaning, repairing or transporting the machinery.

Specific legislative requirements applicable;

- Health and Safety at Work NI Order 1978 (Health and Safety at Work Act 1974)
- The Supply of Machinery (Safety) Regulations 1992 (SI No. 3073)
- The Supply of Machinery (Safety) (Amendment) Regulations 2005 (SI No. 831)
- The Provision and Use of Work Equipment Regulation 1998 SI No. 2306 (PUWER 98)



RISK ASSESSMENT PROGRAMME

Each area of the machine and any envisaged tasks have been individually examined to identify significant hazards that exist or potential hazards that could pose a significant risk during the operation, maintenance, installation or transportation of the equipment. Each hazard identified has been individually assessed according to the following criteria to determine the level of risk and what control measures have been implemented or what remedial action should be taken to eliminate or reduce the level of risk.

SEVERITY OF INJURY:

- 5 - Death
- 4 - Disablement
- 3 - Over 3-day injury (RIDDOR)
- 2 - First aid
- 1 - Negligible

LIKELIHOOD:

- 5 - Imminent
- 4 - Very likely
- 3 - Likely
- 2 - Possible
- 1 - Unlikely

Severity x Likelihood = Risk Rating

RISK ASSESSMENT MATRIX (RISK RATING)

Likelihood	Severity				
	Death (5)	Disablement (4)	3 Day (3)	First Aid (2)	Negligible (1)
Imminent (5)	25	20	15	10	5
Very likely (4)	20	16	12	8	4
Likely (3)	15	12	9	6	3
Possible (2)	10	8	6	4	2
Unlikely (1)	5	4	3	2	1

RISK RATING PRIORITY

Score	Priority	Action to be taken
1 - 9	LOW (L)	Action is required to reduce the risk, although low priority. Time, effort and cost should be proportional to the risk.
10 -16	MEDIUM (M)	Action required soon to control. Interim measures may be necessary in the short term.
20 - 25	HIGH (H)	Action is required urgently to control the risk. Unacceptable, immediate action required before work activity can continue.