



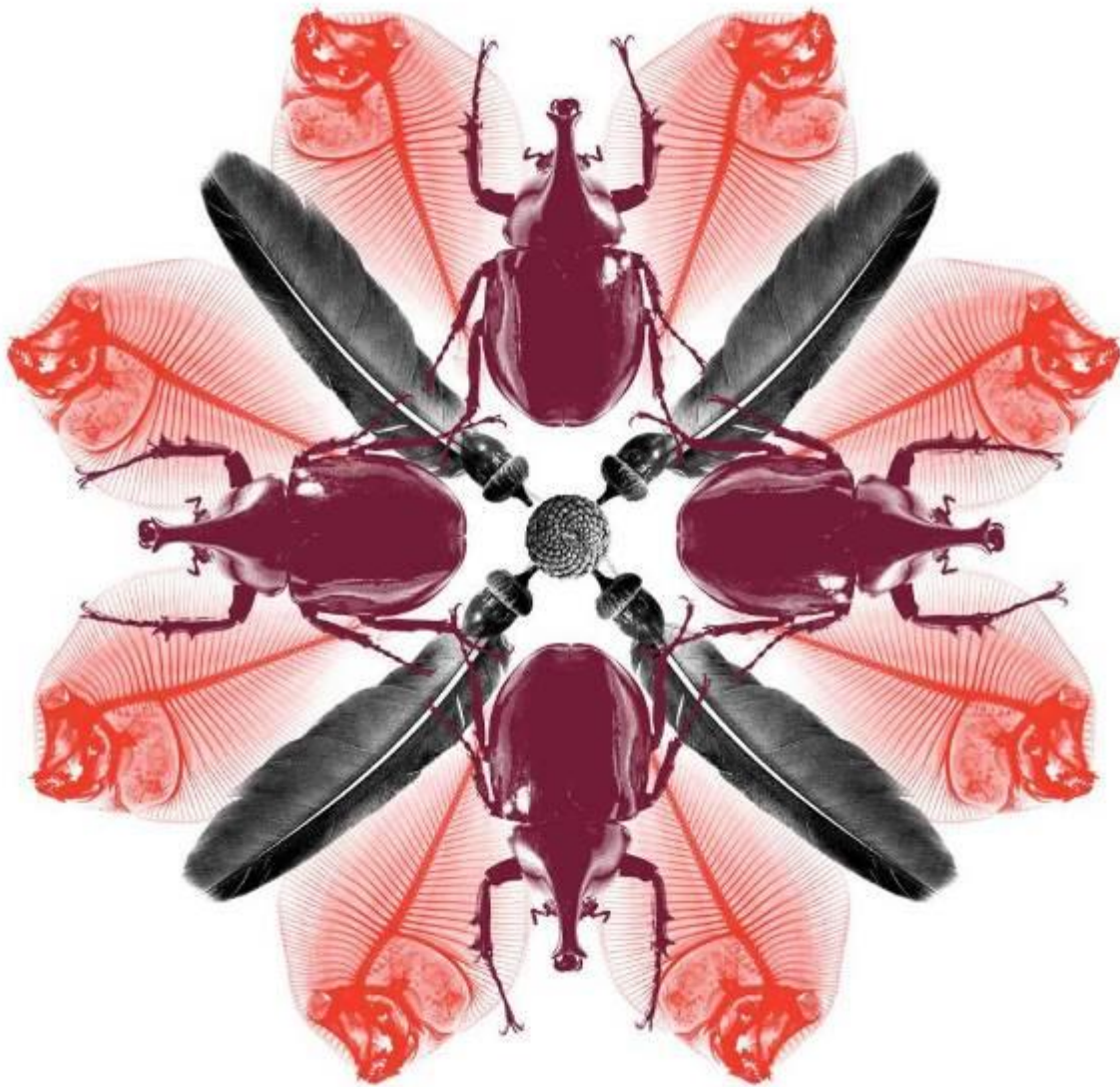
Australian Government
Department of Agriculture
and Water Resources

Machinery Cleaning Guide - Compactors

Biosecurity

Publication series

April 2016



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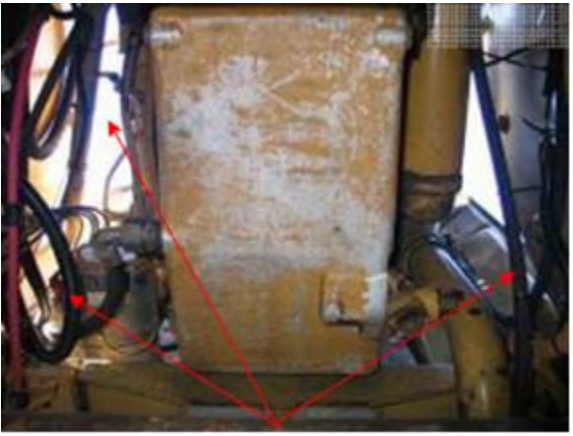
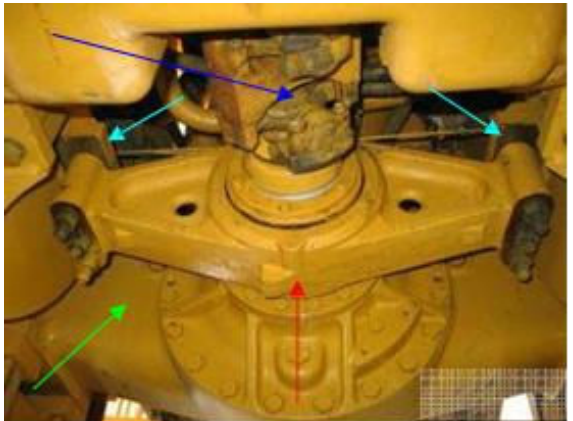
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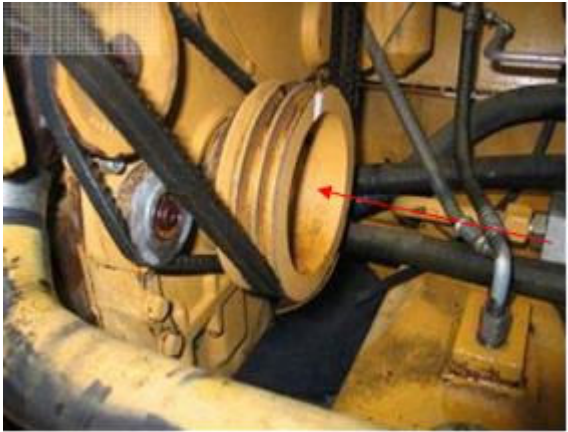
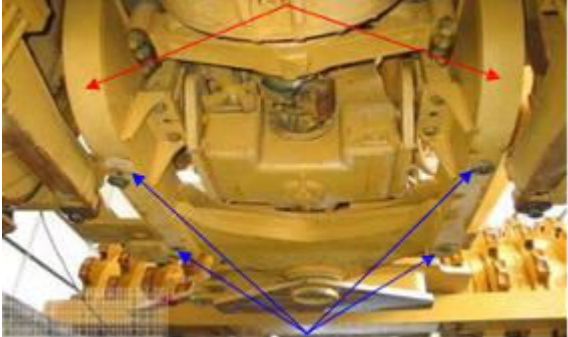

Cleaning guidelines

Engine, chassis, oil tank and housing


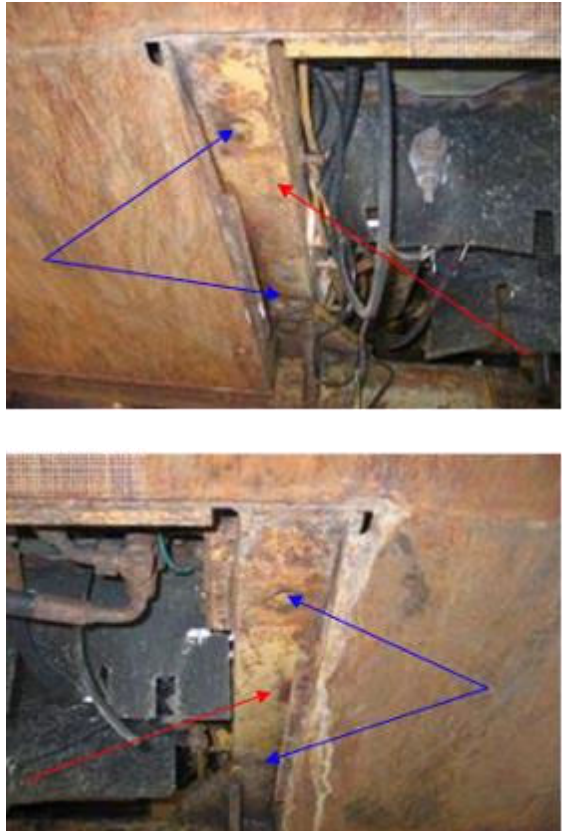
Description	Images
<p>The right hand side of the compactor engine block. All non-affixed panels have been removed to facilitate cleaning and inspection.</p>	
<p>The left hand side of the compactor engine block. All non-affixed panels have been removed to facilitate cleaning and inspection.</p>	
<p>All belly plates have been removed exposing the underside of the engine block for cleaning and inspection. The hollow chassis rails (red arrows) must be flushed in the presence of the inspecting officer to verify cleanliness.</p>	

Description	Images
<p>The underside of the radiator and shroud (blue arrow). The bolt hole access to the hollow chassis rail is highlighted again (red arrows).</p>	
<p>The sump under the front end of the Compactor. Ensure that this area has had all contaminated grease removed. All hydraulic hoses and wiring harnesses (red arrows) must be thoroughly cleaned and inspected.</p>	
<p>The rear sway bar (red arrow), universal joint (blue arrow) and diff (green arrows). All contaminated grease must be removed from all universal joints. Check all countersunk holes and ledges. Ensure all topside of the engine mounts (aqua arrows) are clean.</p>	

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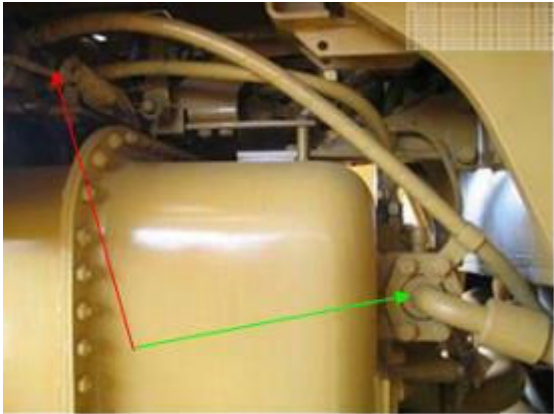


Description	Images
<p>At the rear of the engine block are the harmonic balancers or flywheels (red arrow). These are generally concave and can harbour significant amount of biosecurity risk material (BRM).</p>	
<p>The front hollow chassis rails (red arrows). The four belly plate bolts (blue arrows) are still in place in this illustration, however all must be removed and the area flushed to ensure cleanliness.</p>	
<p>This image depicts a rare sight because the cabin has been removed from the compactor. The top of the block directly under the cabin is one of the most difficult areas to clean and inspect. The bell housing (red arrows) with the undulating surface can harbour BRM.</p>	

Biosecurity




Description	Images
<p>The front of the engine as seen from the pivot point. This area contains a myriad of ledges, hydraulic hoses and countersunk holes that require thorough cleaning and inspection.</p> <p>Ensure all engine mounts are free of BRM including the reverse side.</p>	
<p>These illustrations highlight the hollow chassis rails (red arrows) and drainage holes (where the belly plate bolts have been removed – blue arrows). The area will require flushing to ensure cleanliness.</p>	

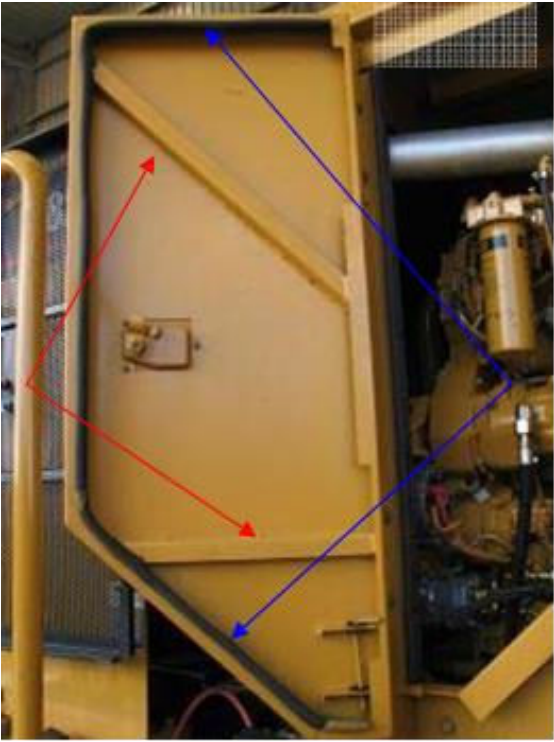
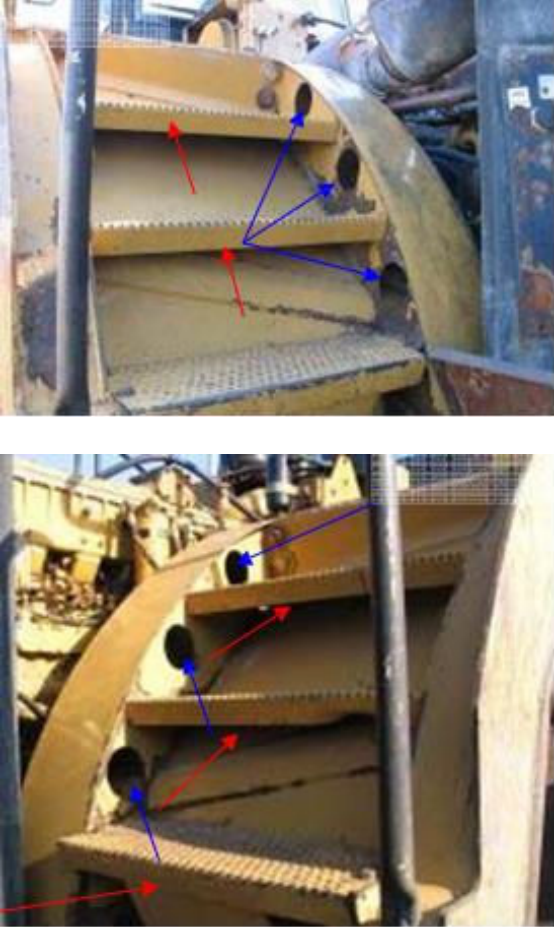
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Description	Images
<p>Just behind the pivot point another belly plate has been removed, exposing another hollow channel (red arrows) that will require flushing to ensure cleanliness. All BRM from the bottom pivot point (green arrow) must be removed.</p>	 A photograph showing the underside of a compactor's chassis. A vertical metal rod is visible on the left. A red arrow points to a narrow, V-shaped hollow channel in the metal structure. Another red arrow points to a similar channel further back. A green arrow points to a pivot point at the bottom center.
<p>One of the 'dropped' belly plates from under the compactor. This one has no internal or external gussets, however all belly plates must be removed to facilitate cleaning, flushing and inspection.</p>	 A photograph of a single, rectangular metal belly plate. It is heavily rusted and shows signs of wear. The plate is oriented vertically, showing its thickness and the lack of internal or external gussets.
<p>The oil tank under the cabin. The topside and rear of the oil tank is the most difficult to access (green arrow).</p>	 A photograph of the yellow oil tank located under the operator's cabin. The tank is cylindrical and has several access points. A green arrow points to the rear of the tank, which is the most difficult area to access. The surrounding area is cluttered with various mechanical parts and hoses.

Description	Images
<p>The topside of the oil tank and under the cabin step. There can be numerous hollow channels (red arrow), ledges and hydraulic hoses and couplings (green arrow) that require thorough cleaning and inspection.</p>	
<p>Some engine covers may tilt rearwards as illustrated, exposing the topside of the engine block. The engine covers must be checked for hollow rails, if present they require to be flushed. Check all handrails (red arrows) for open ends or drainage holes that can be flushed.</p>	
<p>An illustration of a hollow channel in the engine cover (red arrow) of the Compactor. This will require flushing to ensure cleanliness.</p>	

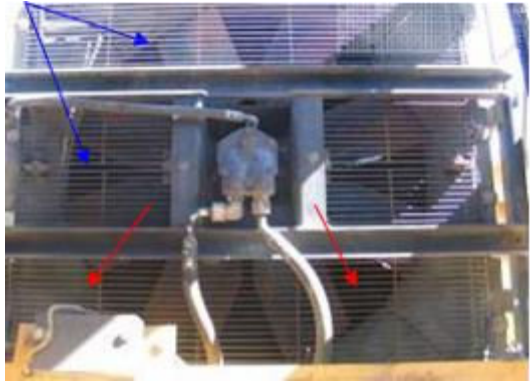

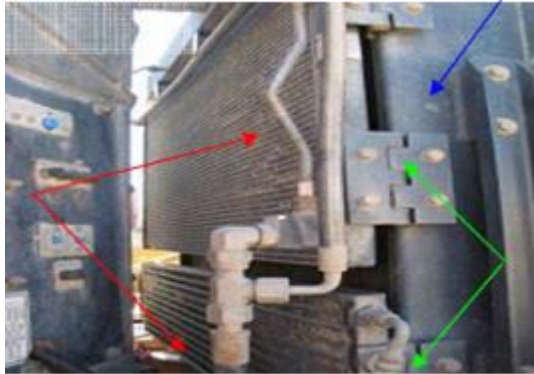
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Description	Images
<p>A fixed compactor engine housing with non-affixed panels (red arrow) and hollow framework (blue arrow).</p>	 A photograph showing the interior of a yellow engine housing. A red arrow points to a non-affixed panel, and a blue arrow points to a hollow framework structure.
<p>The underside of the engine housing, where hollow, open-ended support channels (red arrows) may be located. All must be flushed to ensure cleanliness.</p>	 A photograph showing the underside of the engine housing. Red arrows point to hollow, open-ended support channels.
<p>Further illustrations of the hollow support framework that may be located under the engine cover.</p>	 A photograph showing the hollow support framework under the engine cover. Blue arrows point to various parts of the framework.

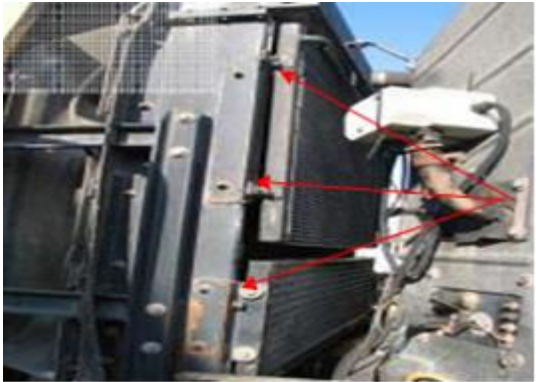
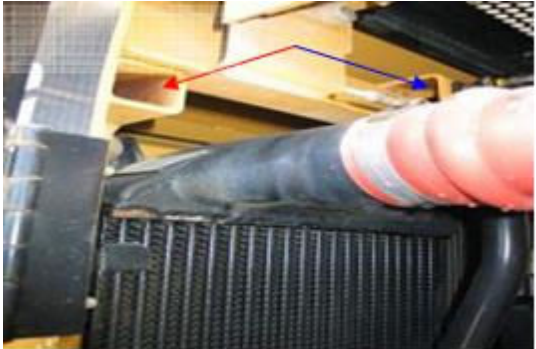

Description	Images
<p>The hinged door to the engine bay has been opened, revealing spot welded support frames that are hollow (red arrows) and will be inspected by a biosecurity officer for cleanliness. All engine door rubbers must be cleaned and inspected (blue arrows).</p>	
<p>On some of the larger model compactors, above the rear drum and along the side of the block, a small set of steps may be located. The underside of each footstep (red arrows) must be verified clean, but also the hollow cavities as highlighted by the blue arrows.</p>	

Description	Images
<p>At the top of these steps seen in the last illustration, a non-affixed panel has been removed, allowing access for cleaning and inspection.</p>	
<p>The left and right hand side of the compactor, just in front of the rear drums. On this model there are no non-affixed panels, allowing sufficient access to the side of the engine block for cleaning and inspection. On other models, non-affixed panels will need to be removed to allow this access.</p>	

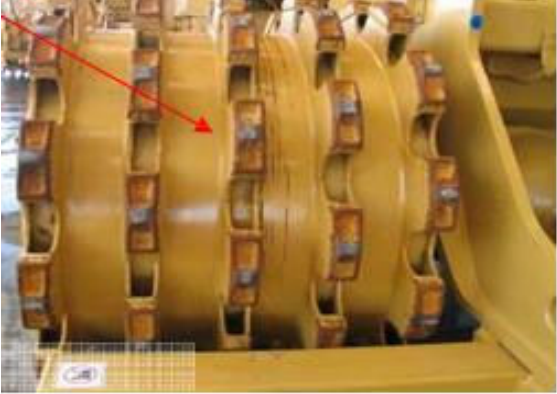


Radiator and rear end




Description	Images
<p>The rear end, highlighting the radiator grill (blue and red arrows), which must be removed to allow cleaning and inspection access inside the bottom of the shroud.</p>	
<p>Another radiator grill on a different model of compactor. This must be removed to allow access for cleaning and inspection inside the bottom of the shroud (red arrows).</p>	
<p>The rear side of the radiator (blue arrow) and oil cooler (red arrows), which require flushing of the fins to ensure cleanliness. On this model the cooler is hinged (green arrows), allowing the oil cooler to be opened (see next illustration) from the radiator fins and be flushed.</p>	



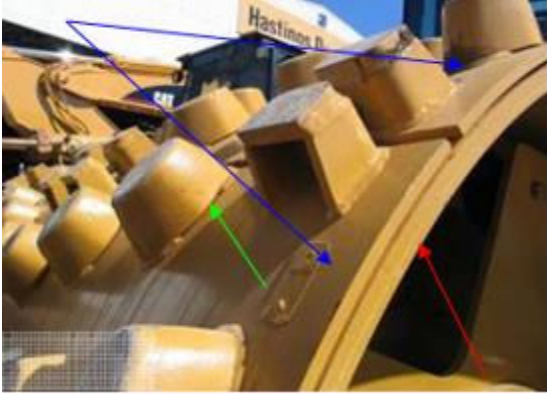

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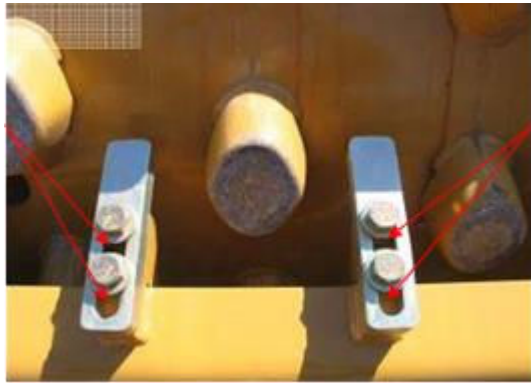


Description	Images
<p>The opposite side of the radiator and oil cooler showing the bolts that can be removed (red arrows), allowing the oil cooler to be swung open so both the radiator and oil cooler can be flushed.</p>	
<p>On some models there may be hollow channels (red arrow) and ledges (blue arrow) above the radiator that must be free of all BRM.</p>	
<p>All air-filter pre-cleaner covers are to be removed to allow cleaning and inspection access (red arrow).</p>	

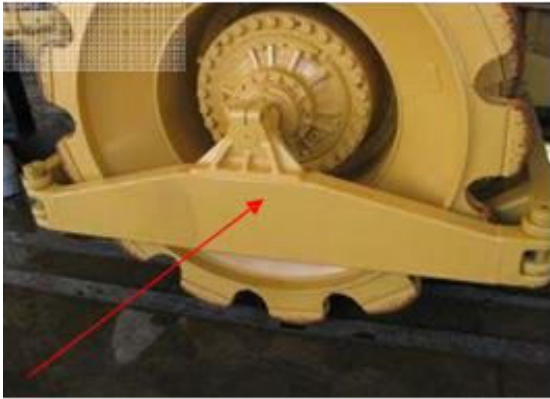
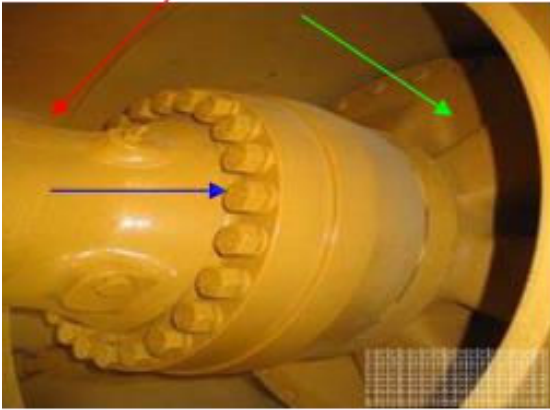

Boots (Sheepfoot), rims and cleaning bars

Description	Images
<p>An example of some of the styles of boots that may be found on compactors (red arrow). These boots are hollow and have an access point on the underside (illustrated next), and all must be flushed to ensure cleanliness.</p>	
<p>The underside of the boot on this style of compactor. Although not easily seen, there is a hole on the underside (where red arrow is highlighting) and these must all be flushed to ensure cleanliness.</p>	
<p>A view of this boot reveals that it is not completely sealed (only spot welded) in place. The green arrow highlights the small recesses, allowing contaminants inside this hollow cavity (blue arrow). These will require further investigation to verify cleanliness. Flushing via these small recesses with a pin jet, will not suffice in removing BRM or verifying internal cleanliness. All boots must be removed (illustrated in second image). Once removed, access is easy for verifying (red arrow).</p>	

Description	Images
	
<p>Another example of some of the styles of boots that may be found on compactors (red arrow).</p>	
<p>A close view of this boot reveals that it is not completely sealed (only spot welded) in place. The red arrow highlights the small recess, allowing contaminants inside this hollow cavity (blue arrow). These will require further investigation to verify cleanliness. Flushing via this small recess with a pin jet, will not suffice in removing BRM or verifying internal cleanliness.</p>	

Description	Images
<p>These boots were only spot welded into place and the importer chose to remove the internal BRM by inserting a small access point into each boot. There may be evidence on some drums that the boots have been repositioned at some stage (old welding tracks present). In this instance, the internal cleanliness of these boots will also be required.</p>	
<p>Another example of some of the styles of boots that may be found on compactors. The boots illustrated in this shot are spot welded onto a semi-circular drum that is fitted to a roller wheel.</p>	
<p>A close illustration highlighting the roller wheel (red arrow) and the semi-circular drums (blue arrows). These semi-circular drums must be removed to allow access for cleaning and inspection. The internal cleanliness of each spot-welded boot (green arrow) must also be verified.</p>	
<p>The semi-circular drums removed for cleaning and inspection.</p>	

Description	Images
<p>An example of the cleaning bars that remove trash from between the boots when operating. Note the small holes on the underside (red arrows), which can harbour BRM and must be verified clean.</p>	
<p>Another example of the cleaning bars found on compactors. These cleaning bars also have small recesses (red arrows) where BRM can accumulate.</p>	
<p>The outside of the compactor rim. Check that all countersunk holes and around each nut is free of BRM (red arrow).</p>	
<p>Check all surfaces of the rim (red arrows) for any cracks, splits or evidence of repair. The green arrow is highlighting a small seam (common on some models), which is not a split or repair. This seam will require flushing to verify cleanliness.</p>	

Description	Images
<p>Another example of the outside rim, this time partly obscured by the cleaning bar (red arrow). Check that all countersunk holes and around each nut are free of BRM.</p>	
<p>An example of an inside rim with no cover plates. Ensure that the top of the axel (red arrow), around each nut (blue arrow) and the undulating surfaces inside the rim (green arrow) are free of BRM.</p>	
<p>An inside rim cover with a large recess behind. Access may be required to verify cleanliness (red arrow).</p>	




Tyres

Description	Images
All cracks and splits in tyres must be verified to ensure that all are free of BRM.	

Cabin



Description	Images
<p>The side view of a typical compactor cabin.</p>	 <p>A side view of a yellow compactor cabin. The cabin is blue and yellow, with a large window and a door. It is situated on a yellow base.</p>
<p>The inside of the cabin. All rubber matting and pedal covers (red arrows) must be removed and cleaned.</p>	 <p>An interior view of the compactor cabin. A steering wheel is on the left, and a gear shift is in the center. Red arrows point to a rubber mat on the floor and a pedal cover on the right side.</p>
<p>The rubber shroud under the seat must be internally and externally cleaned and inspected. Check behind and inside all cabin wall linings (green arrow) and storage compartments (blue arrow) are free of BRM. On some models the air-conditioning unit is in the box section below the seat (aqua arrow) and access for cleaning and inspection will require that the seat is removed.</p>	 <p>A view of the seat area. A grey mesh seat is on top of a metal frame. A red arrow points to a rubber shroud under the seat. A green arrow points to the cabin wall lining. A blue arrow points to a storage compartment. A cyan arrow points to the air-conditioning unit below the seat.</p>

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Description	Images
Access will be required to the joystick control panels to verify internal cleanliness (red arrows).	
Remove the air-filter cover (red arrow) and verify the cleanliness of the filter (pressurised air).	
All internal cabin compartments (red arrow) are to be checked and all internal padding (blue arrows) must be cleaned and inspected (and behind).	

Biosecurity

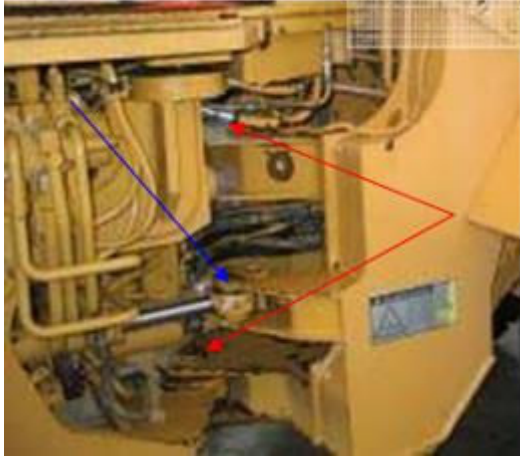

Description	Images
Verify behind all internal cabin wall linings to ensure free of BRM (red arrow).	 A photograph of the interior of a CAT machine cabin. A red arrow points to a gap between the wall lining and the structure behind it, indicating a potential area for biosecurity risk.
The door latches are hollow structures and verification of internal cleanliness is required (red arrow).	 A close-up photograph of a door latch mechanism. A red arrow points to a hollow interior of the latch, indicating that it needs to be cleaned.
On some models a small recess can be found between the cabin roof and the Roll Over Protection System (ROPS) see red arrow.	 A photograph showing the cabin roof and the Roll Over Protection System (ROPS) structure. Red arrows point to a small recessed area between the roof and the ROPS, indicating a potential area for biosecurity risk.

Description	Images
<p>Underneath the cabin, the framework may be open-ended as illustrated (small triangular corners missing) and will require flushing to verify cleanliness (red arrow).</p>	
<p>Check all footsteps for cleanliness (including underside – see red arrow).</p>	


Articulated pivot point

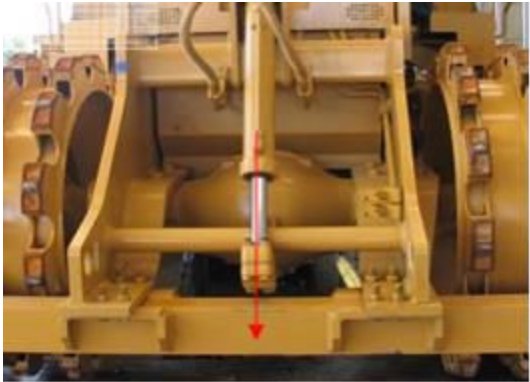

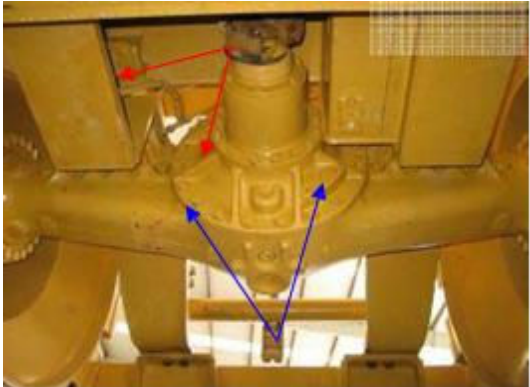
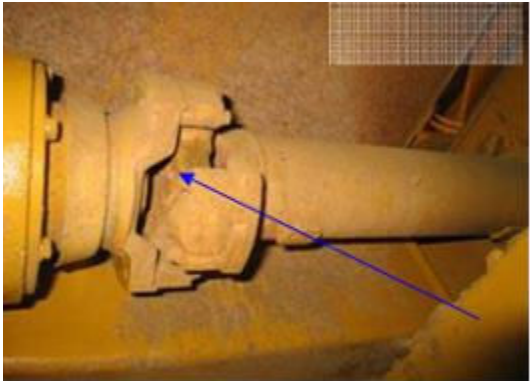
Description	Images
<p>The bottom pivot-point (red arrow) as generally seen on compactors. This area is signified by several pivot points (above), universal joints (blue arrow) and a myriad of hydraulic hoses (green arrows), all requiring thorough cleaning and inspection.</p>	

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Description	Images
The pivot-points (red arrows) and hydraulic rams (blue arrow). All non-affixed panels and shrouds have been removed, allowing access for cleaning and inspection.	 A close-up photograph of the internal mechanical components of a compactor. The image shows a complex arrangement of metal parts, including what appear to be pivot points and hydraulic rams. Two red arrows point to specific pivot points, and a blue arrow points to a hydraulic ram. The background is a yellow-painted metal structure.
The bottom pivot point from a slightly elevated angle. Check all hollow framework (green arrow) for entrance holes (blue arrow) or drainage holes underside. This area can harbour a significant amount of BRM and must be verified clean.	 A close-up photograph of the bottom pivot point of a compactor, viewed from a slightly elevated angle. The image shows a yellow-painted metal structure with a hollow framework. A green arrow points to the hollow framework, and a blue arrow points to a potential entrance hole. The area appears to be a complex mechanical assembly with various components and wiring.

Front end

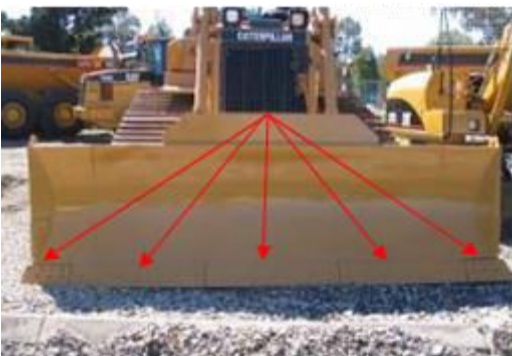
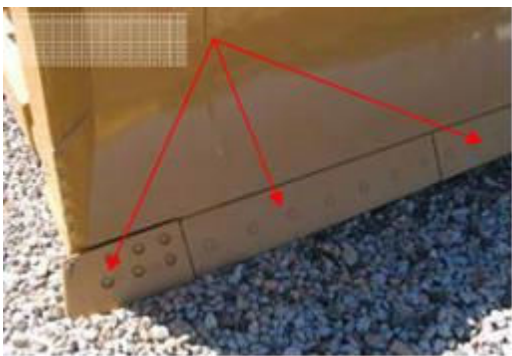
Description	Images
Illustration of the front end of a compactor.	 A photograph showing the front end of a yellow compactor. The machine is positioned in a large, well-lit industrial or warehouse setting. The front view shows the compactor's frame, wheels, and the front-mounted compaction mechanism. The background shows the interior of a large building with high ceilings and structural beams.

Description	Images
<p>Check the cleaning bar (red arrow) for any cracks, splits, drainage holes or evidence of repair.</p>	
<p>The non-affixed housing has been removed, allowing access for cleaning and inspection. This cover can be completely removed, if required. There are small recessed areas (red arrows) that will require flushing to verify cleanliness.</p>	
<p>The front axle and differential. All ledges (red arrow), top of axels, countersunk holes (blue arrows) and inside wheel rims must be thoroughly cleaned and inspected.</p>	
<p>All contaminated grease is to be removed from all universal joints (blue arrow).</p>	



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Description	Images
<p>Axle mounts are generally concave as illustrated and require cleaning and inspection (red arrow).</p>	 A close-up photograph of two yellow axle mounts. Two red arrows originate from a single point at the top and point to the concave inner surfaces of the mounts.




Blade

Description	Images
<p>A typical blade on a compactor. All cutting teeth (red arrows) must be loosened and flushed to verify cleanliness. Check for any cracks, splits or evidence of repair to all surfaces. If detected, the interior of the blade will have to be verified clean.</p>	 A wide-angle photograph of a yellow compactor's blade. Five red arrows point from a central point above the blade to various cutting teeth along its length.
<p>A close up of the cutting teeth on a blade that need to be loosened and flushed to verify cleanliness (red arrows).</p>	 A close-up photograph of the cutting teeth on the blade. Three red arrows point to the teeth, highlighting the areas that need to be inspected and cleaned.



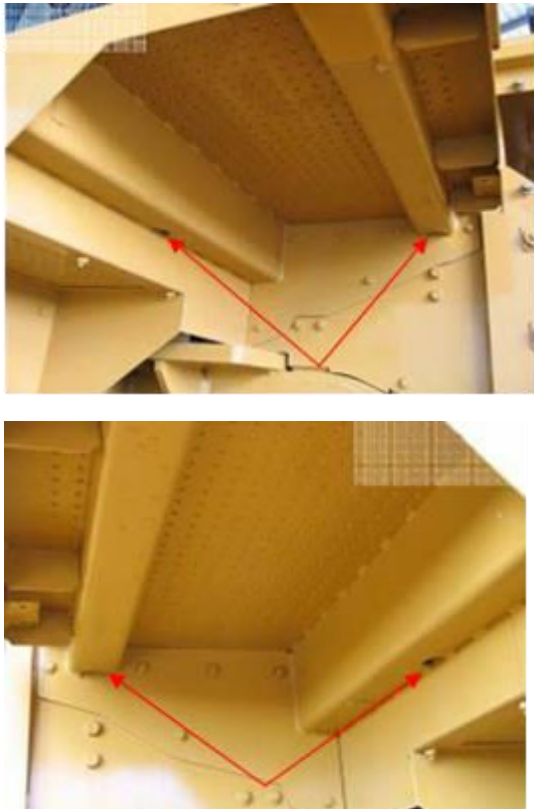
False floors under cabins

Description	Images
<p>On some models of compactors, under the cabin may be a false floor (red arrow). These are reasonably common and worth illustrating as this area can harbour a significant amount of BRM. The false floors can be made from hard rubber or compressed fibreboard and can be unbolted to allow access for cleaning and inspection.</p>	
<p>This illustrates the compartment under the cabin step. Like the oil tank on the other side, this area has ledges (red arrow) and hollow channels (blue arrow) that require cleanliness verification.</p>	

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Description	Images
Remove all light covers and check the internal surfaces (blue arrow).	 A photograph showing a red rectangular light cover mounted on a yellow piece of heavy machinery. A blue arrow points to the top surface of the red cover, which is the internal surface to be checked. The background shows a white wall with a 'CAT' logo.
Check all wiring harnesses for internal cleanliness.	 A close-up photograph of a wiring harness. A blue arrow points to a specific area where the wires are bundled together, showing a significant amount of dirt and grime on the internal surfaces.
Check all looms around hydraulic hoses for internal cleanliness.	 A close-up photograph showing a person's hands holding a black corrugated hydraulic hose loom. A blue arrow points to the internal surface of the loom, which is heavily contaminated with dirt and debris.

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Description	Images
<p>Batteries are to be loosened from the tie down points for cleaning and inspection (red arrows).</p>	 A photograph showing a battery compartment with several blue batteries. Red arrows point to the tie-down points where the batteries are secured.
<p>All non-slip checker plate is to be flushed to verify cleanliness (red arrow).</p>	 A close-up photograph of a non-slip checker plate. A red arrow points to the surface of the plate.
<p>The wheel arch as illustrated on some models. Note the small drainage holes (red arrows) on the underside of the support framework. These will require flushing to verify cleanliness.</p>	 Two photographs showing the underside of a support framework. Red arrows point to small drainage holes on the underside of the support framework.

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Description	Images
<p>Examples of the amount of dismantling required to facilitate cleaning and inspection.</p>	