Tire Care & Maintenance
I. Tire Care and Maintenance

1. Purpose

This manual forwards information relevant to maintenance and servicing of Bridgestone aircraft tires; new and retreaded. The practices and supporting information presented hereinafter are intended to maximize tire performance and life in service by ensuring appropriate procedure in inspection, storage, and maintenance.

2. Inspection Prior to Mounting

Upon receipt and before assembling with wheel, the tire should be visually inspected for anomalies that may have occurred during transportation. Such as:

- Deterioration of sidewall markings impeding to confirm tire identification such as; brand name, size, ply rating, serial number, part number, authorization number (TSO, etc.) and fabrication date.
- Permanent deformation of tire profile or radial-runout, unless disappear in 24 hours after inflation.
- Permanent deformation (bent, kink) at bead area.
- Surface deterioration; such as swelling, hardness, cracking, and discoloration due to contamination. Check condition after removing the contaminants by alcohol and water.
- Surface blister, unless disappear in 24 hours after inflation.

3. Mounting Tires on Wheels

The mounting of aircraft tires requires careful attention and adherence to established procedures. Care should be taken to abide by wheel/airframe manufacturer’s instructions for assembling wheels and mounting tires.

Bridgestone commercial aircraft tires are tubeless. It is prohibited to mount these tires with an inner tube unless otherwise specified.

Standard tire/wheel mounting procedure

In general, it is recommended to mount without grease or lubricated agents on the tire bead area. A tire with adjusted balance is stamped with a red dot on the sidewall immediately above the bead to indicate the lightweight point of the tire. The following step-by-step instructions generally apply for mounting tubeless tires on split wheels:

1) Make sure that the tire is clean inside. Visually inspect the bead area and wipe them clean with a cloth moistened with denatured alcohol, allow the tire beads to dry.
2) Wipe the “O-ring” seal of the wheel halves with an alcohol dampened cloth. Lubricate the O-ring seal with a light coat of grease following manufacturer’s instructions, if any. Place seal carefully in its groove without stretching or twisting.
3) Place the tire on the inboard wheel half being careful not to disturb the “O-ring”.
4) Set the outboard half in the tire. Align red-dot on tire with the wheel valve or wheel's heaviest point if indicated.
   Align bolt holes in accordance with manufacturer’s instructions.
5) Install wheel bolts, washers and nuts, tighten in a criss-cross fashion, and torque according to the wheel manufacturer’s instructions.
6) Inflate the assembly to the rated inflation pressure.
   Make sure to do this inflation in a safety cage.
   In case bead-fitting is not appropriate, spray de-ionized water over tire bead area before the inflation.
7) Ensure “tire rim line” is perfectly concentric to the wheel flange edge on both sides.
4. Inflation in the Tire Shop

The aircraft tire is designed to be operated at specific “deflection”. If the inflation pressure is incorrect, this deflection becomes out of designed range. Such operating condition may cause significant adverse influence on durability, leading to substantial consequences such as quicker tire fatigue, internal separation, and burst.

A. Recommended Inflation procedures

The inflation must be done by using the safety cage. Nitrogen is recommended for prevention of combustion and reduction of oxidization of the “innerliner”. The tire structure stretches after the inflation for a significant period of time, since the nylon cords are used as reinforcing material. This stretch results in reduction in the inflation pressure. Therefore, readjustment of inflation pressure after stabilization-period is mandatory to ensure the correct pressure. The stabilization period is shown in the Table 1. The readjustment can be done at PNO (unloaded service pressure) instead of the rated pressure.

Pressure Gauge:
Recommended specifications are error of 0.25% and less, and minimum digit of 2 psi.

Table 1: Period for Stabilization

<table>
<thead>
<tr>
<th>Period</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min. 12 hours*</td>
<td>Normal</td>
</tr>
<tr>
<td>Min. 2 hours</td>
<td>Alternate</td>
</tr>
</tbody>
</table>

* : “Min. 12hours” for the stabilization is recommended in AC 20-97B issued by FAA.

Natural pressure loss may occur even after the stabilization. If the loss does not exceed criteria specified in the Table 2, the tire is normal and serviceable.

Table 2: Air Retention Criteria

<table>
<thead>
<tr>
<th>Period</th>
<th>Criteria of pressure loss</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 hours**</td>
<td>5 percent</td>
<td>Normal</td>
</tr>
<tr>
<td>12 hours</td>
<td>2.5 percent</td>
<td>Alternate</td>
</tr>
</tbody>
</table>

** : “Min. 24hours” for the retention test is recommended in AC 20-97B issued by FAA.
Flow chart

[ Recommended Procedure ]

- Normal Procedure

  Inflate tire to rated pressure (Pn)  
  Check inflation pressure  
  Check and re-inflate to unloaded service pressure (PNO)  
  Install tire/wheel assembly on aircraft after re-adjustment to unloaded service pressure (PNO)

  Check leak cause

  PNO>=95%  
  PNO<95%

- Alternate Procedure

  Inflate tire to rated pressure (Pn)  
  Check inflation pressure  
  Check and re-inflate to unloaded service pressure (PNO)  
  Install tire/wheel assembly on aircraft after re-adjustment to unloaded service pressure (PNO)

  Check leak cause

  PNO>=97.5%  
  PNO<97.5%

- Emergency Procedure

  Inflate tire to 105% of unloaded service pressure (PNO)  
  Check air leakage with water or soap solution  
  Install tire/wheel assembly on aircraft  
  Check inflation pressure before each flight during the first 48 hours after the installation

  No air leakage (No stream of bubbles is found)  
  Air leakage (A stream of bubbles is found)

  Check leak cause

  Pn>=90%  
  Pn<90%

  Remove the tire/wheel assembly from aircraft

  Remain tire/wheel assembly on aircraft

WARNING

The inflation pressure should not exceed the rated pressure. Extremely high pressures may cause in explosion of tire or wheel, leading to devastating consequences. Use appropriate regulator to maintain pressure of injected gas within safe range. Use of the safety cage is mandatory for the inflation.

B. Inspection Before Installing Tire on Aircraft

Once tire is stabilized, check for permanent tire deformation or cracking of the tire grooves. Should there be major tire asymmetry, blisters or bulges, the tire is not usable. Furthermore the tire is not usable if there is damage to the sidewall reaching to the carcass plies.

* When the wheel and rim are not in straight alignment.

Note that undulation of the grooves in a zig-zag pattern which is seen on radial tires is acceptable and does not affect tire performance. (Cut protector pattern.)

Should the reinforcing fabric (bias) or aramid cord protector (radial) be exposed in the groove area, the tire is unusable. However, if the cracks or splits are shallow and neither the reinforcing fabric (bias) nor aramid cord protector (radial) is exposed, the tire may be utilized.
5. Inflation Pressure Control

It is recommended that inflation pressure of each aircraft tire be checked daily, and that the pressure gauge be calibrated regularly. Maintaining correct tire inflation pressure is the most important factor in any preventive maintenance program.

A. Pressure Readjustment After Installing Tire on Aircraft

PNZ (loaded service pressure) shall be used instead of the PNO, if the aircraft is on the ground. PNZ is specified as add 4% to the PNO, to adjust the target pressure considering increase by small shrink of tire gas chamber due to vertical loading.

- Aircraft on Jacks: Readjustment pressure is PNO
- Aircraft on Wheels: Readjustment pressure is PNZ

\[ 1.04 \times \text{PNO (Unloaded)} = \text{PNZ (Loaded)} \]

B. Pressure Control In Service

The pressure check should be done exclusively with “cold tire”; tire temperature is within a rage of ambient temperature.

If the tire is not operated for successive 3 hours or longer, the tire is granted as the “cold tire”, unless otherwise exposed to direct sun light for a significant time period.

C. Normal Pressure Loss During Service

Slight pressure loss occurs with aircraft tires due to natural leakage of small amount of gas. Permissible range of the loss is 5% or less within 24 hours. A small amount of gas diffusion through the “vent holes”; artificial holes situated at the lower sidewall, is a normal mechanism to bleed off trapped air, preventing internal separation or blistering. However, such air leakage should not be detectable by hand. If pressure is found to be less than the minimum pressure, refer to Table 3.

Table 3: Tire Pressure Verification

<table>
<thead>
<tr>
<th>Tire Pressure</th>
<th>Verification</th>
<th>Recommended Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>P &gt; PN +5%</td>
<td>Overinflation</td>
<td>Readjust to maximum of normal operating range if tire is at ambient temperature.</td>
</tr>
<tr>
<td>PN + 5% &gt; P &gt; PN</td>
<td>Normal Operating Range</td>
<td>No action if within Normal Operating Range (NOR).</td>
</tr>
<tr>
<td>PN &gt; P &gt; 95%PN</td>
<td>Allowable Daily Pressure Loss</td>
<td>Reinflate to specified service pressure.</td>
</tr>
<tr>
<td>95%PN &gt; P &gt; 90%PN</td>
<td>Moderate Pressure Loss</td>
<td>Reinflate to specified service pressure. Record in aircraft log book. Remove if pressure loss reoccurs within 24 hours.</td>
</tr>
<tr>
<td>90%PN &gt; P &gt; 80%PN</td>
<td>Large Pressure Loss</td>
<td>Replace the tire.</td>
</tr>
<tr>
<td>80%PN &gt; P &gt; 0</td>
<td>Extreme Pressure Loss</td>
<td>Replace tire and its axle mate.</td>
</tr>
<tr>
<td>P = 0</td>
<td>Complete pressure loss due to;</td>
<td>Replace tire and its axle mate.</td>
</tr>
<tr>
<td></td>
<td>Tire perforation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Blown fuse plug</td>
<td></td>
</tr>
</tbody>
</table>

P: Tire Pressure Reading  
PN: Loaded Service Pressure  
NOR: Normal Operating Range (Service Pressure)

* Please mark pressure loss tire with “tire pressure loss removal” or “low pressure”.

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D. Identification of Axle Mate
When a tire is removed for any of the following reasons, the axle mate tire must be identified and the serial number must be provided to the appropriate retreader (Refer to Table 3).

1. Large pressure loss
2. Extreme pressure loss
3. Perforation
4. Blown fuse plugs

E. Adverse Effects of Underinflation
Underinflation will cause high tire deflection and heat build-up, which in turn may lead to ply separation. Low inflation pressure may also cause uneven wearing of the tread and rapid wearing of the shoulder. It may also increase the tire footprint, possibly leading to damage of the tire sidewall during landing.

An example of Casing Break Up (CBU) in a bias tire at the lower sidewall caused by running the tire at pressures below those recommended.

F. Tire Deflection and Durability
Figure 1 shows the relationship between the changes in tire deflection at various inflation pressures and the durability of the tire carcass. With aircraft tires, an increase in deflection during operation greatly weakens the carcass.

G. Adverse Effects of Overinflation on Tires
Excessive inflation pressure may cause uneven tread wear (Wearing of the tread center), less braking efficiency, abnormal tire growth, and may make the tread more susceptible to cutting by foreign objects.

H. Compensation for Climate Change
When a flight is done from a warmer city to a colder city, inflation pressure becomes lower at the destination due to change in ambient temperature. If the temperature fall of 25 deg C or more is anticipated, the pressure shall be altered by using a rule shown below, prior to the take off at the origin airport. The minimum required inflation pressure must be maintained always.

<table>
<thead>
<tr>
<th>Rule:</th>
<th>Tire pressure must be increased by 3.7% for each (-10^\circ\text{C}) difference.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example:</td>
<td></td>
</tr>
<tr>
<td>Temperature of departing airport:</td>
<td>25°C</td>
</tr>
<tr>
<td>Temperature of destination:</td>
<td>(-10^\circ\text{C})</td>
</tr>
<tr>
<td>Required pressure adjustment:</td>
<td>(\frac{35}{10} \times 3.7 = 13%)</td>
</tr>
</tbody>
</table>
I. Pressure Control for “Hot Tires”
A “Hot Tire” is defined to be a tire heated by aircraft operation (Braking) or by exposure to sunlight and having a surface temperature higher than ambient temperature by at least 30°C. A “Hot Tire” may also result from operating with an abnormally large tire deflection.

If a “Hot Tire” is identified, the following actions should be taken:
- Compare tire pressure for tires of the same gear (nose or main gear). Tire pressure should be in the same range for all tires on the same gear and always greater than PNZ. Tire pressure can be much greater than PNZ+5% after long taxiing or severe braking maneuvers. Leave the tire in service.
- Tire pressure should always be greater than PNZ. If pressure is lower than PNZ, conduct pressure verification after cooling of the tire in accordance with Table 3 (p43).
- If all tire pressures are greater than PNZ, but not all in the same range (unusually large variation), check for brake malfunctions or incorrect pressure adjustment during a previous check.

Reference: Tire cooling curve
The graph above shows a natural cooling curve (as a typical example) from a temperature of 95°C for each the bead and crown section of the tire at a room temperature of 25°C. As compared to the crown section of the tire, the bead section cools slowly. These curves are based on typical examples obtained through bench testing. When other factors such as heat build-up from braking, etc., are taken into consideration, the cooling rate will become slower. Accordingly, the tires must be artificially cooled or else left at rest for a longer period of time.

J. Extraordinary Hot Tire
If the tire temperature is significantly higher than what experienced at normal daily operation, tire pressure investigation shall be done. Make sure to cool down the tire/rim sufficiently before do this check.

Tires are not recommended for further use when the tire surface temperature exceeds 225°F (107°C), or when the brake heat creates temperatures that exceed 300°F (149°C) at points where the tire is in contact with the wheel surface.

WARNING
Never bleed off excess inflation pressure from a hot tire. Any adjustments to inflation pressure should be conducted after tires have cooled to ambient temperatures.
6. Caution in Taxiing

The aircraft tire generates heat in the body much more than car tires. This heat generation is considerably influenced by taxi distance and taxi speed. If a taxi is done at extraordinary higher speed, or for unexpectedly longer distance, tire temperature becomes extremely high. Such increases in temperature accelerate deterioration of nylon cords, shorten the serviceability of the carcass, increase wearing of the tread, and lower the adhesion between ply cords.

Effect of taxi distance and taxi speed upon tire temperature rise

As shown by Figure 3, tire temperatures continue to rise as taxiing distances increase. Although these values differ depending upon the type of aircraft, the general trend is the same. Increases in taxiing distances cause increased deterioration in aircraft tires. Note that taxiing speeds are also a factor affecting increases in tire temperatures.

7. Inspection After Landing

Aircraft tires should always be inspected for damage after each landing. The inspector must check carefully for evidence of cuts, bulges and blisters, severe cracking, slippage on the wheel, evidence of severe overheating and other types of tire failure. Removal criteria is contained in “Examination and Recommended Action” p55.

8. Normal Wear Removal Criteria

Extreme wearing of the tire may cause wet-skidding or hydroplaning, or may damage the tire. Therefore the tire should be removed at the following condition whichever comes first across the tread;

i) When the wear level reaches the bottom of any groove at one point or up to 1/8 of the circumference.

ii) The reinforcing fabric (bias) or aramid cord protector (radial) is exposed.

If it is necessary to continue the tire in service beyond the limit i), the tire should be removed either at the next maintenance base or the limit ii) happens, whichever occurs first.

9. Removal due to Abnormal Use

If the tire is used under “abnormal operating condition”, the tire must be removed from service immediately. Typical abnormal operating conditions are as listed below;

- Rejected take off
- Skidding due to break malfunction
- Over loading due to failure of axle mate tire (mate to flat)
- Low inflation pressure for a significant time period
- Hard landing

If the tire undergoes those conditions, the tire is not serviceable even though there is no specific sign of damage in appearance.
10. **Removal by tire condition other than tread wear**

If the following phenomenon are found, or incidents are reported, remove the tire for inspection by Bridgestone.

- **A.** Exposure of reinforcing fabric (bias) or aramid cord protector (radial) resulted by spot wear, tread reversion, groove cracking, rib tearing.
- **B.** Tread cut reaching the depth and length limit.
- **C.** Rib undercutting.
- **D.** Chevron cut exposing the reinforcing fabric (bias) or aramid cord protector (radial) by 5 cm squared or more.
- **E.** Tread separation, peeled rib, open tread splice, impact break, skid burst, bulge/blister, casing break up, heat burst.
- **F.** Cord exposure caused by sidewall cracking, weathering & radial cracking.
- **G.** Inflation pressure loss by more than 10% at daily check.
- **H.** Experienced hard-landing.

11. **Dismounting Bias Tires**

- Inflated gas shall be released completely before removing the tire from the wheel assembly.
- Pay attention to avoid the valve-core being projected at tremendous speed when removing it from the valve.
- Bead-breaking; removing tire bead areas from rim flanges, shall be done by applying pressure evenly at tire surface as close to the rim flanges as possible.
- The bead-breaking-press should have cylindrical brims to contact with the entire sidewall of the tire.
- Once the bead-areas parted from the rim flanges, do not press tire sidewall further more.

12. **Dismounting Radial Tires**

Procedure is partly different from that for the bias tires. Please refer to Section II, “Instructions Specific to Radial Tires.”

13. **Tire condition unsuitable for retreading**

If the following conditions are detected, the tire is not retreadable.

- **A.** Bias tires with cut penetrating to 40% and more of the actual number of carcass plies.
- **B.** Radial tires with cut penetrating 40% and more of the belt plies.
- **C.** Reinforcing cords are exposed at the sidewall or bead area, due to cut or weathering.
- **D.** Spot-wear exposing the carcass or belt cords more than 10 inches squared.
- **E.** Melted reinforcing-cords at bead-base, due to overheating.
- **F.** Bead wires are exposed or bent.
- **G.** Wrinkles at the surface of innerliner.
- **H.** Axle mate of burst tire. (Both should be scrapped).
- **I.** Casing separation.
- **J.** Removed due to RTO or hard landing.
14. Matching Tire Diameters

Axle mate tires ought to have close outside-diameters, in order to equalize vertical load bearing. Recommended tolerance of the diameter difference for the inflated tire is listed in the Table 4.

<table>
<thead>
<tr>
<th>Tire Outside Diameter Inch (mm)</th>
<th>Maximum Tolerance Inch (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 24&quot; (610)</td>
<td>1/4&quot; (6.4)</td>
</tr>
<tr>
<td>24–32 (611–813)</td>
<td>5/16&quot; (7.9)</td>
</tr>
<tr>
<td>32–40 (814–1016)</td>
<td>3/8&quot; (9.5)</td>
</tr>
<tr>
<td>40–48 (1017–1219)</td>
<td>7/16&quot; (11.1)</td>
</tr>
<tr>
<td>48–55 (1220–1397)</td>
<td>1/2&quot; (12.7)</td>
</tr>
<tr>
<td>55–65 (1398–1651)</td>
<td>9/16&quot; (14.3)</td>
</tr>
<tr>
<td>66–over (1652–over)</td>
<td>5/8&quot; (15.9)</td>
</tr>
</tbody>
</table>

15. Tire Flat-spot

- If an aircraft is grounded for a long period of time, the tire deformation becomes “permanent” and flat spot remains at the tread area even after the vertical load is removed.
- The flat spot tends to occur more easily at lower ambient temperature.
- For most of the case, the distortion disappears during taxi, however, if significant vibration remains detected, the tire should be removed from service.
- To prevent permanent flat-spot, it is recommended to place the aircraft on jacks or roll the tire periodically when parked the aircraft for a long period of time.

16. Protection from Contamination

Care should be taken that tires do not come into contact with oil, gasoline, jet fuel, hydraulic fluids or similar hydrocarbons. Such substances have deteriorating effects on rubber. When servicing aircraft, cover tires. Be especially careful not to stand or lay tires on floors that are covered with these contaminants.

17. Maintenance of Airport Surfaces

Airport surfaces require excellent maintenance. If airport surfaces and runways are rough or poorly maintained (holes, cracks, foreign objects) aircraft tires are liable to be damaged. Strict control of hanger, runways, ramps and other field areas is especially important where large, high speed aircraft operate. Bolts, nuts, rivets, tools and other foreign objects will easily cut into aircraft tires.

The items in the photograph were picked up from taxi ramps, service areas and runways. These objects present a potential danger to tires and to aircraft.
18. Tires in Other than Aircraft Service

Bridgestone aircraft tires are designed and manufactured for use only on aircraft. Any unauthorized use of Bridgestone aircraft tires for ground use is strictly prohibited.

19. Storage of Tires

1. Storage should be kept clean and tidy. Floor and walls shall be free from contaminants; such like oil, chemical, water, and foreign objects; such as metal debris, stones, wood chips etc to avoid tire damage.

   Ensure that no rain leaks through the roof, windows or doors in the storage location.

2. Keep storage area practically dark. If there are windows, curtain or films shall be installed to avoid strong sunlight. If illumination is done by fluorescent tubes, those shall be turned off unless needed.

3. Storage room shall be cool and dry in practical sense. Source of ozone, such as electric motors, electric generators, battery chargers, electric welding equipment and else, shall be kept away from tires. Keep away radiant heat from tires.

4. Preferable posture of tire is upright to avoid deformation and difficulty at assembling with wheels, as a consequence. Use of tire rack is highly recommended.

20. Transportation & Storage of Tire/Wheel Assemblies

When storing or transporting serviceable tire/wheel assemblies, it is permissible to inflate with nitrogen to full service pressure. Take care to ensure that the valve cap is installed and tightened to the specified torque value.

Worn assemblies and/or those deemed unserviceable for any reason should be shipped and/or stored at low inflation pressure.

21. Precautions during Unloading

Strictly observe the following precautions when unloading tires.

1. Do not throw, sit on or kick tires. Those careless deeds may result in scratches, cracking and permanent deformation.

2. Check the insides of trucks to ascertain there is no oil or water that may contaminate the tires or nails, stones, wood chips etc that may damage the tires on the truck bed or walls during transportation. Use rugs or other padding to prevent the tires from becoming scratched or soiled.

22. Service Claim Memorandum

In the case that a product claim is initiated, fill out the Service Claim Memorandum shown on the next page, or an authorized alternative form, with the necessary information and mail it to Bridgestone.

By observing the basic procedures mentioned in the foregoing pages, tire life can be maximized and unnecessary damage to tires and to aircraft avoided. External damage can usually be detected, but if internal damage appears evident, the damaged tire should be returned to Bridgestone for inspection.
# Service Claim Memorandum

<table>
<thead>
<tr>
<th>Details</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tire size, ply rating, speed rating</td>
<td></td>
</tr>
<tr>
<td>Serial number</td>
<td></td>
</tr>
<tr>
<td>In case of recapped tires, the number of times they have been recapped and the shop which recapped them last</td>
<td></td>
</tr>
<tr>
<td>Type of aircraft</td>
<td></td>
</tr>
<tr>
<td>The positions in which the damaged tires were mounted</td>
<td></td>
</tr>
<tr>
<td>Date when the tires were damaged</td>
<td></td>
</tr>
<tr>
<td>Circumstances under which the tires were damaged</td>
<td></td>
</tr>
<tr>
<td>Particulars of the damage (preferably with illustrations or photos)</td>
<td></td>
</tr>
<tr>
<td>Customer’s signature</td>
<td></td>
</tr>
<tr>
<td>Date when the customer served notice</td>
<td></td>
</tr>
</tbody>
</table>
II. Instructions specific to radial tires

The care and maintenance of bias and radial tires is for the most part very similar. However, it is necessary to emphasize certain important differences.

1. Radial Tire Mixability

When operated under similar conditions, radial aircraft tires may exhibit different characteristics than those of bias aircraft tires. Bridgestone recommends that the following guidelines be heeded.

   a. Aircraft need to be certified for use of radial tires in place of bias or vice versa. Questions arising concerning the certification of a given aircraft must be taken up with the airframe manufacturer.

   b. Radial tires should not be mounted on wheels designed for bias ply tires or bias tires on wheels designed for radial tires without first checking with the wheel or airframe manufacturer.

Mixability of Bridgestone radial tires with bias tires is permitted only as expressly stated in the official airframe manufacturer’s bulletin or specification. Any other use is unauthorized by Bridgestone Corporation.

2. Radial Tire Dismounting Procedure

A. Deflation

Before dismounting the tire from the wheel, completely release all remaining inflation pressure. Remove the valve core only after all pressure has been relieved.

**WARNING**

Removal of the wheel valve core on an inflated tire could project the core with dangerous speed and force.

B. Recommended Bead-breaker Press Design

The lower sidewalls of radial aircraft tires are significantly more flexible than those of bias tires, and are easily damaged by inappropriate dismounting procedures and/or equipment. For dismounting radial aircraft tires from their wheels, Bridgestone recommends the use of either a full-circle ring or a conical pressure roller to ease the tire beads away from the wheel flanges.

B-1 Full-circle Bead Ring Type

With this type of bead-breaker, a bead removal ring sized to fit specific tire size is used to apply pressure as close to the bead as possible on the area directly above the bead (Fig. 5). The space or distance between the removal ring and the wheel flange should be approximately 10mm (Fig. 6). Furthermore, the range of motion of the removal ring towards the tire center should be greater than 150mm, and the removal ring should be constructed to allow observation of the tire bead during dismounting. This may be achieved by designing “windows” in the removal ring (Fig. 7).
B-2 Conical Pressure Roller Bead-breaker (Fig. 8)

Bridgestone has found that this type of bead-breaker is most effective for radial aircraft tires. A conical roller is slightly forced against the lower sidewall immediately above the wheel flange as the tire is slowly rotated. This technique will result in the tire bead begin gradually moved away from the wheel flange after several revolutions with no damage to either the tire bead area or the wheel flange.

C. Procedure for Dismounting Using Full-circle Bead Rings

Roll the tire into bead-breaker press and position the removal ring so that it evenly contacts the entire circumference of the bead. More than one technique may be applied to ease the tire bead away from the wheel flange. The preferred method is to reduce the bead-breaker press speed to 5mm/second and press the tire bead continually until the bead is dismounted. Using this method, the bead should separate smoothly from the wheel, often with the first application of force.

In the event that there may be concern about bead “Turn Over” (Fig. 9), an alternative method is recommended. Extend the bead ring laterally against the bead for a distance not exceeding 100mm, hold for two to three seconds, and retract the bead ring. Repeat this procedure until the bead is dismounted. The lateral speed of the bead ring should typically be about 30mm/second using this method.
The latter method should be used when the tire cannot be dismounted using the first method, or when the bead-breaker press cannot be set for low speeds.

D. Procedure for Dismounting Using a Conical Pressure Roller

Mount the tire/wheel assembly in the bead-breaker press. Position the conical roller against the bead as close as to the top of the wheel flange. While rotating the tire/wheel assembly, slowly apply force against the bead with the roller.

As with the full-circle bead ring method, care must be taken to avoid excessive sidewall deformation that could result in bead “Turn Over”. The stroke of the conical pressure roller should not exceed 100mm.

E. Recommended Dismounting Procedure

Loosen the wheel tire bolts only after confirming that the tire beads have been completely released from the wheel. If the wheel tie bolts are loosened before the beads are completely released, the possibility exists that the wheel may be scratched or gouged.

After the tire bead is released from the wheel flange, insert a block of rubber or other material of appropriate size between the tire and the wheel flange to prevent the tire from returning to its original position. Inserting the block will facilitate the dismounting process.

The use of water or a soap solution as a lubricant will facilitate dismounting. Application of the water or soap solution while simultaneously applying pressure with the removal ring increases the effectiveness of the solution.