

MUNSCH & CO. AEROMECHANICS

AH-64 AND UH-60 BLADE PIN ALIGNMENT TOOL

BPAT INSTRUCTION MANUAL

DESCRIPTION:

The Blade Pin Alignment Tool or BPAT was created as an alternative solution to the friction and forced fit of previous main rotor blade pin installation methods. The goal was to make the process uniform, frictionless, safer and faster.

The BPAT is composed of an Alignment Shaft of A2 Tool Steel, that has been hardened to Rockwell Rc60, which mates with a Head and Handle unit constructed of corrosion resistant Stainless Steel. The two are attached by an indented retaining pin that passes through aligned holes in the both units and is held in place by a ball plunger. The retaining pin prevents unscheduled separation of the two units.

The Alignment Shaft is tapered on the bottom end, cylindrical through the body and milled to accept the bottom of the main rotor blade pin on the top end. It has two through holes for the small retaining pin to pass through.

The Head and Handle unit has a main body that is milled to fit over the top of the Alignment Shaft and also has two through holes, one small and one large.

The large through hole is for the indented handle and the small through hole is for the indented retaining pin; each held in place by ball plungers when inserted. Both handle and pin are attached to the head by stainless steel lanyards and machine screws which are secured with Loctite to prevent their becoming FOD.

The bottom of the head has a 1/16" gum rubber washer held on by cyanoacrylate adhesive to prevent metal-to-metal contact when the assembled unit is inserted down through the lead lag link and blade root bushings.

The AH-64 BPAT also has a .035 gap spacing tool, known as the SPORK, for the .002-.060 gap spacing requirement under the main rotor blade pin washer. The SPORK has a flat, two pronged spacer, angled for ease of insertion and Tig welded to a cylindrical handle. Both components are corrosion resistant stainless steel.

APPLICATION:

The clamped and secured main rotor blade is elevated and positioned to an approximate position of visual rotor blade bushing alignment with the lead lag link bushings. The blade root should be able to move freely when held with one or both hands. When the visual bushing alignment is effected the assembled BPAT is inserted and pushed down through the top bushings of one hole until fully inserted and seated. At this point a mechanical and physical alignment of all bushings in the blade root and lead lag link is effected by the alignment shaft.

Under certain field, IMC or shipboard conditions it may be advisable to insert a second BPAT down through the bushings of the second hole ASAP to lock the blade in place and secure it from any further uncontrolled or unsafe movement.

Under normal operating conditions when the BPAT has effected alignment of one set of bushings it is possible to have the main rotor blade led or lagged as required to align the second set of bushings. This should allow the installation of a blade pin through the second hole while keeping the BPAT in place in the first.

When the BPAT is inserted and seated it should be manually secured below the link-root assembly prior to the pulling of the small retaining pin past its indent and freeing the head from the alignment shaft. As the alignment shaft can align the bushings to a point where the alignment shaft could fall through and injure personnel below IT IS IMPERATIVE THAT THE ALIGNMENT SHAFT BE MANUALLY SECURED BELOW BEFORE REMOVING THE HEAD AND HANDLE.

When the head and handle are removed and set securely aside, the bottom of the blade pin can be inserted in the milled top of the alignment shaft. At this time downward pressure is applied to the blade pin until it displaces the alignment shaft by following it down through the aligned bushings and takes its proper position in the assembly.

If only one pin has been installed at this stage then the BPAT is reassembled securely, inserted and seated in the second hole and the above process repeated until the second pin is in its proper position.

In the case of the AH-64 blade pins, where the .002-.060 under washer gap spacing is required, the blade pin spring clip is rotated to a fully upright position and the SPORK, the .035 spacing tool, inserted under the washer and seated around the blade pin. The blade pin spring clip is then rotated downward until the compression washers expand sufficiently to hold it in place. At this point the SPORK is removed and the blade pin spring clip is rotated further downward into its final position by the application of the 0-100 Spring Resiliency Tester until the required pressure is applied and the spring clip is seated and clipped over the hex nut on the bottom of the blade pin.

The use of the SPORK is not a requirement with the UH-60 blade pins. Proper TM procedures for UH-60 blade pin spring clips should be followed until seated and secure.

By following the above applications aircraft maintenance personnel should be able to extend the life span of both blade pins and bushings through the elimination of the forced fit and friction of previous methods. In addition the ability to instantly secure a blade by the use of two BPATs simultaneously adds a margin of safety and control not previously realized.

STORAGE AND SHIPPING:

The Alignment Shaft of both the AH-64 and UH-60 BPAT is non corrosion resistant hardened tool steel and should be coated with a light film of WD40 and wrapped in a WD40 impregnated shop towel to prevent corrosion after each use and before being put in storage or shipped.

Application of WD40 is not required prior to utilization of the BPAT and the alignment shaft may be wiped clean prior to assembling the components for use.

ADDITIONAL INFORMATION:

A video of the BPAT in use, Nato Stock Numbers, ordering information and POC may be seen at www.munschandco.com.

The BPAT has been granted U.S. Patent # 7,114,924 by the USPTO. The patent is held by Donald T. Munsch.

Munsch & Co. Aeromechanics is the patent holder, manufacturer and sole source provider for the AH-64 and UH-60 BPAT. Listed in the DLA CCR under CAGE Code 3G2X1.

