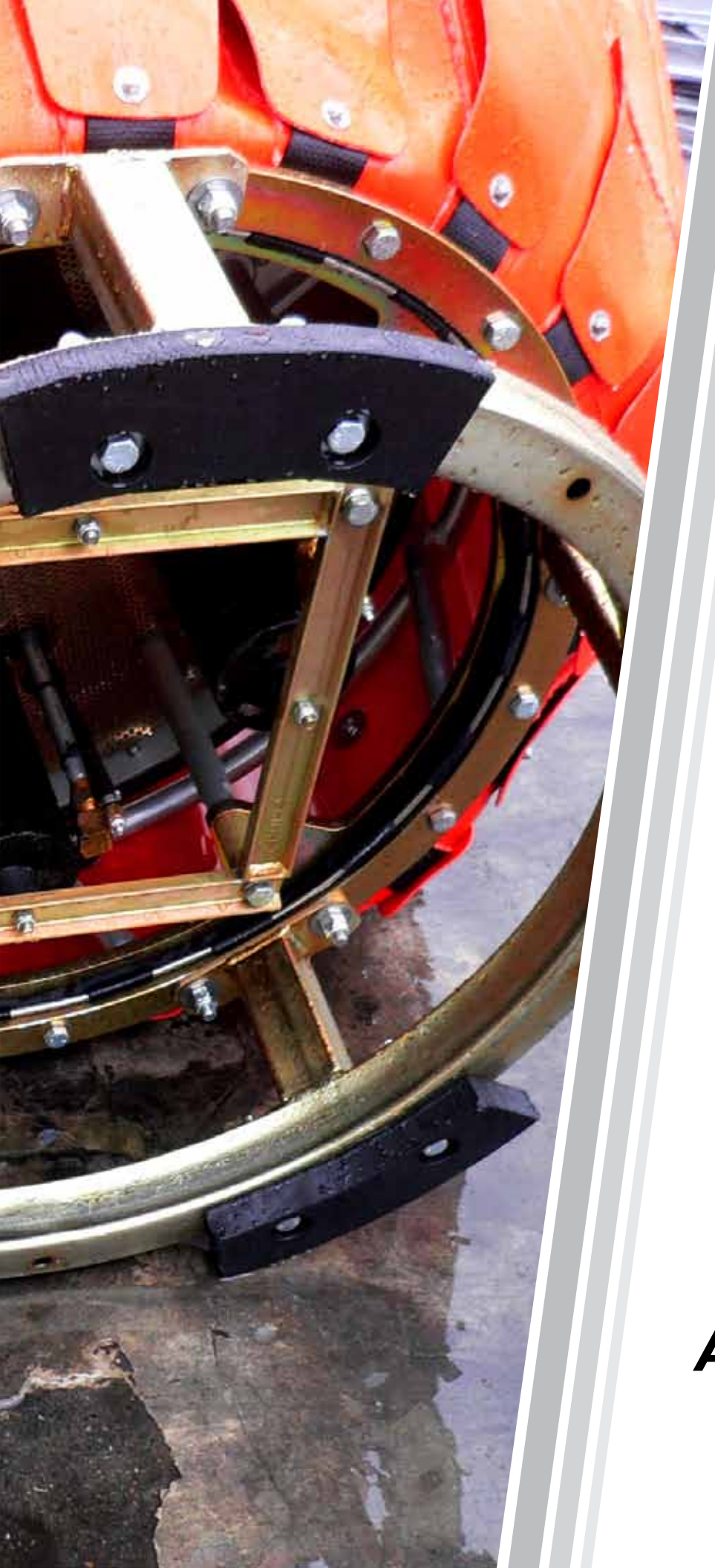

SEI INDUSTRIES

Bambi BUCKET®
Driven by Innovation

TORRENTULA BUCKET DAMAGE ASSESSMENT MANUAL

Torrentula Valve™ Bambi Bucket®

Repair Assessment Manual
with
PowerFill I Supplement

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Introduction to the Torrentula Valve™ Bambi Bucket® Repair Assessment Manual

Since its introduction to the marketplace in 1983, the Bambi Bucket has become the preferred means of helicopter fire fighting by over 600 companies and agencies worldwide. The industrial fabrics used in the construction of the Bambi Bucket are designed specifically for the Bambi Bucket and meet substantial safety factors to provide the operator with a quality product that is designed to last.

This manual is intended to provide the user with information that will allow for the proper repair assessment evaluation of the Torrentula Valve Bambi Bucket. The repair assessment process is mostly identical for all sizes of the Torrentula Valve Bambi Buckets, with exceptions noted for minor bucket design variations between the models. In these cases subsections describing the different types of damage will be presented. Diagrams, photos and part descriptions are provided as an aid for quick identification and evaluation of parts and components on the Torrentula Valve Bambi Bucket.

This manual contains specific guidelines for the assessment of the operational condition of Torrentula Valve Bambi Buckets. At the end of each section of the Repair Assessment Manual is a guide that sorts the component defects into one of four categories, **Safety, Operational, Monitor, and OKAY**. Use the guideline definitions below to determine how urgently a repair should be carried out:

Attached as a supplement is the repair assessment process and guidelines for the Torrentula Valve Bambi Bucket fitted with the PowerFill I shallow water pumping system. The following guidelines are also to be used to sort the component defects into categories and determine the urgency of repairs.

Category 1: Safety
All defects in this category must be repaired immediately before further operation of the Bambi Bucket. Ignoring defects in this category could result in personal injury or damage to equipment. These defects can compromise the following functions of the Bambi Bucket:

1. Structural integrity
2. Flight stability
3. Water release
4. Flight Safety

Category 2: Operational
All defects in this category should be repaired before the next operational day, or approximately 8 hours of flight time. The defects do not compromise the safety of the bucket, but may lead to Category 1 defects if not addressed within a short time frame.

Category 3: Monitor
Many defects such as wear, abrasion and minor impact damage do not need urgent attention. Defects of this nature should be monitored daily and repaired before the progress to Category 2 defect.

Category 4: OKAY
The Bambi Bucket does not need repairs.

SECTION A: PARTS - SHELL AND VALVE MODELS 2024-HL9800

Parts Diagram

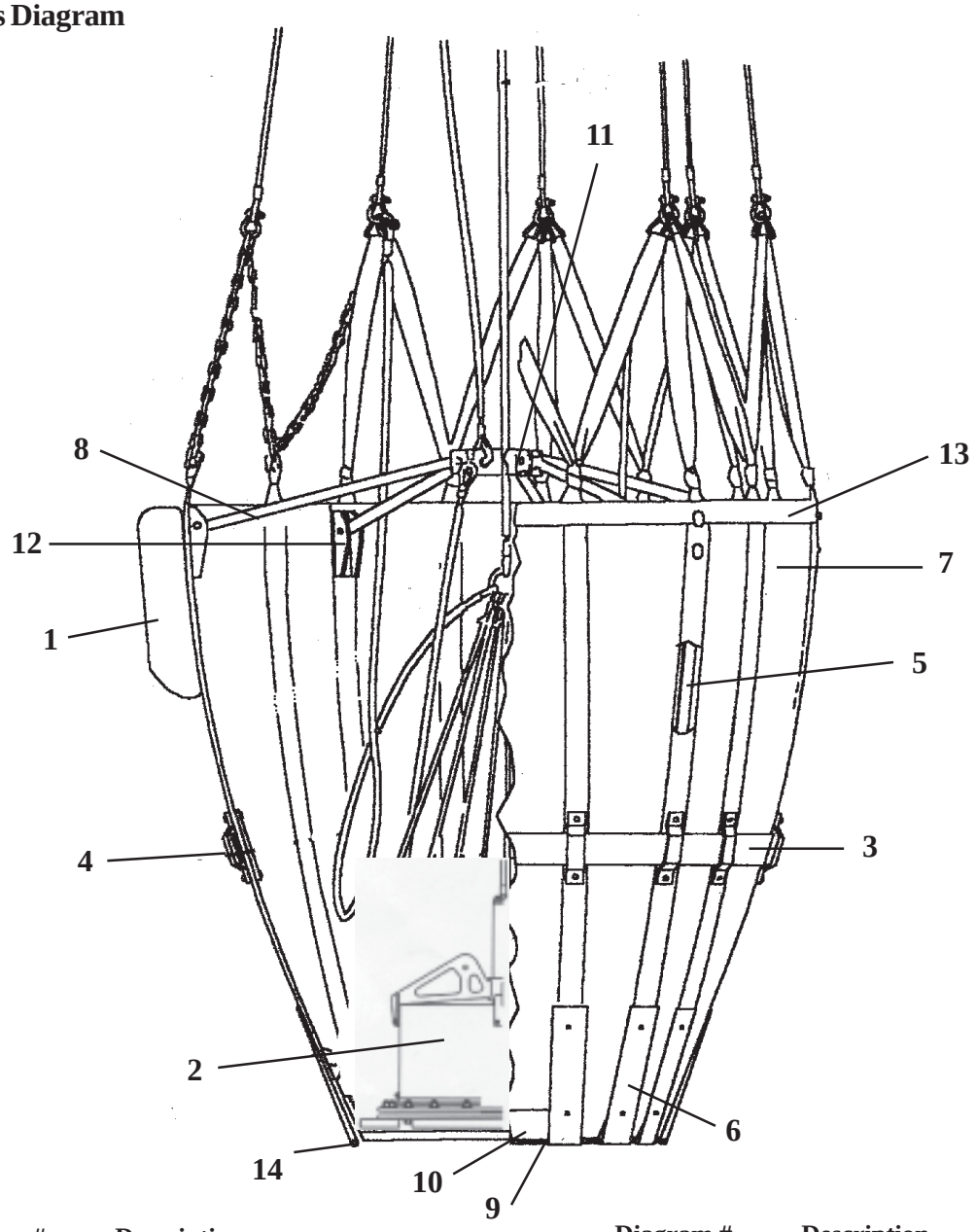


Diagram #	Description
1	Ballast Plates
2	Torrentula Valve
3	Cinch Strap
4	Cinch Strap Bar
5	Side Battens
6	Bottom Webbing Loop Wear Strip

Diagram #	Description
7	Bambi Bucket Shell
8	IDS Hub Spokes
9	Bottom Webbing Loops
10	Bottom Chain or Rod
11	IDS Hub
12	IDS Brackets
13	Top Webbing
14	Bottom Webbing

Parts Diagram

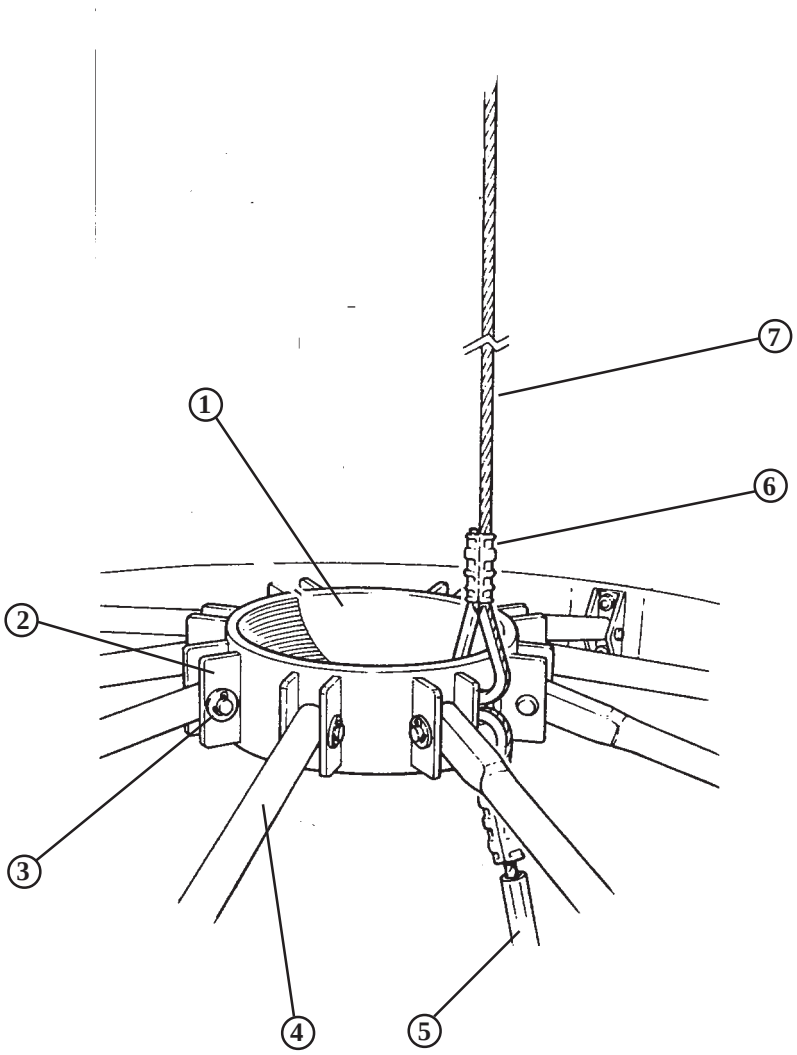


Diagram #	Description	Diagram #	Description
1	IDS Hub	5	IDS Hub Restrainer
2	IDS Hub Bracket	6	Swage Block
3	Clevis Pin	7	Deployment cable
4	IDS Spokes		

Figure 3

Parts Diagram

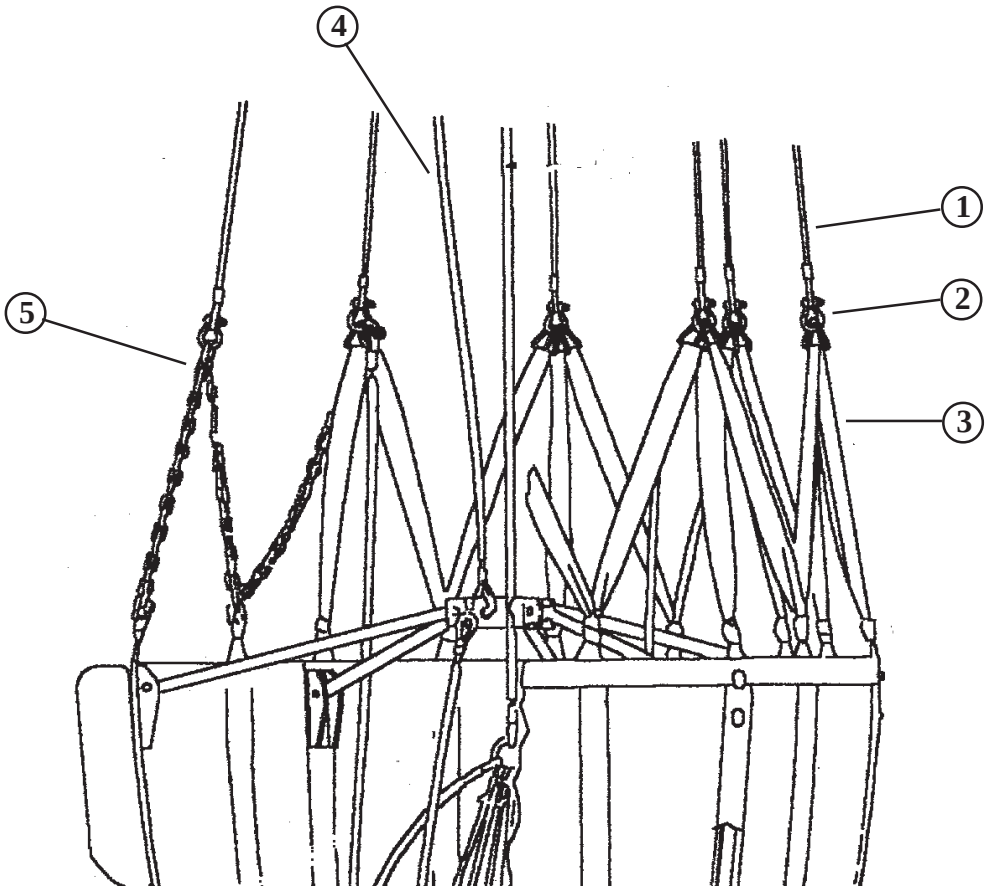


Diagram #	Description
1	Suspension Cables
2	Shackles
3	M-Straps
4	IDS Deployment Cable
5	Top Chains

Figure 4

SECTION B: CARRY BAG

Inspect the carry bag carefully. Look for any holes, broken zippers or torn handles. Torn handles and holes in bags can be fixed, but broken zippers cannot. The carry bag acts as a protective cover for the Bambi Bucket when not in use. In the event that the zipper is broken, you may want to replace the bag. Holes can be fixed by hand sewing fabric over the holes. Torn handles can be fixed by overlapping a portion of the handle webbing, and sewing it together.

SECTION B: CARRY BAG

Category 1: Safety
Cease Operations and Repair Immediately

- Not Applicable

Category 2: Operational
Repair before next days operation, or 8 hours flight time

- Not Applicable

Category 3: Monitor
Monitor and or repair if condition deteriorates

- Holes in the bag
- Broken zipper
- Torn handles

Category 4: OKAY
Does not need repair

Bambi Bucket Shell

The shell forms the basis for the Bambi Bucket. In your repair assessment, examine the shell for any weld separations along the panels, punctures, leaks or tears on the fabric, broken Top or Bottom Webbing Loops, broken Battens or for Bambi Strips that are beginning to peel away from the panel.

- Small punctures, tears or leaks can be repaired by the operator, by welding a patch over the affected area with a heat gun (refer to Operator's Manual for proper procedure). Large holes may require replacement of the panel.

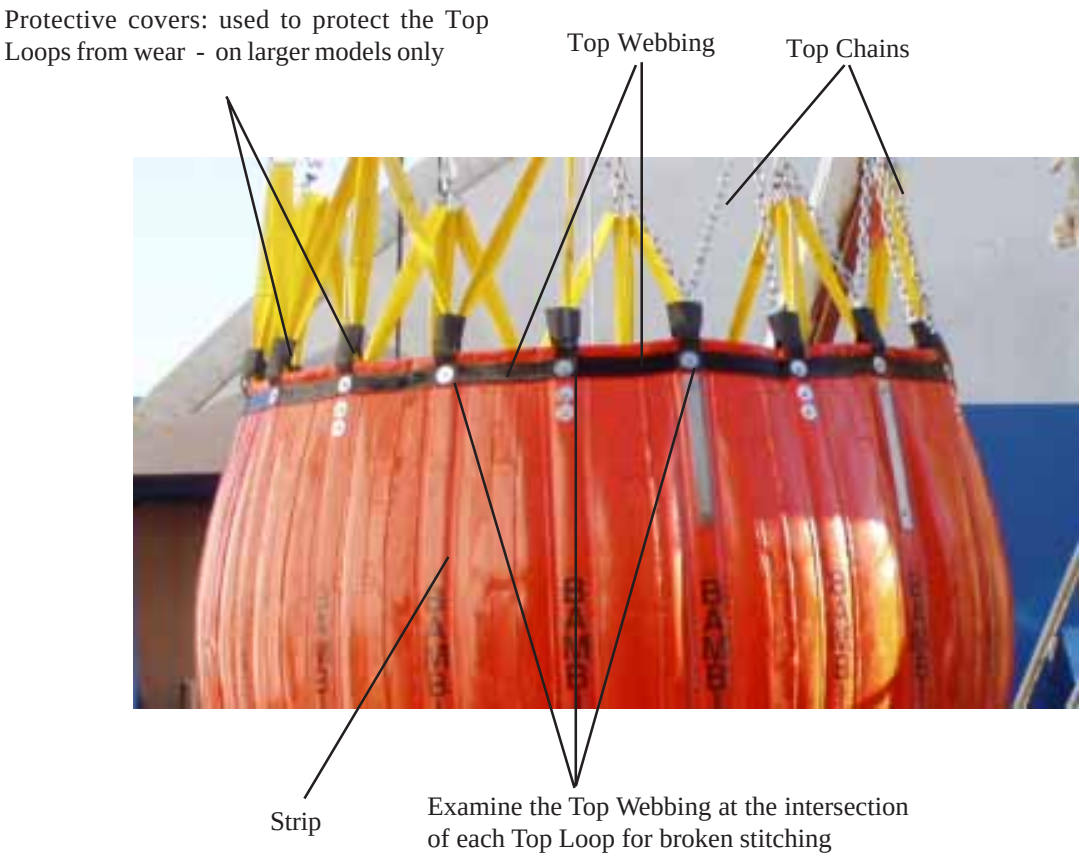
- Look for peeling along the welded seam. Examine the seams carefully by folding each panel along the weld's edge, and look for any areas that have begun to peel. Sections that are peeling will appear to pull away from the mating panel when folded. If peeling is severe, the panel may need to be replaced

In this picture, the operator applied a patch to cover a puncture

SECTION C: SHELL - TOP WEBBING

Top Webbing

The Top Webbing is sewn around the upper perimeter of the Bambi Bucket Shell. Its function is to reinforce the top of the Shell and to help prevent tears during operation. Examine the Top Webbing for broken stitching or tears. Pay close attention to the sewing directly below each Top Loop. Due to high tensile loading, broken stitching in this area may result in the Strip being pulled away from the Panel. Larger model buckets have bolts as additional reinforcement to the stitching.



SECTION C: SHELL - BOTTOM LOOPS

Bottom Webbing Loops are are clamped between the Base Ring and the Clamp Ring at the opening on the bottom of the bucket. The Loops are restrained with either a chain or 1/4" stainless steel hoop, dedending on the bucket model. Check the loops where they wrap around the chain, or rod, for abrasion and tears.

The exposed portion of the Bottom Loops, above the Clamp Ring, are protected by flexible fabric Wear Strips. Check all the Wear Strips for tears, abrasion and proper attachment.

Side Battens

The Side Battens give the Bambi Bucket some shape when the bucket is empty. They assist in the process of deploying and filling the bucket. A minimum number of broken Battens will not affect the safe operation of the Bambi Bucket, but the sharp edges of broken Battens may cause small punctures through the shell with prolonged operation. Replacement of broken Battens is recommended.

Operators who cinch their buckets beyond the maximum approved cinch rating run the risk of breaking the Battens.

To Check for broken battens:

Step 1

Open up the bucket lay it on its side.

Step 2

Place your hand along the centerline of the strip that you want to inspect and apply pressure along the length of the strip, checking for breaks.

- Broken Battens will make a cracking noise
- Broken Battens will bend at the break point

SECTION C: SHELL - TOP LOOPS

Examine the Top Loops for tears and wear under the knot.

Bambi Strips

Look for cuts that run across the Strip. Cuts can be on the surface of the strip only, or they can penetrate through the Strip into the webbing. Cuts may also break through the stitching that holds the webbing to the Strip, and may result in the stitching in that area working loose over time. Small cuts can usually be repaired by applying a patch with a heat gun or with glue (see Operator's Manual). If the cut is deep enough such that it severs the webbing, the panel may need replacement.

The Strip may peel away from the Shell at the weld. Peeling can expose the scrim on the Panel, which could result in leaks or punctures.

Webbing, which is sewn to the Bambi Strip is used to transfer the vertical loads to the Shell and the Bottom Chain. Look for torn loops, or broken or loose stitching.

Battens are inserted between the Bambi Strip and the panel and help give the bucket its shape.

Here, the Bambi Strip, which is welded to the Panel, has began to peel away.

As long as the topcoat on the Panel is intact, up to 4 inches of peeled weld is acceptable.

SECTION C: SHELL - BALLAST

Ballast

All Bambi Buckets use ballast to assist in sinking the bucket when dipping and to help stabalize the bucket in flight. The Ballast comes in the form of steel Ballast Bars.

Ballast Bars: Examine the Shell for missing Bars, or missing retaining hardware. Check the Ballast backing plates, which are mounted behind the Ballast bars on the other side of the shell, for rough or bent edges. Rough edges may result in cutting on the Shell.

Steel Ballast Bars mounted to the outside of a Bambi Bucket. Newer models of Bambi buckets have the ballast mounted on the inside.

SECTION C: SHELL - REPAIR CRITERIA GUIDELINES

Category 1: Safety
Cease Operations and Repair Immediately

- 1 or more broken Top Loop knots (M-Strap attachment point to the shell)
- Gross punctures through shell that cut or severely damage one or more Panel Strips
- Separation of fabric welds longer than 3” (76 mm)
- Punctures or cuts through shell longer than 3” (76 mm)
- 2 or more broken Bottom Webbing Loops

Category 2: Operational
Repair before next days operation, or 8 hours flight time

- Top Loop knots that are worn or have damage to more than 25% of the fabric
- Cuts, punctures or weld separations less than 3” and / or cut through more than 25% of a Panel Strip
- Bottom Webbing Loops with more than 25% damage to fabric strands
- Broken or missing Bottom Webbing protective wear strips
- 5 or more broken Battens

Category 3: Monitor
Monitor and or repair if condition deteriorates

- Wear, abrasions, and cuts to the Bucket Shell fabric isolated to one side of the material that do not cut through.
- Wear, abrasions and cuts to the Webbing Loops, Strips, and Top Loop knots that involve less than 25% of the fabric strands on any portion of the affected webbing.
- Wear and abrasions to Webbing Protective Strips
- Up to 4” (102 mm) of peeled weld on Panel Strip
- Up to 4 broken Battens

Category 4: OKAY
Does not need repair

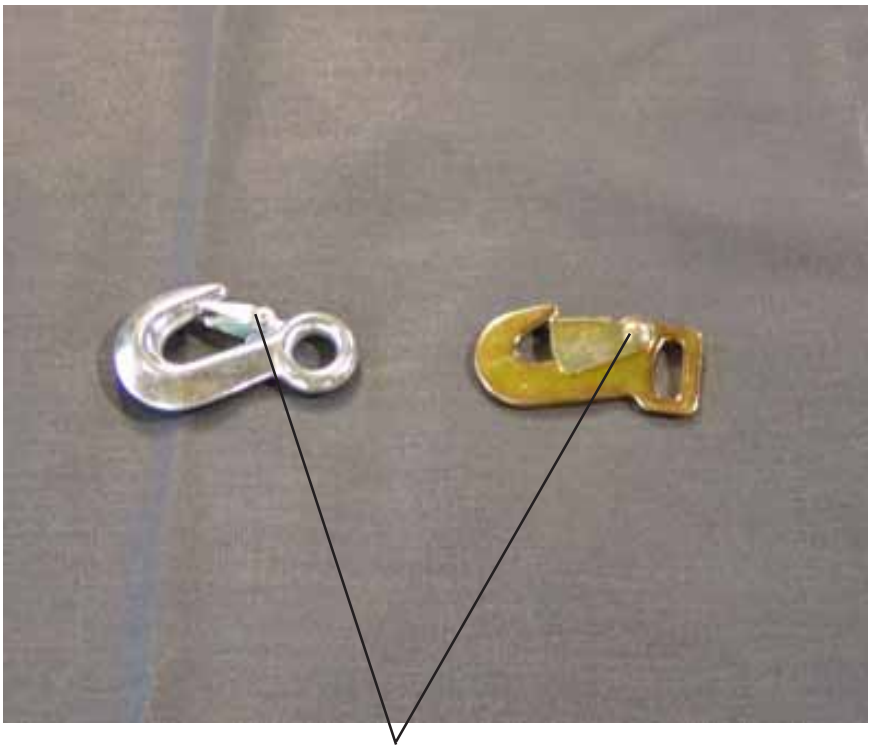
SECTION D: CINCH STRAPS

Cinch Strap

The Cinch Strap is located on the inside of the Bambi Bucket for models 2024 - 4453, and on the outside of the Bambi Bucket for models 5566 - HL9800. The Cinch Strap is made up of a strap, hook, and load-setting rings. Each ring location has a tag that indicates the percentage of maximum fill. Examine each strap for damage to the hook, torn or broken cinch straps and missing or broken rings at each load tag. A damaged cinch strap may impair the operator's ability to reduce the maximum volume of the Bambi Bucket. Cinching beyond the marked load ratings may result in damage to the bucket. Tying knots in in the Cinch Strap is not an acceptable practice as it will give a false indication of the actual maximum volume of water in the bucket. Excess Cinch Strap material should be rolled up and wrapped with duct tape or zip ties, in a manner that will not interfere with or hang up on the Cinch Brackets when the bucket is full of water. Buckets that are operated in the cinched mode should have their Hub Restrainer Cables adjusted (see Operators Manual).

The Cinch Strap hook may not work properly if the jaw is broken or if the latch has been damaged. Examine the hook carefully, and manually test the latch for correct operation. If it does not close or lock properly, the cinch strap needs to be replaced.

Cinch Strap Hooks:

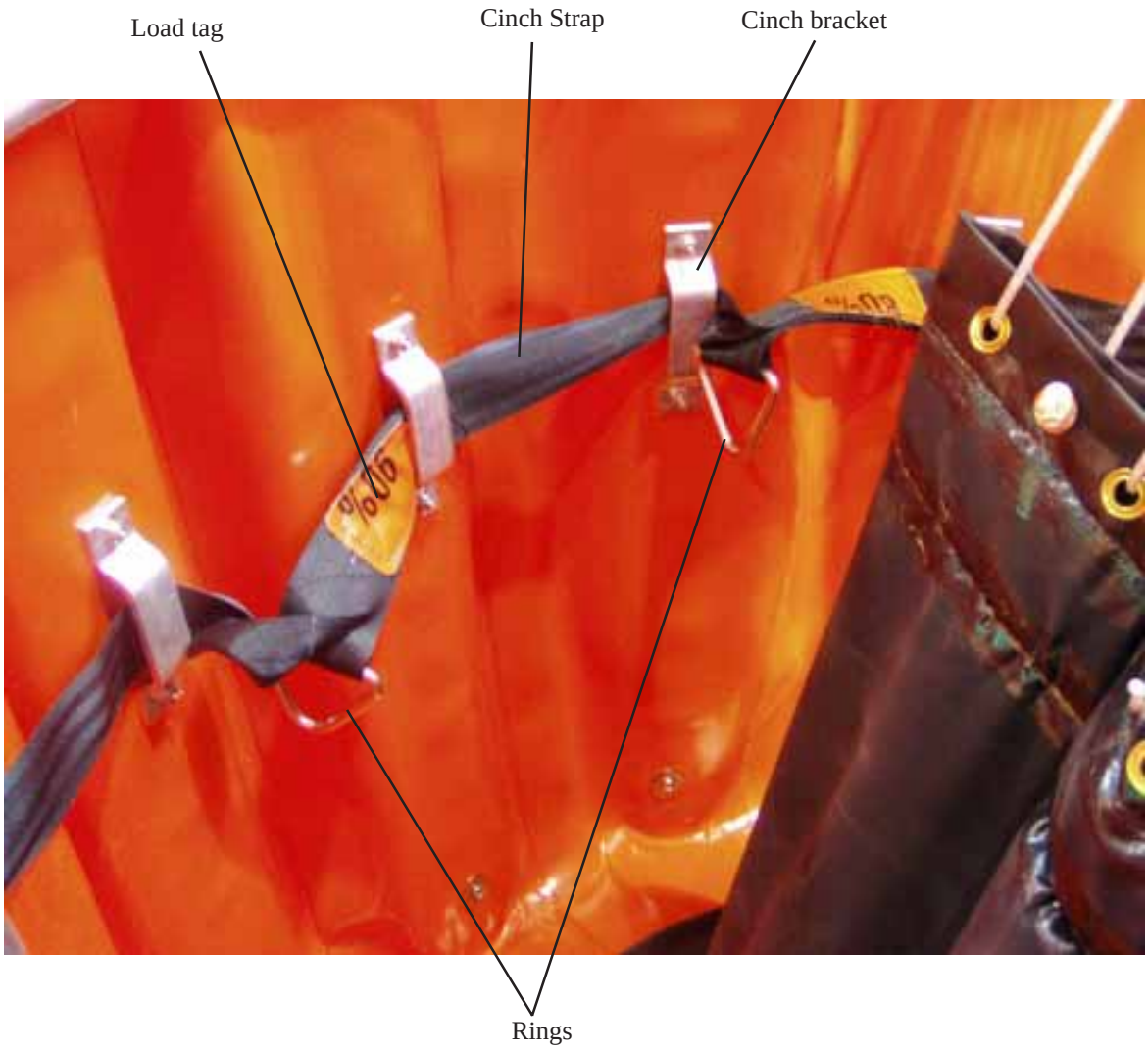


Manually test the latch for correct operation

SECTION D: CINCH STRAPS

When cinched, the strap is under tension. Any tears or cuts in the strap may eventually result in breakage.

Beside the load rings are tags indicating the percentage of maximum fill. Examine each ring and the stitching that holds the ring in place. Straps that show signs of loose or broken stitching at the load ring should be repaired or replaced.



SECTION D: CINCH BRACKETS

Cinch Brackets

The Cinch Brackets retain the Cinch Strap to the bucket Shell.

Bucket models 2024 - 4453: The medium size Bambi Buckets use aluminum Cinch Brackets, which are located on the inside of the bucket's shell. Examine the Brackets for any bending and look for broken or missing hardware. Broken bolts, bent Cinch Brackets or bent washers should be replaced. Loose bolts can be tightened.

Bucket models 5566 - HL9800: The large buckets have their Cinch Brackets located on the outside of the Bambi Bucket Shell. Examine the Brackets for any bending, dents and rough edges. Look for broken or missing hardware. Broken bolts, bent Cinch Brackets or bent washers should be replaced. Loose bolts can be tightened. You may be able to file or sand the edges of the Cinch Brackets that have experienced some gouging.

SECTIONS D: CINCH STRAP - REPAIR CRITERIA GUIDELINES

Category 1: Safety
Cease operations and repair immediately

- Not Applicable for Torrentula Valve buckets

Category 2: Operational
Repair before next days operations, or 8 hours flight time

- Broken or missing Cinch Strap
- Field-modified Cinch Strap
- Broken or missing Cinch Strap retaining brackets
- Broken or missing Cinch Strap hook or mating ring
- Wear or damage to Cinch Strap involving more than 25% of the fabric strands
- Missing Cinch Strap bracket hardware.

Category 3: Monitor
Monitor and or repair if condition deteriorates

- Wear or damage to Cinch Strap, less than 25%
- Worn or bent brackets

Category 4: OKAY
Does not need repair

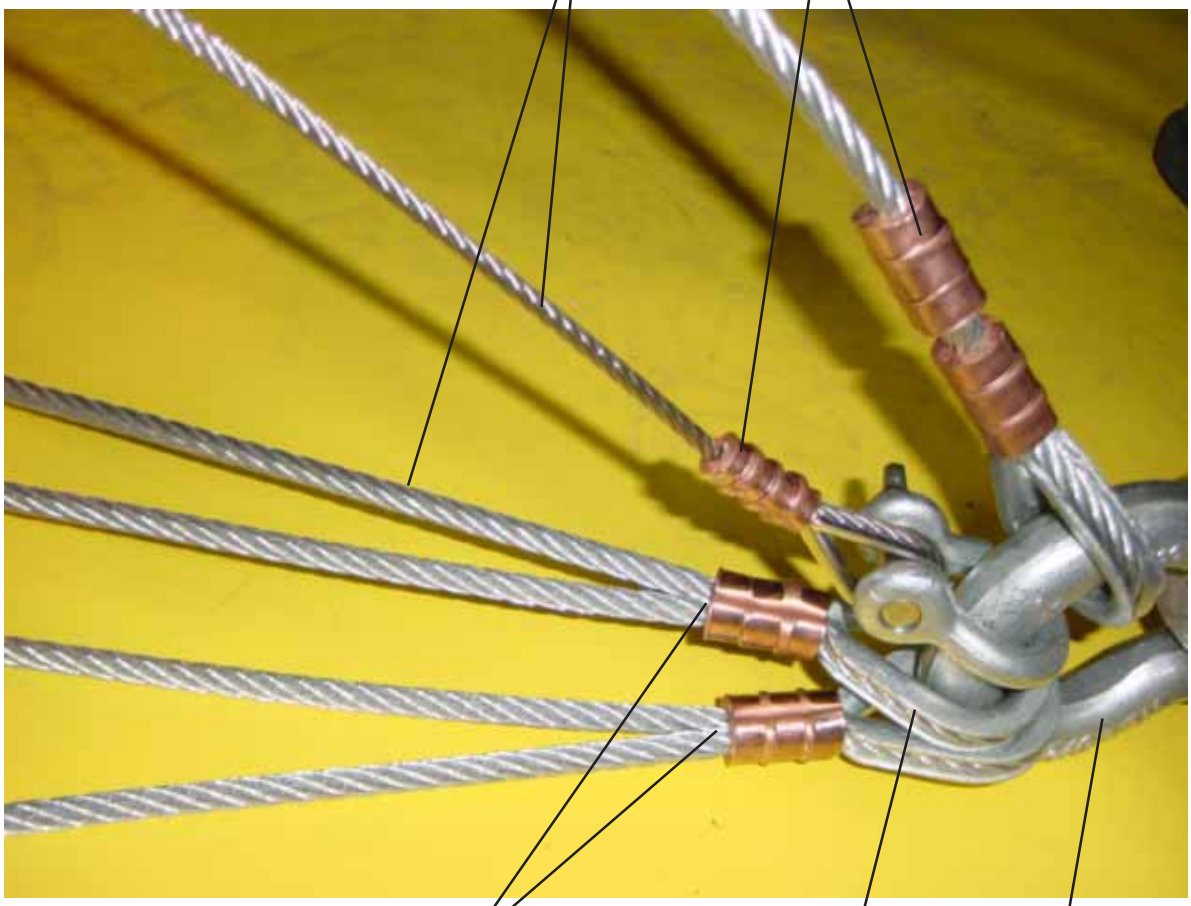
SECTION E: CABLES

The various cables on the Bambi Bucket use common components. Examination of all cables is similar. Look for breaks, frayed wires, twisting and kinks. Pay close attention to the wires directly under the swage blocks as These areas may display more fatigue wear than on other parts of the cable.

Suspension Lines
The Suspension Lines interface the control head with the M-Straps and carry the load in the Bambi Bucket.

Hub Restrainer Cables
The Hub Restrainer cables are connected from the Hub restrainer brackets, located on the inside bottom of the shell, to the IDS hub. They prevent the IDS hub from deploying beyond its designed position when the Bambi Bucket is empty.

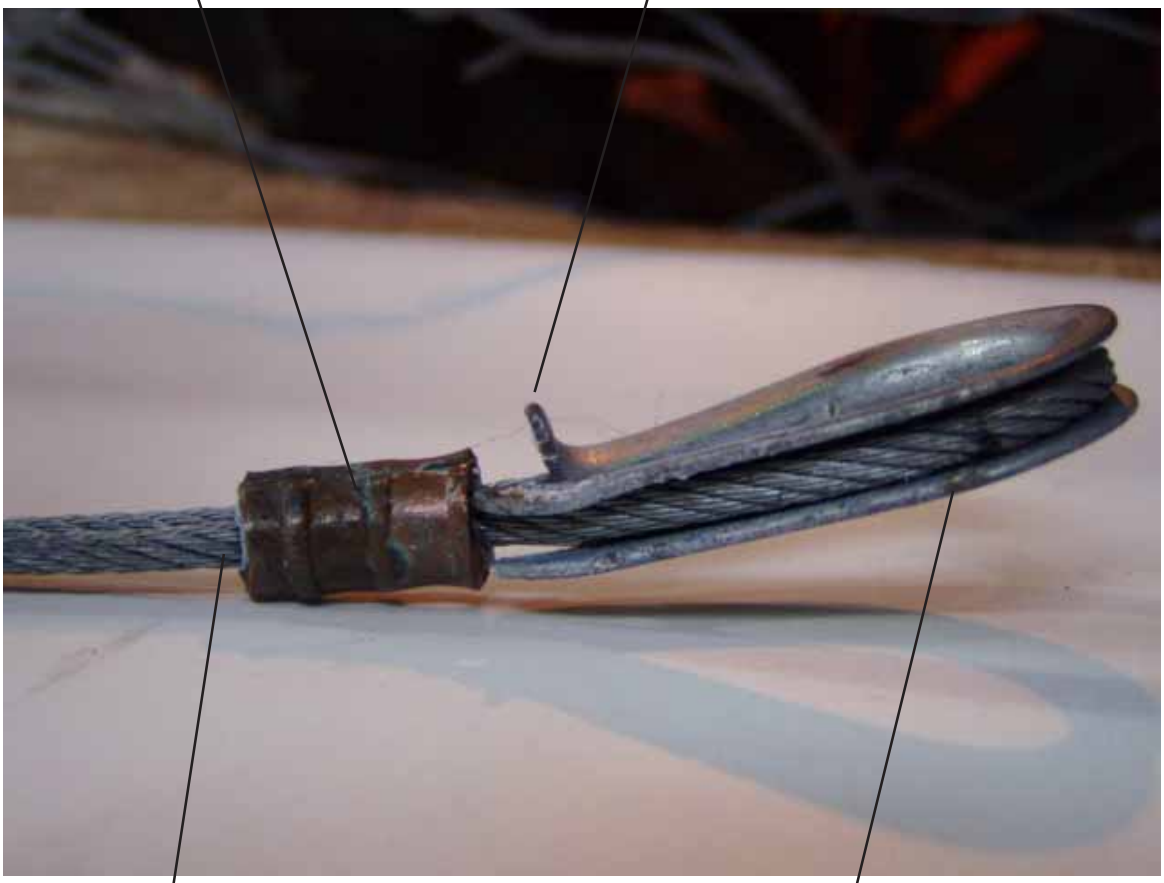
Deployment Cable.
The Deployment Cable pulls vertically on the IDS hub when the bucket is lifted, and deploys the IDS hub system.


Suspension Lines
Swage Blocks
Examine the cables directly under the Swage Blocks and look for any frayed or broken wires.
Thimble
Shackle

In your repair assessment, you may encounter thimbles that are bent, twisted or have begun to stretch as shown in picture below. Some elongation of the Thimbles may occur in use. Elongation is acceptable as long as the cable is not damaged, and the Thimble is not cracked or broken.

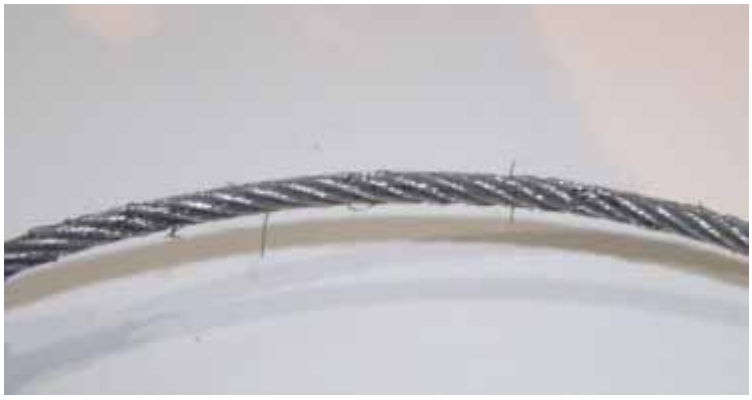
Swage Block

A portion of the Thimble has been bent, and can be repaired quickly by pressing down to its original position with a pair of pliers

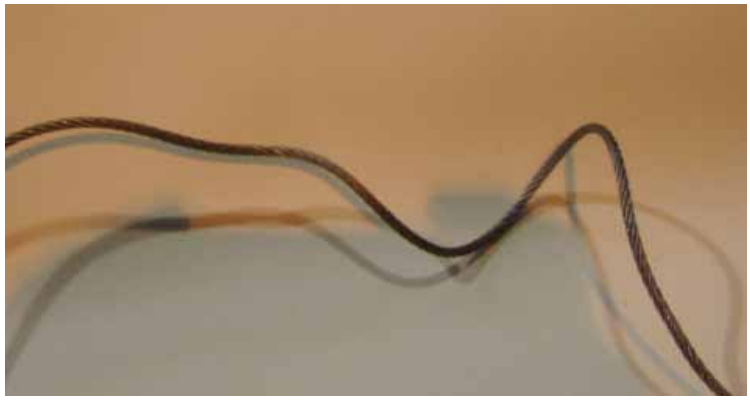


Suspension Cable

Bent or twisted Thimbles can easily be repaired by untwisting or bending the Thimble back to its original position with a pair of pliers.



Frayed wires on the Riser cable or the IDS Restrainer cable can cause tears in the valve fabric.



Twisted cables that show no signs of fraying, kinks, or broken strands can usually have their twist worked out. If the twisted cable cannot be reasonably straightened then the cable may need replacement.

Cables that have broken must be replaced

Cables that have severe kinks or broken wire bundles should to be replaced.

Kinks that cause the wire bundles to spread apart are known as “Bird Caging”. If you can see through the strands, as shown in the picture, then thecable should be replaced.

Bent cables that do not show signs of Bird Caging can usually have the kink worked out by hand.

Protective covers are intended to protect the cable from wear. When protective covers have more than 25% wear on in a single wear area, or if they have broken in two or more pieces, they should be replaced.

SECTION E: CABLES - REPAIR CRITERIA GUIDELINES

Category 1: Safety
Cease operations and repair immediately

- 1 or more broken Suspension Cables or end fittings
- Broken Riser cable
- Broken Deployment Cable

Category 2: Operational
Repair before next days operations, or 8 hours flight time

If 3 or more individual Suspension Cables, Riser Cables, or the Deployment cable have the following defects:

- 10 or more randomly distributed broken strands, or 4 adjacent broken strands
- Visible kink or kinks
- Separation of the strands due to twisting (known as “Bird-Caging”)
- Evidence of heat damage
- Abrasion wear comprising of more than 1/3 of the original diameter of the outside individual strands
- Any visible reduction in outside diameter due to overload
- Cracked or broken end fittings (some elongation of cable eyes is acceptable)

Category 3: Monitor
Monitor and or repair if condition deteriorates

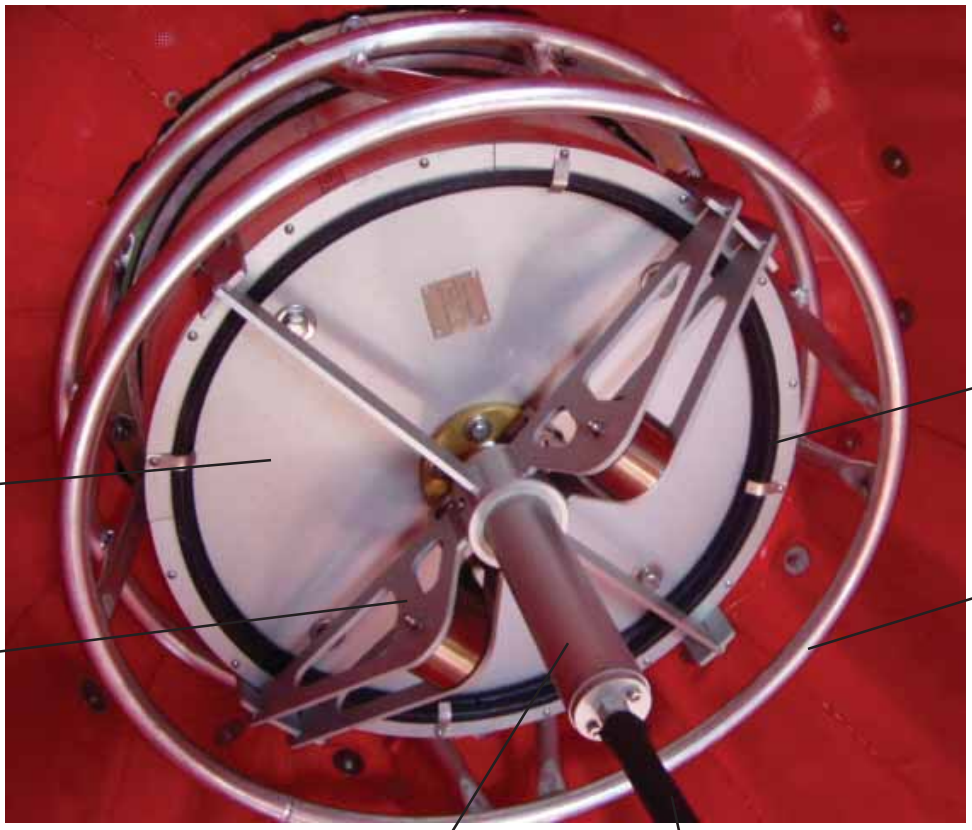
- Wear, broken strands, kinks and twisting in cable that do not exceed the limits defined in Category 2 defects

Category 4: OKAY
Does not need repair

Torrentula Valve in the Bucket - Top View

Unlike the flexible valve on the Standard Bambi Bucket, the Torrentula Valve is a rigid composite metal structure that is clamped to the bucket shell with a ring of bolts. Check over the Valve structure for impact damage and cracks. The Support Rod bolts (top and bottom) should be tight. Ensure that the Valve Guard is not bent or broken such that it interferes with the movement of the valve

Flexible Seals on either end of the Valve Tube (the moving portion of the valve) seal the water in when the valve is closed. Check the Seals for wear and tears. Small cuts or tears can be repaired - see the Operator's Manual.



The Valve should slide up and down smoothly with no binding. Check the Bottom Bushings, and adjust them to achieve smooth valve transit, if required.

Torrentula Valve in the Bucket - Bottom View
Valve shown partially open

The valve Actuator Cable attaches to the Lift Bar to move the valve open and closed. The principle of operation is very similar to a bicycle brake cable, with an external conduit, fixed on both ends, and a moving cable inside. The bottom fitting on the Actuator Cable can be adjusted to achieve the required amount of end play or "slack" in the cable. If there is too much slack, the valve will not open fully. Too little slack may not allow a full seal when in the "closed" position. Check the Actuator Cable grease boot above the Lift Bar for tears. Damage to the grease boot may allow water to migrate up the conduit into the Control head.

With the valve in the "closed" position, check for a consistent gap between the base ring and the bottom of the Valve Tube. Large variations in the gap may indicate the the base ring is warped, and consequently may result in a poor seal.

The Bumper Blocks are designed to absorb impacts and wear during lift-off and set-down, and will become worn-looking with heavy use. Replacement is only required if the blocks are broken or severely worn, to the point that they do not protect the bucket.

SECTION F: VALVE

SECTION F: VALVE - REPAIR CRITERIA GUIDELINES

Category 1: Safety
Cease operations and repair immediately

- 1 or more missing or broken Support Rod bolts
- Loose Actuator Cable fitting nuts
- Bent or broken Valve Guard that interferes with movement of valve
- Broken or cracked Valve Tube
- Broken or bent Top Slider Pipe
- Bent Base Ring, greater than 3/8" (10mm) out of flat

Category 2: Operational
Repair before the next days operation, or 8 hours flight time

- Loose Support Rod bolts
- Torn Valve Seal, greater than 1" (25mm) long
- Loose Base Ring Bolts
- Misaligned or loose Bottom Bushings
- Loose or missing Spider of Lift Bar hardware
- Bent Base Ring 3/16" to 3/8" (5mm to 10mm) out of flat
- Broken or missing Bumper Blocks

Category 3: Monitor
Monitor and or repair if condition deteriorates

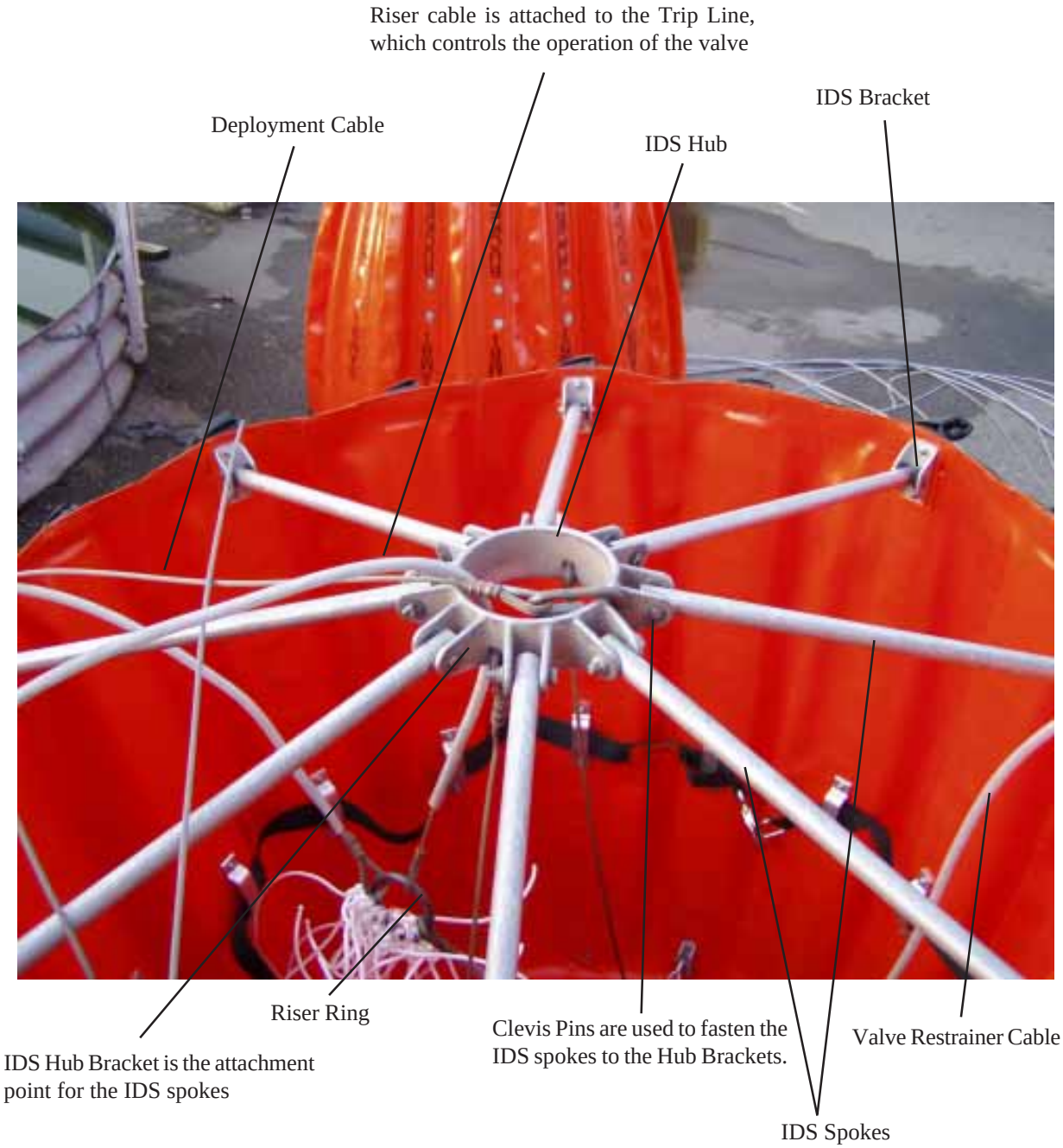
- Torn Valve Seal, less than 1" (25mm) long
- Visible wear on Support Rods and Top Slider Pipe
- Minor impact damage and deformation that does not interfere with the function or movement of the Valve
- Bumper Block wear

Category 4: OKAY
Does not need repair

SECTION G: IDS SYSTEM

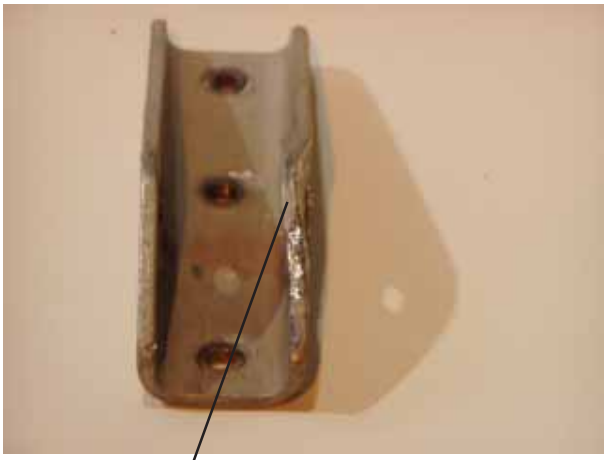
The IDS Hub assembly consists of the IDS Hub, spokes, clevis pins, IDS brakets and cables. The IDS Hub is the attachment point for the Spokes.

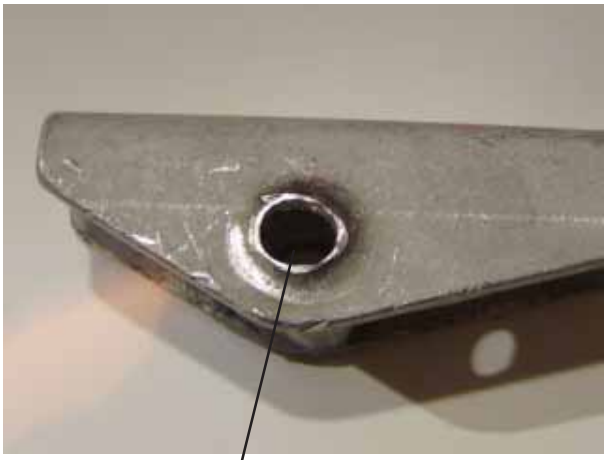
Look for chips, cracks, broken brackets, or enlarged bracket holes. Also look for frayed, twisted or kinked hub restrainer cables.



SECTION G: IDS BRACKETS

Examine the IDS Brackets for bending and enlargment of the clevis pin holes. Bent Brackets may bind against the Spoke, and prevent the bucket from deploying properly. If the clevis pin holes are too large, the pins can pull out. Check for loose bolts on the IDS Brackets. Loose IDS Brackets may pull through the fabric or damage the Battens.

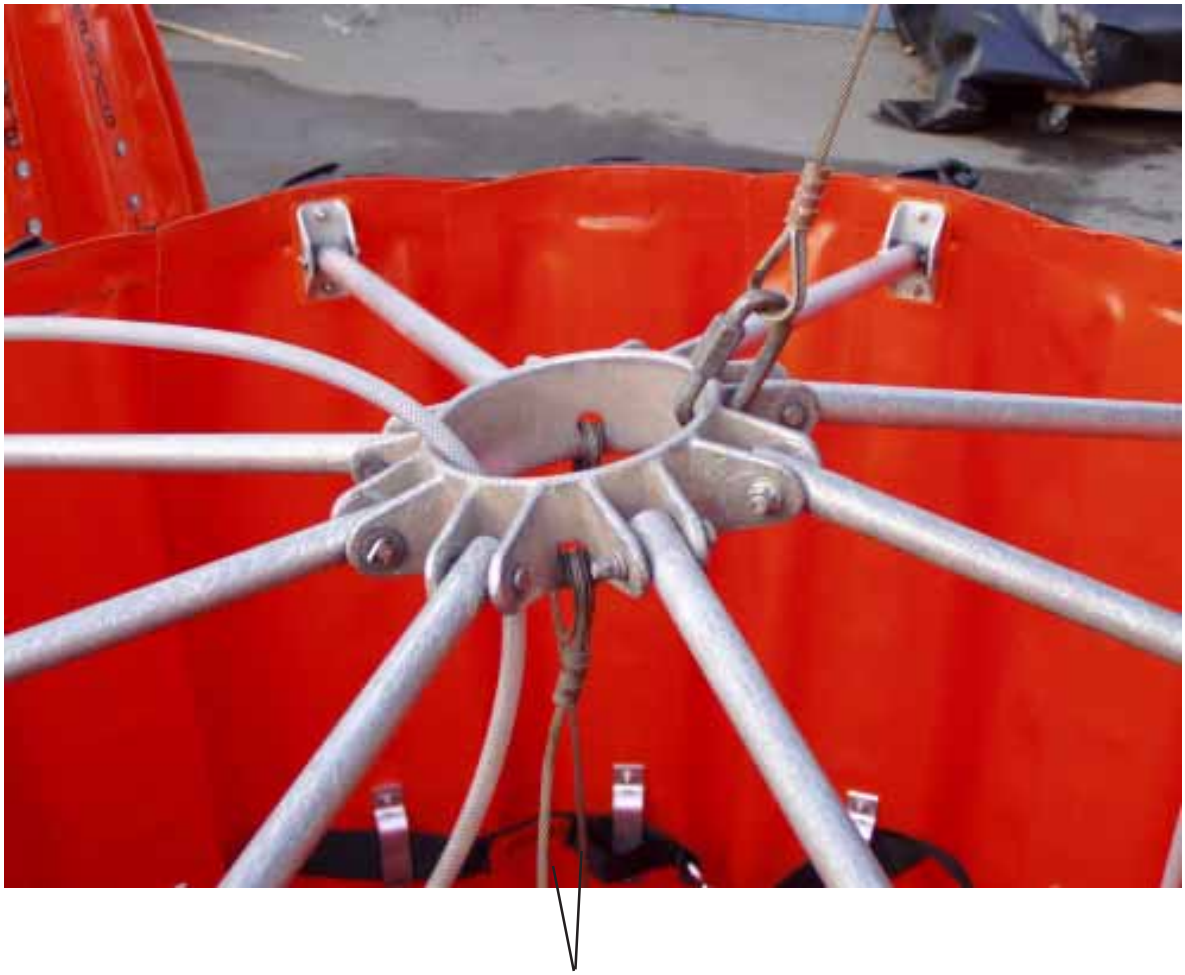

Bracket that has been bent


Bracket with an enlarged hole

SECTION G: IDS HUB RESTRAINER CABLES

The IDS Hub Restrainer cables prevent the Hub from opening beyond its proper deployed position.

Check the cables for frayed wires. Also check directly under the swage block for frayed wires.



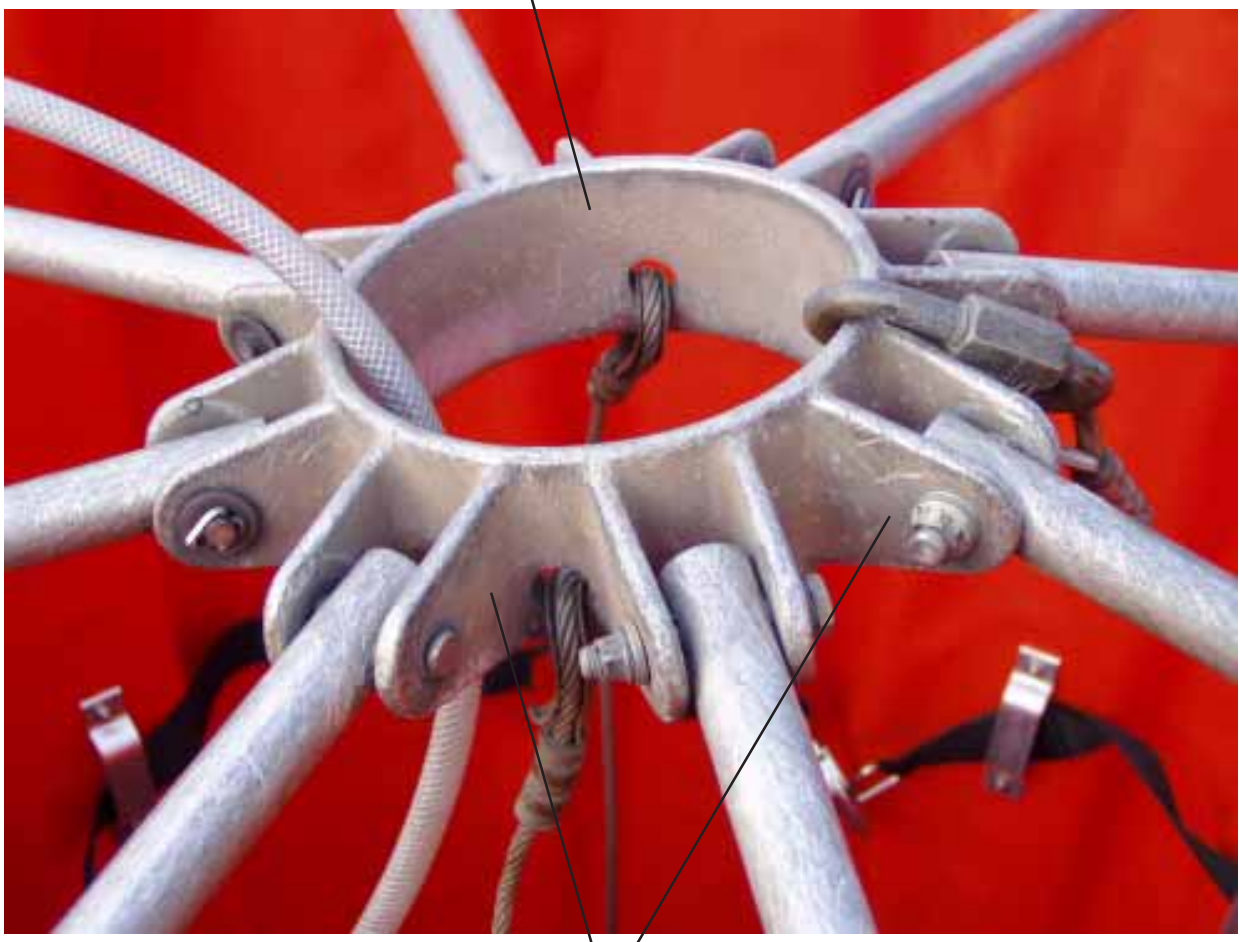
IDS Restrainer Cables

SECTION G: IDS HUB

The IDS Hub is the mounting point for all IDS spokes.

Check for any cracks or broken parts. If any part of the Hub or Hub Brackets are cracked or broken, the hub needs to be replaced.

Examine the IDS Hub for any cracks

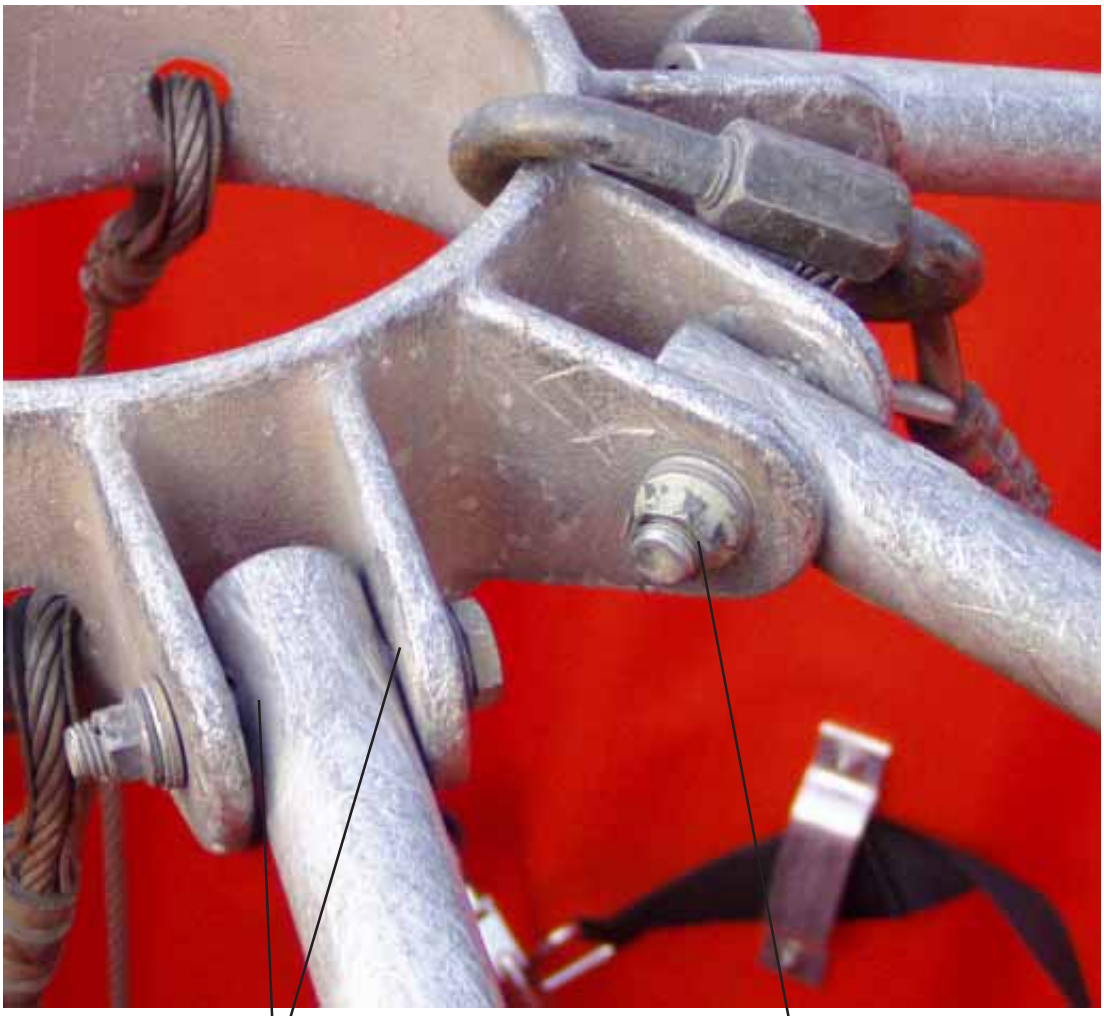


Examine the IDS Hub Brackets for any cracks or breaks.

SECTION G: IDS SPOKES AND CLEVIS PINS

Examine each Spoke and Clevis pin for bending. The Spoke should be replaced if it is bent or if the holes have enlarged to the point that the head of the Clevis pin can pass through freely. In the event of a heavy impact, the Spokes are designed to bend before the Shell is damaged.

Bent Clevis pins must be replaced. In the event that the operator does not have access to Clevis pins, a correctly sized locknut and bolt can be used instead.



Look for damage in these areas

A lock nut and bolt can beused in place of a clevis pin.

SECTION G: IDS SPOKES AND CLEVIS PINS

Examine each Spoke for holes that have stretched through wear. If the hole is large enough such that the head of a Clevis pin can pass through, then the Spoke needs to be replaced.

Examine each spoke for any broken holes. In this example, a piece of the spoke has broken away, and the spoke should be replaced.

Bent or broken Spokes will affect the deployment of the bucket. In the event of an overload Spokes are designed to bend and will prevent damage the Shell.

Clevis pins may bend on a hard impact. Bent Clevis pins should be replaced. A correctly sized bolt and a locking nut will act as a suitable replacement.

SECTION G: IDS HUB - REAPIR CRITERIA GUIDELINES

Category 1: Safety
Cease operations and repair immediately

- Cracks or breaks across the major section of the IDS hub
- 2 or more broken or cracked Spoke Brackets
- 2 or more broken or missing Spokes, Clevis Pins, Shell Brackets
- 3 or more bent spokes (bends in excess of 20 degrees = broken)

Category 2: Operational
Repair before next days operation, or 8 hours of flight time

- 1 broken or cracked Spoke Brackets on IDS Hub
- 1 broken or missing Spoke
- 1 broken or missing Clevis Pin or Shell Bracket
- Up to 2 bent Spokes

Category 3: Monitor
Monitor and or repair if condition deteriorates

- Wear on IDS hub
- Dents, abrasions and wear on Spokes
- Clevis Pin and Shell Bracket wear

Category 4: OKAY
Does not need repair

SECTION H: M-STRAPS AND TOP CHAINS

M-Straps

The M-Straps are tied to the Top Loops on the bucket Shell. They transfer the loads between the Suspension Lines and the bucket Shell. Examine the M-Straps for broken webbing and fraying. Minor fraying can be mitigated by melting the frayed area with a flame.

Top Chains

Chains are used in place of the M-Straps on the weighted side of the bucket because of their greater durability and resistance to abrasion. The weighted side of the bucket is naturally subjected to more wear and tear in operation. Damage to the Chains is rare, but in the event that the Chain is broken, it must to be replaced.

Chains are used because they can withstand abrasive wear on the weighted side of the bucket

M-Straps are used to transfer the vertical loads form the Suspension Lines to the Shell

SECTION H: M-STRAPS AND TOP CHAINS REPAIR CRITERIA GUIDELINES

Category 1: Safety
Cease Operations and repair immediately

- Broken Top Chains
- Broken or missing Shackles
- 2 or more broken M-Straps

Category 2: Operational
Repair before the next days operation, or 8 hours flight time

- M-Straps with more than 25% of the fabric strands broken
- Visibly worn Top Chains
- Bent, gouged, worn, or cracked Shackles and Shackle pins

Category 3: Monitor
Monitor and or repair if condition deteriorates

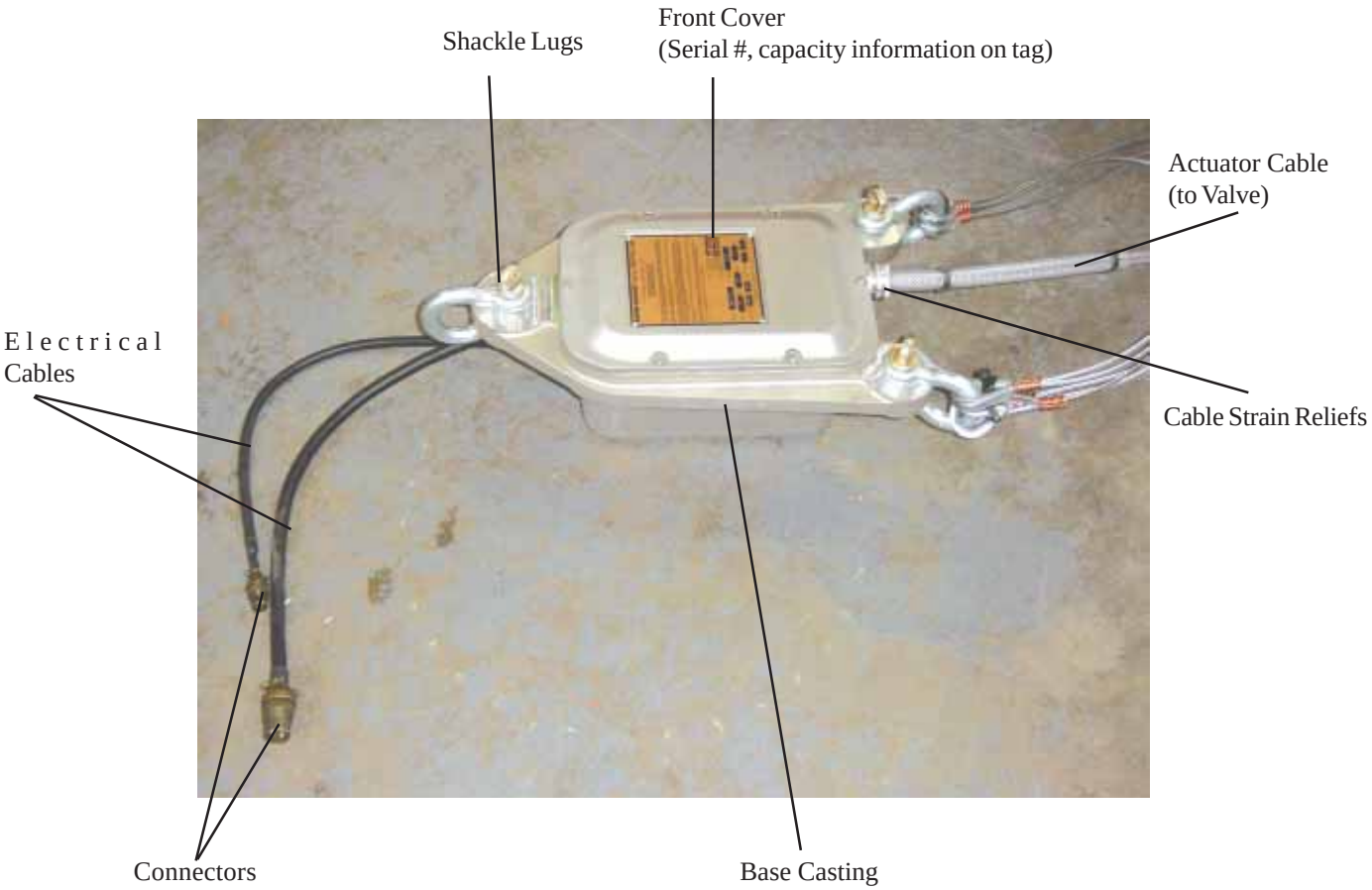
- Damage to an M-Strap that does not exceed 25% of the fabric
- Minor wear, impact marks or corrosion on Chains
- Minor wear, impact marks or corrosion on Shackles

Category 4: OKAY
Does not need repair

Torrentula Valve Control Head

The Torrentula Valve Control Head is the main lifting member for the bucket and contains the actuating mechanism for the valve. O-ring seals on the front and rear covers make it effectively a sealed container that can withstand immersion in water. The base casting and covers are robust, and can endure heavy impacts and wear. The shackle lugs and covers should, however, be inspected closely for bending or cracks.

Ensure that the cover seals and the cable entry strain reliefs (3 total) are in good condition and do not allow for water entry. The function of the actuator motor can be compromised if excessive or prolonged water entry occurs. Minor moisture condensation inside the head may occur due to atmospheric and operating conditions. See the Operator's manual for recommended inspection intervals.



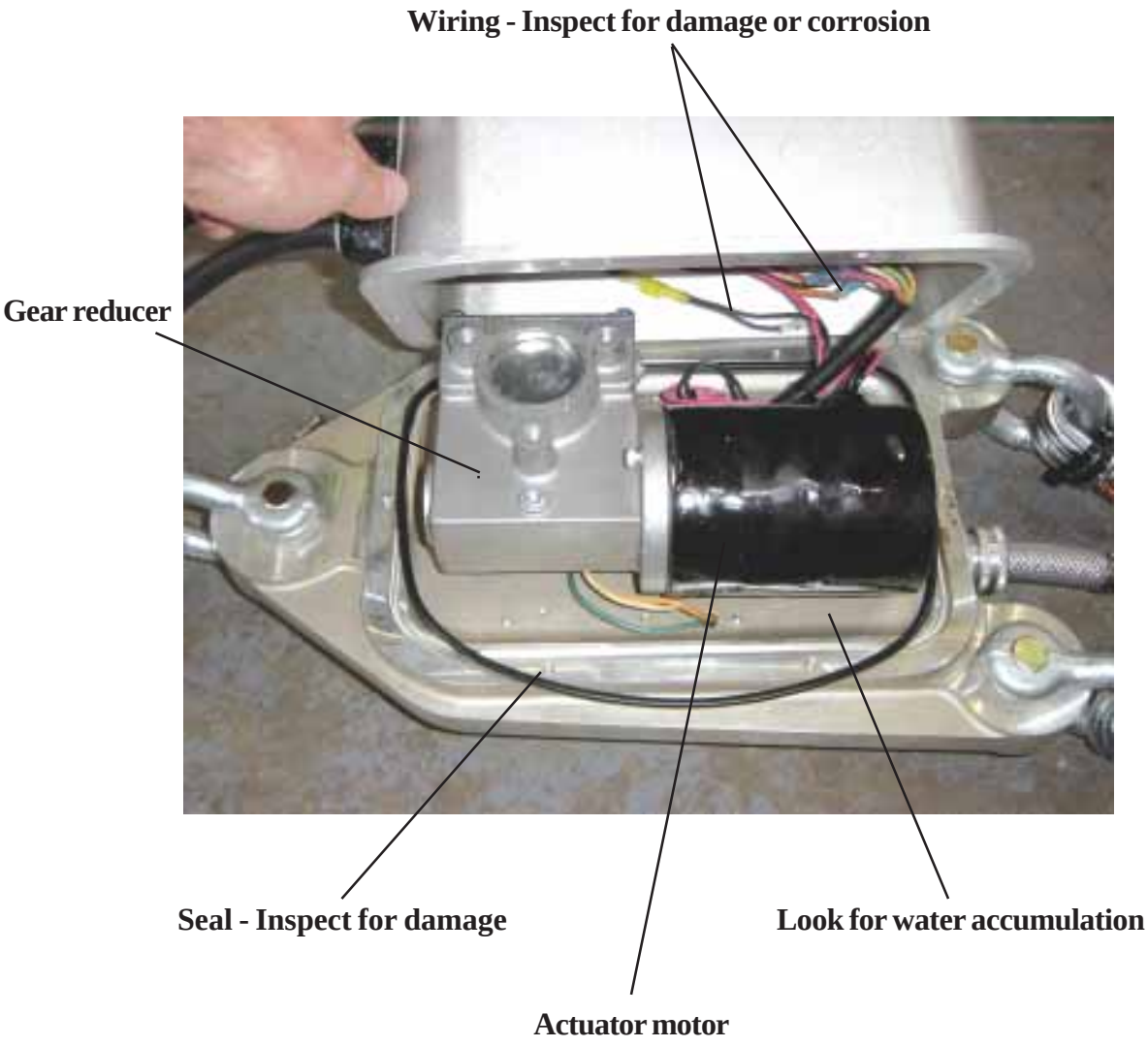
The electrical cables and connector plugs should be in good condition, with no exposed conductors or signs of strain. Intermittent electrical connections due to cable damage is a common cause of malfunction. Where possible, inspect the full length of longline cables and perform continuity checks with a multimeter.

Torrentula Valve Control Head - Front Cover Removed

With the front cover removed, check for water accumulation in the head. Excessive water entry indicates that the seals, cable entry strain reliefs, or valve Actuator Cable may be damaged. Inspect the cover seal - it may be reused if in good condition. Ensure that the seal is fully seated in the groove before reinstallation of the cover.

Torrentula Valve Control Head - Rear Cover Removed

Again, check for water accumulation when the rear cover is removed. Inspect the electrical connections and wires for corrosion. If possible, perform a function check with power, and listen to the actuator motor. It should run smoothly and move the valve fully "open" or "closed" in approximately 1 second. Grinding noises or slow movement indicate internal damage to the motor or gear reducer.



SECTION I: CONTROL HEAD - REPAIR CRITERIA GUIDELINES

Category 1: Safety
Cease operations and repair immediately

- Broken, bent or cracked Control Head shackle lugs
- Broken or severed Actuator Cable
- More than 4 adjacent or 10 randomly broken strands on inner cable of Actuator Cable assembly
- Malfunctioning or non-operational valve actuating mechanism
- Severed or exposed electrical cable wires
- Broken electrical connectors
- Water accumulation in Control Head, greater than 16 oz. (0.5 liters) per 10 hours of operation

Category 2: Operational
Repair before next days operations, or 8 hours flight time

- Missing Control Head cover hardware
- Bent or cracked Control Head cover, front or rear
- Broken or loose cable entry strain relief fittings
- Any wear, abrasion or break on the Actuator Cable casing that exposes the inner cable
- Up to 4 adjacent or 10 randomly broken strands on inner cable of Actuator Cable assembly
- Torn lower actuator Cable Boot
- Measurable water accumulation inside Control Head, up to 16 oz. (0.5 liters) per 10 hours
- Damaged Control Head Cover seals

Category 3: Monitor
Monitor and or repair if condition deteriorates

- Minor water condensation in Control Head - See Torrentula Valve Operator's Manual for inspection procedure and intervals
- General wear and condition of Control Head base casting and covers
- General wear and condition of Actuator Cable covers

Category 4: OKAY
Does not need repair

SECTION J: GENERAL INSPECTION CRITERIA

Category 1 Defects

- **Excessive gross Bucket weight for specific helicopter and/or operating conditions**
  (Ref. Section 16.1, Bambi Bucket Operator's Manual)

- **Maximum total length of Bucket in excess of hook to tail rotor distance, minus 6 inches**
  (Ref. Section 3.3, Bambi Bucket Operator's Manual)

Torrentula Controller Box - Model 'B'

There are no regular maintenance items for the valve Controller box, but periodic visual inspection, such as when when moving the box into or out of the aircraft, is prudent. Look for any dents on the case or broken receptacles on the front panel. Also check the interconnect wires from the face panel to the breakaway plugs at the Control Head. If a visual check reveals no damage, a powered function check of the Torrentula Valve will confirm the operating condition of the Controller.

Check the general condition of the Controller Box, look for any wear and tear, or impact damage.

Note: Torrentula Valve Controller Box model B version, shown above, was introduced in June 2003. Buckets made before June 2003 were supplied with the model A version - see next page

Torrentula Controller Box - Model 'A' (may also be referred to as 'Junction Box')

Check the general condition of the Controller Box, look for any wear and tear, or impact damage.

SECTION K: ELECTRICAL CONTROLS - REPAIR CRITERIA GUIDELINES

Category 1: Safety
Cease operations and repair immediately

- Any electrical fault that causes the Torrentula Valve actuating mechanism to malfunction - See Torrentula Valve Operator's Manual for troubleshooting assistance
- Broken, severed or exposed electrical conductors
- Broken electrical connectors

Category 2: Operational
Repair before next days operations, or 8 hours flight time

- Not Applicable

Category 3: Monitor
Monitor and or repair if condition deteriorates

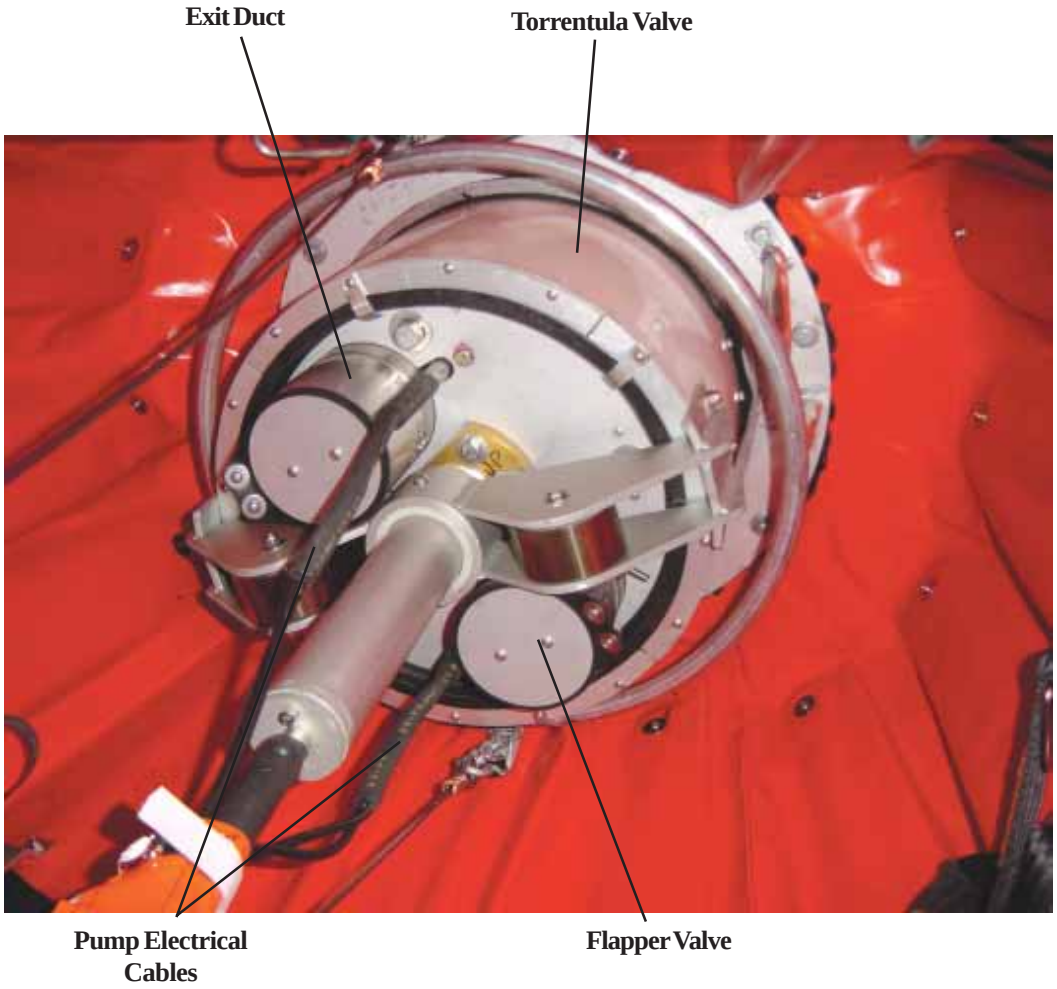
- Wear and abrasion on electrical cables
- General wear and condition of Controller Box (may be referred to as Junction Box)

Category 4: OKAY
Does not need repair

PowerFill I installed in the Torrentula Valve Bambi Bucket - Top View

The PowerFill I is a modular addition to the Torrentula Valve, and consists of between 2 and 4 high-flow electric pumps mounted within the structure of the valve. The pumps provide rapid fill capability in shallow sources.

Inspect the general external condition of the pumps, and look for impact damage. Check that the Flapper Valves seat properly on the Exit Duct and that the seal face and hinge point are in good condition. Shine a flashlight into the exit ducts and inspect the impellers for obvious damage or wear. If possible, do a powered ground check of the pumps Note: the pumps can be run "dry", as long as the operating time is limited to a few minutes. The pumps should run smoothly and quietly, with no grinding noises.
Caution: Do not place an object into the duct while the pumps are running.



Check the electrical cables for abrasion, cuts and exposed conductor. Exposed conductor can be hazardous due to the possibility of an electrical short.

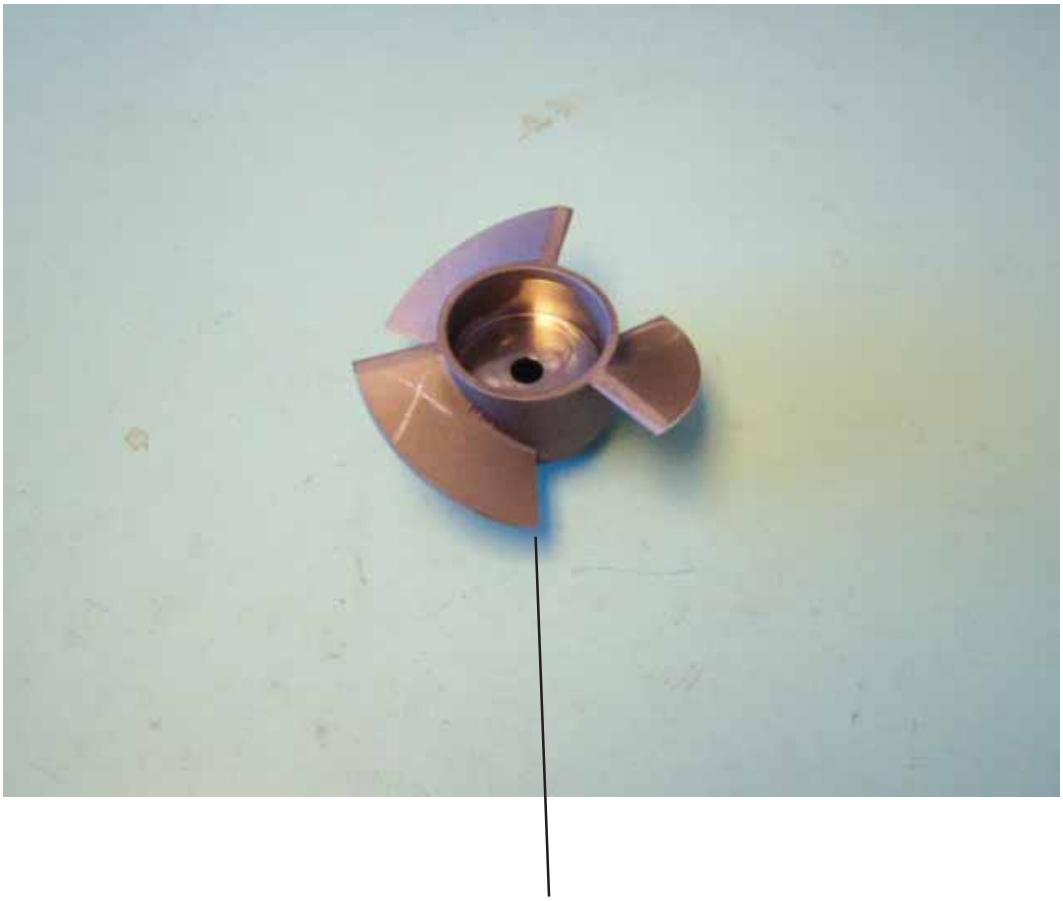
PowerFill I Flapper Valve

Look into duct to inspect pump impeller
CAUTION: Do not run pumps with object inserted into duct

Inspect Flapper Valve for damage or tears at hinge point

PowerFill I pump impeller (shown removed from pump assembly)

If there is a noticeable decrease in pump efficiency, suddenly or over time, it will be nescessary to closely inspect the impellers for wear and damage. A reasonable visual assessment of the impeller can be performed by looking down the exit duct and turning the impeller slowly with a stick or screwdriver (ensure the power is "off").

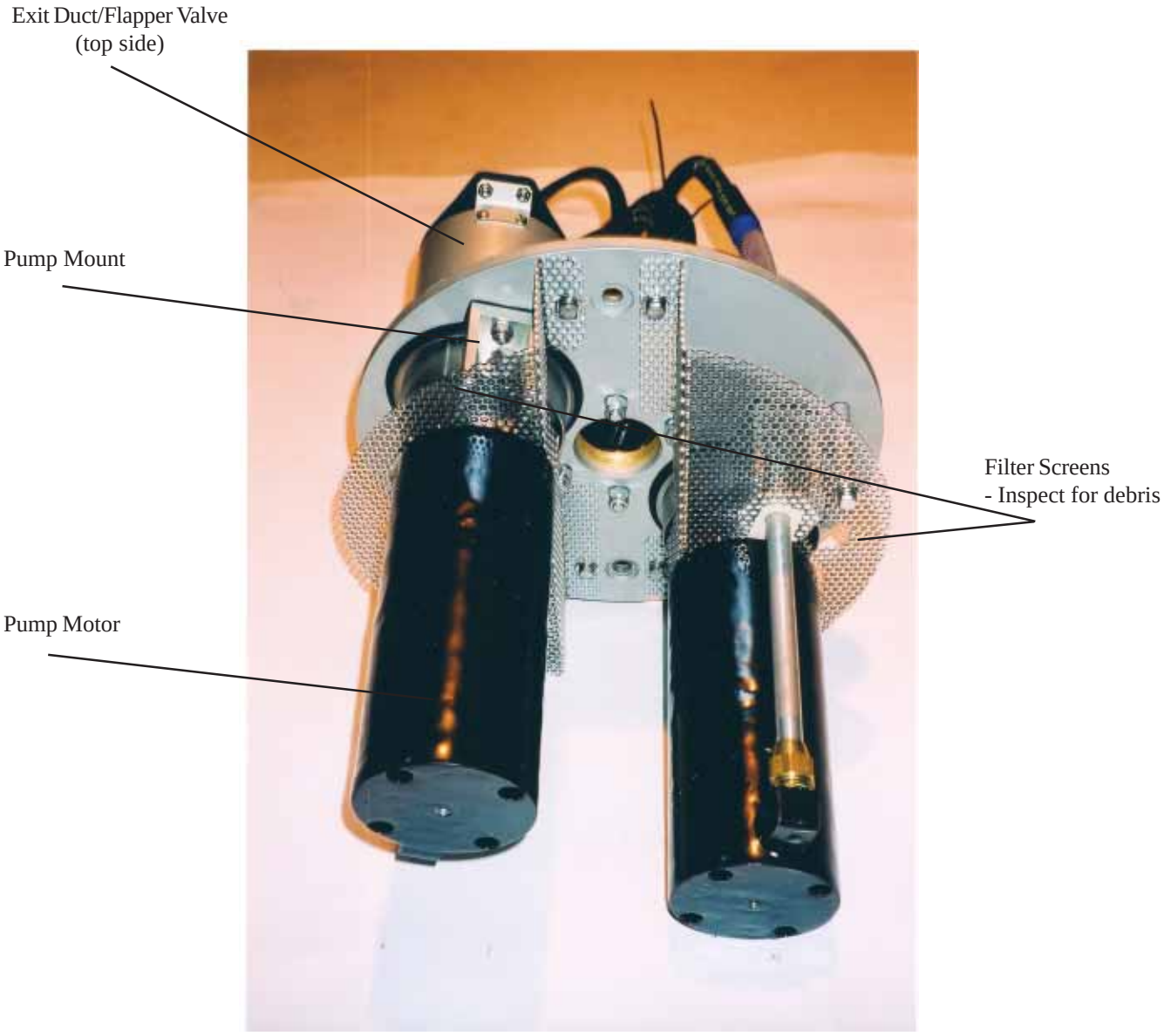


Inspect leading edge (lower side) for damage

The impellers can withstand a fair amount of damage and wear before efficiency is lost. If the impellers do need to be removed for replacement or repair, see the PowerFill I Operator's Manual.

PowerFill I Pump Assembly (shown removed from Torrentula Valve for clarity)

Periodically ispect the filter screens and remove debris as required. Excessive debris in the screens will reduce the pump flow rates. To achieve maximum service life of the pump motors, observe the motor output shaft grease intervals as outlined in the Operator's Manual.



Caution: When washing the pump units avoid spraying high pressure water or cleaning solution directly onto the motor shaft seal area.

SECTION L: POWERFILL I - REPAIR CRITERIA GUIDELINES

Category 1: Safety
Cease operations and repair immediately

- Broken, severed or exposed electrical conductors

Category 2: Operational
Repair before next days operations, or 8 hours flight time

- Malfunctioning or non-operational pumps
- Loose, broken or bent pump mounts
- Noticeable deterioration of pump performance (pump rate)
- Broken or bent pump intake screen(s)
- Broken or torn Flapper Valve(s)

Category 3: Monitor
Monitor and or repair if condition deteriorates

- Intake screen debris
- General condition of pump impellers
- General condition of Flapper Valves

Category 4: OKAY
Does not need repair