For any of the variety of missions required, MDHI has developed optional accessories to tailor the basic MD Explorer® helicopter to your exact needs. The accessories are designed as quick-change items to reduce your down-time and enhance your productivity.

3.0 SYSTEM DESCRIPTION

The MD Explorer® is an eight-place, twin-engine, multi-purpose helicopter. It has a bearingless, composite, fully-articulated rotor system, with the patented NOTAR® anti-torque system. The engines have a direct input to the transmission, with no combining gearbox. A single short shaft from the transmission drives the NOTAR® fan, and two quills drive the engine and transmission oil cooling system. The rotor is supported by a hollow static mast mounted to primary structure which absorbs all of the flight loads, allowing the ON-CONDITION transmission to provide torque only. The transmission is separated from the static mast by an acoustic isolator, thus reducing noise into the cabin and cockpit areas. There are only three wetted areas, which are checked daily through view ports. The hydraulic system is a dual system for reliability. The outer skin of the aircraft is composite, with no magnesium, allowing it to survive well in a hostile marine environment. The fuel cells are separated well away from the outer skin, enclosed by two deep keel beams, and all of the fuel lines incorporate frangible fittings. Powerplants, fuel, hydraulic, and electrical systems are monitored and displayed to the crew with an Integrated Instrumentation Display System. The IIDS provides both digital and analog read-outs for clarity, records all exceedances, does engine trend analysis, and incorporates a Chadwick-Helmuth Balance Monitoring System, (BMS) which allows rotor and NOTAR® fan balancing during revenue flights instead of dedicated maintenance actions. All of the crew and passenger seats are energy attenuating, and meet the new FAR/JAR 27.562 requirements. The landing gear is a non-retractable skid. Large, 52-inch sliding doors are on each side of the spacious cabin. The crew doors are hinged and an aft cabin hinged door allows for baggage or alternate loading.

3.1 **Specifications and certifications**.

The certification is in accordance with FAR Part 27 through amendment 27-26 dated April 5, 1990, and special condition for High Intensity Radiated Fields (HIRF) protection per FAR 21.16; FAR Part 36 Appendix H, Noise, effective on the date of Type Certificate and FAR Part 27, Amendment 27-33, Appendix C - “Criteria for Category A” (November 1997). The Federal Aviation Administration Type Certificate Number is H19NM, dated December 2, 1994. The FAA model designation is MD 900. The FAA/ICAO aircraft type designator is HU90.

3.2 **Rotor.**

3.2.1 **Main rotor head.**

The rotor head consists of two aluminum alloy sections which clamp together to retain the fiber-wound composite flexbeams. Each retention bolt supports the leading strap of one flexbeam, and the trailing strap of another. The hub rotates around a static (nonrotating) hollow mast support tube, which absorbs all of the flight loads. The hub is rotated by a drive shaft which rises from the transmission through the hollow support tube.

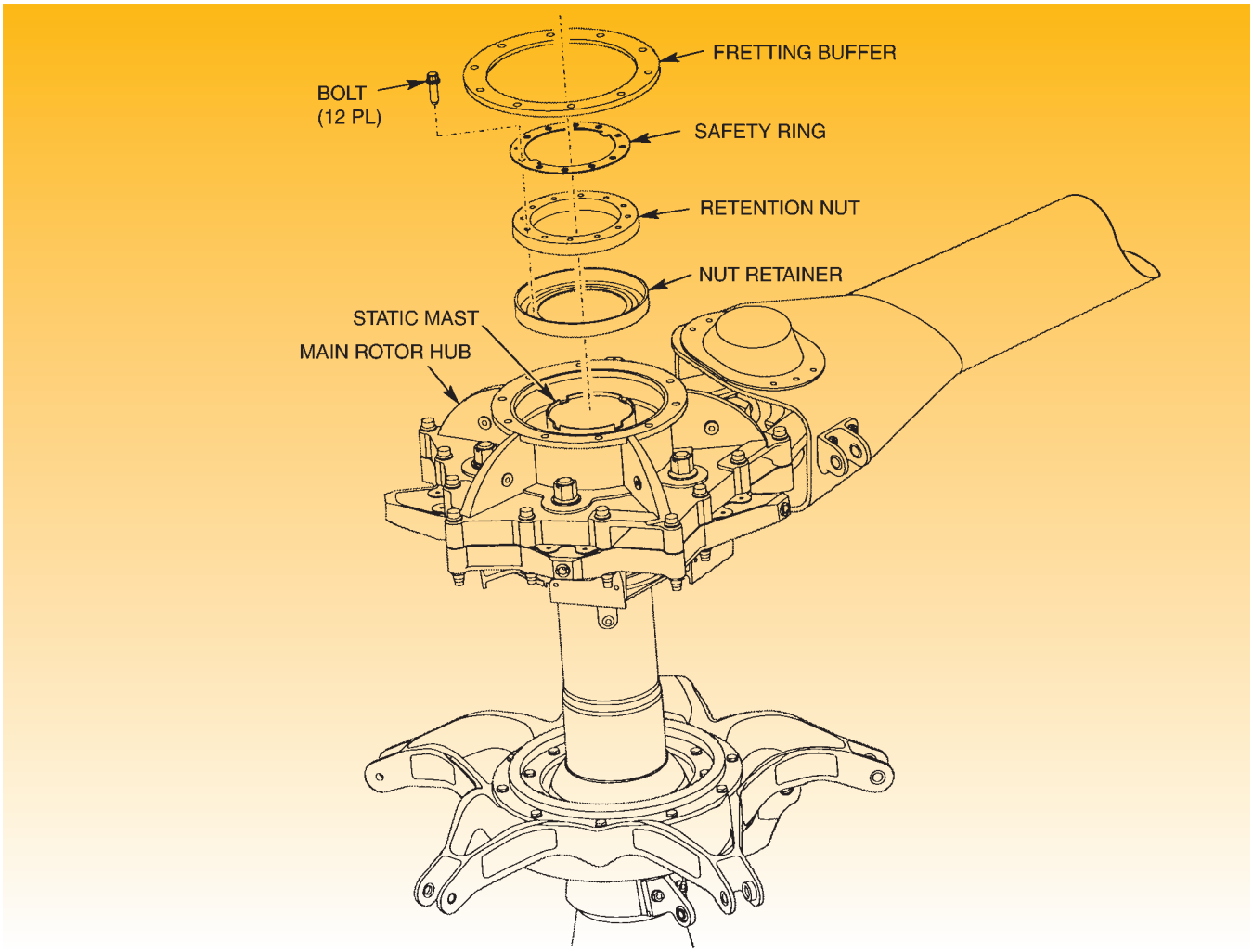

Figure 5. Main Rotor Head

3.2.2 **Main rotor blades.**

The five rotor blades are manufactured of fiber-wound composite material. Bearingless composite flexbeams attach the blades to the forged aluminum hub, and provide feathering and flapping motions. The lead-lag motions are absorbed by elastomeric dampers attached to the top and bottom of each pitchcase. The blade interior aft of the spar is filled with a honeycomb core for rigidity. Blade center of gravity of 27 percent is assured by the addition of aluminum/steel/tungsten weights (as required) in an adjustable weight pocket near the blade tip. The leading edges are erosion-protected by a titanium strip out to 84 percent radius, and by a nickel strip from that point out to the tip. An adjustable tab is located one-fourth span from the tip for fine tuning of the blade track. The blades are attached to the pitchcase and flexbeams with high torque bolts with expandable bushings. A grounding strap for each blade makes electrical contact at the root end and the hub for lightning protection.

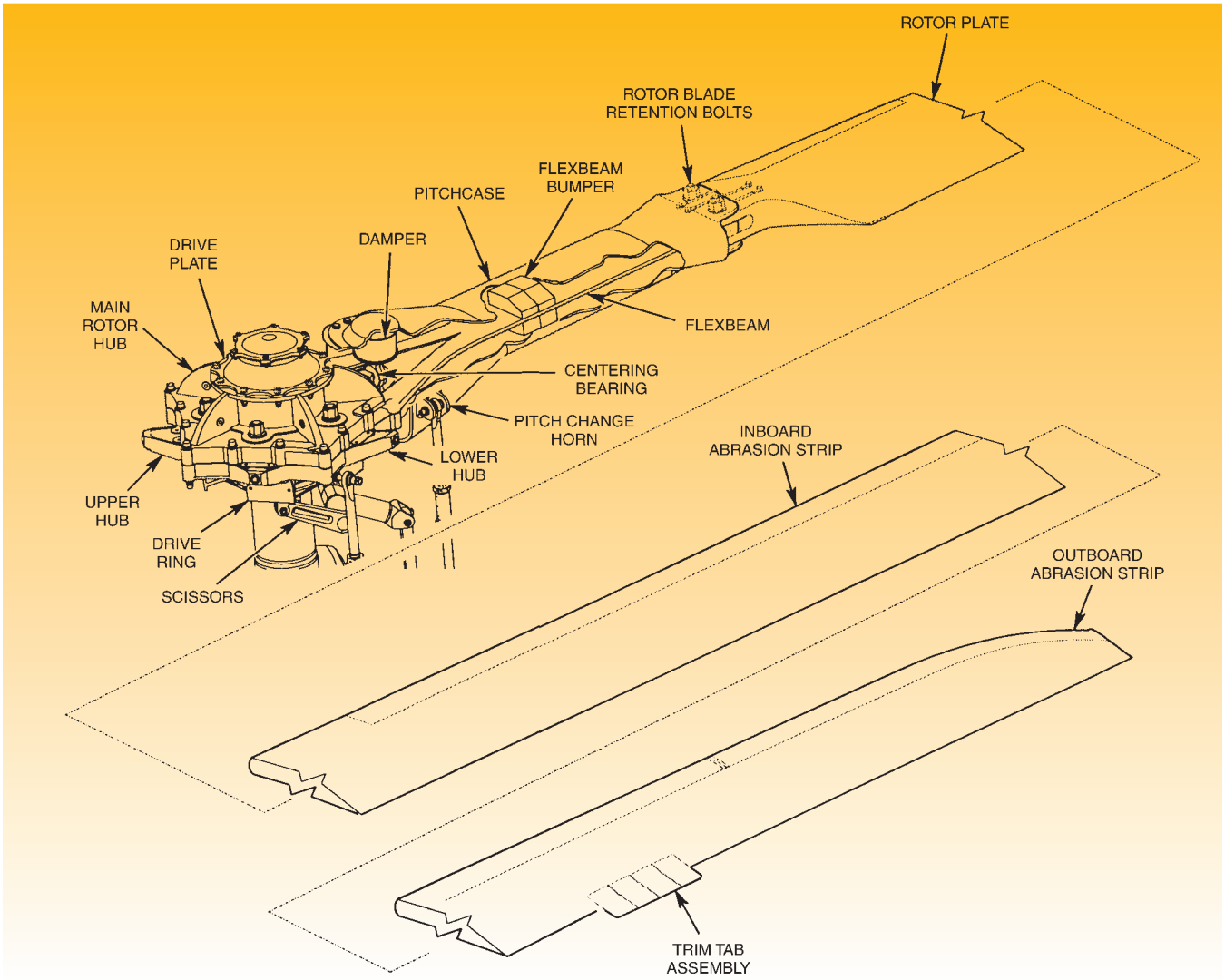

Figure 6. Main Rotor Blades

3.2.3 **Main rotor data.**

Number of blades 5

Direction of rotation .....Counter-clockwise, seen from above.

Diameter .....33.8 ft. (10.3 m)

Blade chord.....0.83 ft (0.25 m)

Disk area .....900 ft^2 (83.6 m^2)

Disk loading.....6.94 lb/ft^2 at maximum weight

Blade tip speed, 100% NR .....695 FPS

Rotor speed, 100% NR.....392 RPM

3.3 **Static support mast.**

The static support mast consists of a nonrotating hollow mast fixed rigidly to a mast support base. It is attached to the main structure of the helicopter by four "V" shaped struts. A pair of tapered roller bearings transfer all of the flight loads directly from the rotor hub into this mast tube and base. Two of the support struts may be removed to allow the removal/installation of the transmission, without disturbing the flight controls or the rotor blades.

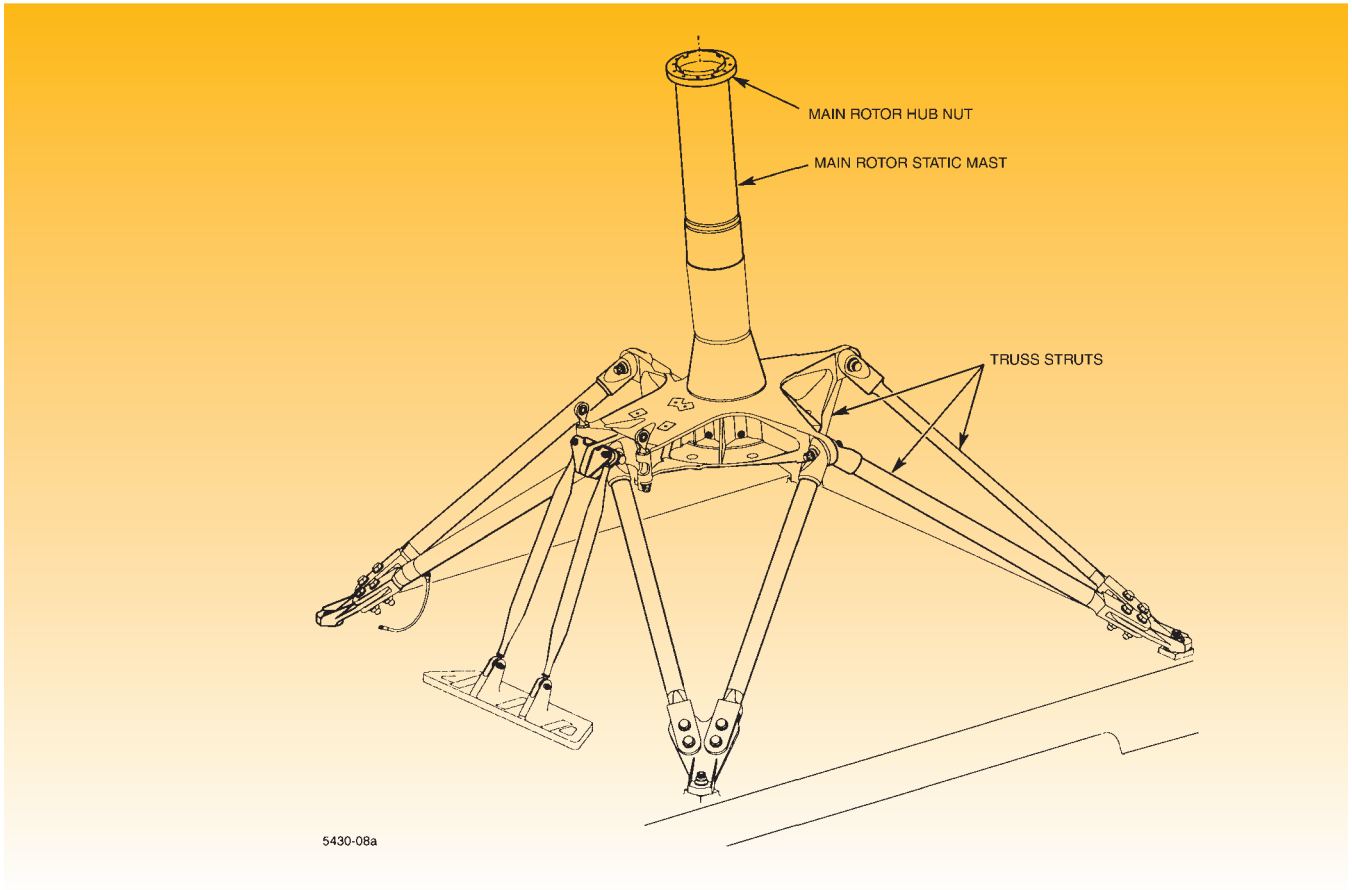

Figure 7. Static Support Mast

3.4 **Transmission.**

The transmission consists of an aluminum alloy casting (there is no magnesium anywhere on the aircraft) containing two gear reduction stages, an input combining stage, and an output planetary stage for transmitting engine torque to the rotor. It also drives the NOTAR® fan, the fans for the transmission and engine oil coolers, and the dual hydraulic pumps. The transmission does not carry any of the flight loads, and has a on-condition design.

An elastomeric isolator forms a vibration-reducing interface between the static mast base and the transmission, thereby reducing the noise and vibration levels in the cabin.

The transmission has the following ratings:

Take-off .....550 shp (per engine)
Maximum continuous.....500 shp (per engine)
OEI, continuous.....620 shp
OEI, 2.5 minute limit.....680 shp

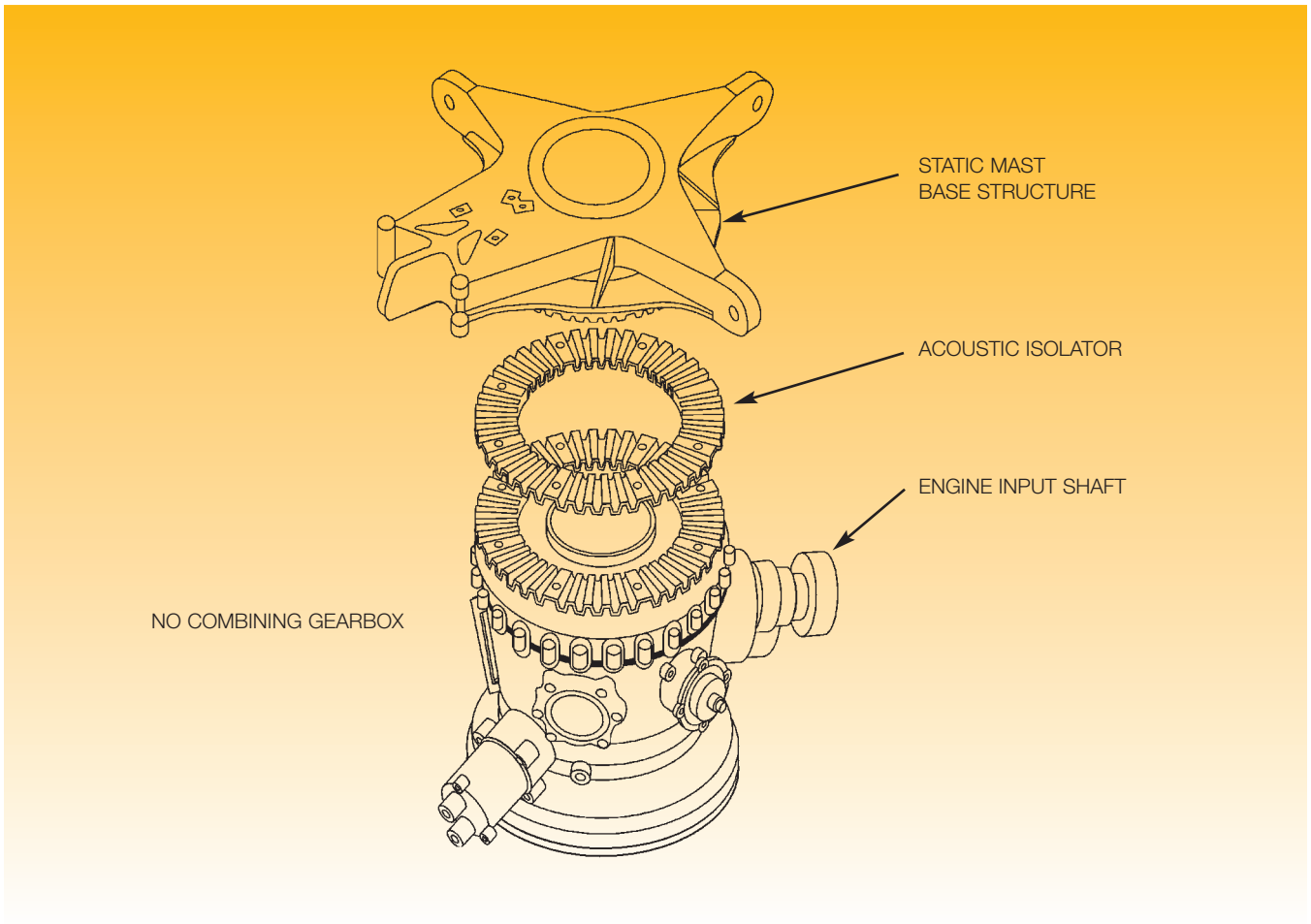

Figure 8. Transmission