



# Rotorbreeze®

A Textron Company

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# Determined to be *Premier* in the Helicopter Industry

**A message from**  
*Mike "Red" Redenbaugh*  
**Chairman & CEO**  
**Bell Helicopter Textron**

The year 2004 was exciting for all of us in the Bell family. Bell achieved a wide variety of major accomplishments over the last year. And we are planning to implement many additional improvements in the future in achieving our goal to be *The Premier Vertical Lift Aircraft Company – Number One*, and this goal is directly linked to bringing benefit to our operators.

There has been considerable attention to the product line at Bell Helicopter, which is a direct result of the input we received from the customer community. Additionally, we have worked many aspects of our business to drive operational improvements. It was very exciting at last year's HAI to share the introduction of the new light twin IFR configuration aircraft from Bell Helicopter. We are looking forward to the reaction from the customer community this year as further details on this aircraft are shared. Bell is listening intensely to the "Voice of the Customer" to guide our decisions in new product offerings.

We have given considerable attention to redirecting resources to design and implement improvements to our existing helicopters to increase productivity while achieving lower operational costs. The focus remains on definite, measurable improvements in the Quality of components through implementation of Six Sigma processes and practices. At many of the customer sessions, it has been clear that we must continue to provide improvements for our full range of aircraft, from the Bell 206 Jet Ranger to the workhorse Bell 412 and all aircraft in between. I was very pleased with the response of the Bell Team to bring dozens of improvements to the marketplace – an



excellent demonstration of the concepts and culture change here at Bell, driven by the five "Bell Behaviors."

In addition to new and improved products, we have added some very valuable process improvements to keep us moving forward with respect to providing industry-leading Product and Customer Support. We have put in place a valuable reference source with the Customer Advisory Board (CAB), allowing quick and direct access to the key perspectives from the operational needs to the highest levels of Bell Leadership. This CAB consists of over a dozen representatives from various segments of the commercial helicopter community. Bell has also held critical sessions with our supply base to help them understand our goals and objectives to

continue improvement in the area of spare parts quality and availability.

We realize that the Bell experience is so much more than the helicopter. In 2004 we opened our new Customer Center at Alliance Airport in Fort Worth. This is the hub for our Commercial Business Unit and the Customer Training Academy that provides a truly world-class facility for new product delivery. This facility provides a substantial improvement to the customer experience at Bell consistent with our mission to be *Premier*. We look forward to sharing this with you. Bell has also moved into a world-class Logistics Center in the Alliance Corridor near the new Customer Center. This facility has been designed from the outset to achieve improvements in our ability to quickly provide spares while providing room for expansion and growth.

In closing, I would like to thank you for using Bell helicopters. Customers are our Number One priority. We are focused on making improvements in products, service, and support to assist you in being successful in the future.

It is exciting to see the positive change at Bell and the reaction in the industry to our efforts. We will continue to listen and adapt our actions to align with your needs, our most valued customer.

All the best,  
RED

**EDITOR'S NOTE:** *Mike "RED" Redenbaugh joined Bell as CEO in June 2003. It took about "5 seconds" to recognize the dynamic, infectious nature of this individual. Through his boundless enthusiastic example and "call it the way it is" leadership style, the Bell cultural change is taking effect in talk and actions. Red's Five Behaviors: Walk the Talk / Meet our Commitments / Act with Velocity / Take on Risk / and Love the Business are evident from the raw stock receiving dock to the final flight line acceptance. This is the second HAI issue for RED and illustrates his committed dedication to making our customers successful.*



# The Beginning of a **NEW ERA** for Bell Helicopter **Customer Support & Services**

Carey Bond  
Vice President  
Customer Support



Happy New Year Everyone! I am pleased to announce that as of January 2005, the Bell Helicopter Customer Support & Services organization has changed forever. If an era is defined as a *memorable or important date or event*; especially one that begins a new period in the history of a person or company, I think it's safe to say that we have turned a corner and this is the beginning of our new era.

As you know, over the last five years Bell Helicopter has made a significant investment in the customer support and services business through acquisition and organic growth in the downstream market,



CSS Logistics Center

but this year the investment is very personal for our employees and ultimately our customers.

Over a two-week time frame, mostly during the holiday season, Bell Customer Support & Services relocated its Logistics and Training Academy facilities to Alliance, a state-of-the-art airport complex located approximately 30 minutes north of our old facility in Hurst.

As a result of these efforts the foundation is now in place to exponentially improve Bell customer service to an even higher standard. Some people may wonder why we invest further in customer service when we are already rated number one by the helicopter industry (*ProPilot Magazine*). The reason is quite simple; Bell is dedicated to setting and continuously raising the bar in the helicopter industry for customer support.

## **The New CSS Logistics Center**

On December 29th, we moved the last spare parts from Hurst to our new facility in Alliance. Over 4 million parts and 60,000 individual part numbers were pulled, transported, counted, bar coded and re-stocked using a complete new warehouse management approach.

This new World Class Logistics Center's operation was designed through Textron Six Sigma's continuous improvement process and augmented with leading edge warehousing technology. The purpose of

this major investment is to improve the entire warehousing and inventory management system by leveraging both new technology and performance-based material flow solutions. Process efficiency, accuracy and speed will be realized from the initial spare parts order

through to final delivery; translating into improved customer responsiveness and ultimately, an increase in operational readiness of customer aircraft. The bottom line is that we will be able to move material faster and more accurately than ever before.

Not only is the facility operationally sound, it is much more welcoming to our customers. Bell employees are proud to

work in a facility that really speaks to the fact that Bell is the worldwide leader in customer support and service. We have always walked-the-talk, but now we *look* the part as well.

**Our New Address:**  
776 Henrietta Creek Rd.  
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## **The New Customer Training Academy**

The Bell Helicopter Customer Training Academy has been relocated to the Bell Helicopter Customer Center at the Alliance Airport, North of Fort Worth, Texas. You will experience the same exceptional training that you've come to expect from the Industry leader in training solutions, but in a whole new package!

There is a newly designed and customized Customer Center, with 18 large modern classrooms and three overhaul labs fitted with the newest learning technology tools. More than 41,000 square feet of hangar space is now dedicated to crucial hands-on maintenance training.

The Flight Training Devices represent a modern and updated visual database system that is certain to enhance your learning experience.

We have built a newly designed helicopter training heliport within a few minutes flying time of our Customer Training Academy. The new practice area for our flight training has been constructed on 100 acres just to the northwest of the Texas Motor Speedway. The practice area (PA) has three runways: a 2,000-ft. light-

ed north/south runway, an 850-ft. north/south runway, and an 850-ft. east/west runway. There are four separate concrete landing pads. Full-time rescue personnel provide on-site support with a rescue cab and fire truck at their disposal. This entire site is dedicated solely for the use our flight training at the

*Continued on page 16*



Bell Helicopter Customer Training Academy

# The “Legacy UH-1H Helicopter” receives another service life extension modification:

## THE MODEL 210

The Bell 210 helicopter made its first flight Dec. 18, 2004, at the Bell subsidiary Edwards & Associates, located in Bristol, Tenn. This successful flight marks the first in a series of qualification flights as the Bell 210 goes thru FAA certification testing. Bell expects to attain FAA certification first quarter 2005, with deliveries following soon after.

The Bell 210 is a civil-certified version of the U.S. Army UH-1H. Starting with a refurbished UH-1H fuselage, Bell Helicopter adds dynamic components from the Bell model 212 (main rotor hub and blades, tail rotor, main and tail rotor support structure, transmission, rotating controls, and tail boom); the Bell 210 will also have all new wiring, an extended 212 nose and dual hydraulics. An FAA-certified Honeywell T-53-517B engine completes the configuration, which will provide a zero-time FAA-certified single engine medium utility helicopter.

“The Bell 210 is also the perfect solution for the many agencies that use the UH-1H in Utility, Homeland Security, Law Enforcement or Firefighting capacities,” declared Bell CEO Mike Redenbaugh.

“It combines great performance with an existing logistical base, an unbeatable DOC (Direct Operating Costs) and a tremendously low initial acquisition cost. Add to that complete FAA certification and the Bell 210 is truly the best total value proposition to be found in the market today.”

The Bell 210 helicopter will satisfy the U.S. Army’s requirement for a Light Utility Helicopter (LUH) in the Theater Defense Aviation (TDA) units as well as the Army National Guard. There are many missions now



supported by the U.S. Army, with assets that are marked for surplus in the coming years, that the Bell 210 could more economically perform. These Army LUH will perform future utility missions for non-combat organizations (TDA), National Guard utility including; drug interdiction efforts with Recon Air Interdiction Detachments (RAID), MEDEVAC, and Homeland Defense (HLD) missions.

The Bell 210 is a Commercial-Off-The-Shelf (COTS), FAA-certified, zero-timed helicopter that will operate for around \$550 per hour. The Bell 210 will allow the Army to unburden itself of logistics and engineering overhead management, and avail itself of the Bell worldwide, world-class commercial support in spares, manuals, and technical support very similar to the TH-67 program at Ft. Rucker, Al. All this with a warranty and 40% reduction in operating costs. Cost of the Bell 210 will be approximately \$3 million. A comparable Huey-sized off-the-shelf commercial aircraft would cost approximately \$5 million.

The Bell 210 will have a useful load that is 640 lbs. higher than the UH-1H, with 400 shaft horsepower increase and direct operating costs that will be considerably less than other aircraft in the same class.

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# CHICAGO AIR SEA RESCUE

## *A Multi-mission Organization*



Chicago, Ill. – (Aug. 31, 2004). Few helicopter aviation units are as truly multi-mission as the Chicago Fire Department's Air Sea Rescue Unit. The unit operates three aircraft on missions from search and rescue to law enforcement to photography and observation. "Our primary responsibility is search and rescue on Lake Michigan and area rivers," said Chief Harry Vergis. Along with this primary mission, the unit supports law enforcement operations of local, state and federal agencies in the Chicago area. "We carry both UHF and VHF radios for communication with multiple agencies. We work with the police, marine units, and the Coast Guard, and they each use different radios." Along with these primary missions, the unit conducts administrative and photo flights for city agencies. An aerial view provides a different perspective, which can be helpful when planning development and roadways, reported Vergis.

The Air Sea Rescue unit has operated Bell Helicopter aircraft since their first aircraft, a Bell 47G, in September 1965. As more powerful turbine aircraft became available, the unit upgraded to the 206A, then 206Bs and 206Ls, along with a UH-1H. A Bell 412, delivered in December 2001, is the most recent addition to the fleet. "We stayed with Bell due to consistent handling, familiar switch and cockpit positioning, the throttle on the collective, and maintenance," said Chief Vergis. "In addition, we do a lot of our maintenance in-house, so we are not

starting over" with maintaining a new type of aircraft.

The Air Sea Rescue Unit uses their Bell 412 as the first line of response for search and rescue missions. The aircraft is equipped with a Breeze-Eastern 600-pound hoist and searchlight for rescue missions. For pilot training and law enforcement or observation missions, the unit operates the 206L-4, which is also equipped with a hoist and searchlight, along with emergency floats.

The 412 was acquired for a variety of reasons. "We liked the Huey platform; the cabin configuration works very well for us," said Vergis. "We carry scuba divers on many of our missions, and the Huey-style cabin is easy for divers to get in and out, along with giving them the room they need."

In addition to providing needed cabin space, the 412 is quieter with its four-blade main rotor, and its twin engines provide a greater safety margin for over-water operations.



Chief Harry Vergis



# OSPREY

## COMPLETES FINAL SHIPBOARD DEVELOPMENTAL TESTING

By Ward Carroll, NAVAIR (V-22)  
Public Affairs Officer

V-22s conduct the final series of developmental tests aboard USS Wasp (LHD 1), steaming off the Maryland coast.

(Photo by PH1  
Theresa Ellison)



The V-22 Integrated Test Team conducted Shipboard Suitability Phase IVc for ten days beginning on November 12. This was the fourth and final underway period for the ITT since the program's return to flight in May of 2002. Phase IVc's successful completion was an important step on the path toward the Osprey's operational evaluation early next year.

The primary objective of this phase was to complete interaction testing between a V-22 parked on the flight deck and another V-22 hovering in front of it. Additional test objectives included flight envelope expansion for all port side landing spots aboard the LHD, developing a night short takeoff envelope, and evaluating the latest flight control software version.

"The team was able to get a lot done during our time underway," said Bill Geyer, the ITT's lead shipboard suitability engineer. "The data we gathered will help us close the book on the MV-22 shipboard developmental test. We've given the operational testers and, in turn, the fleet the tools for success at sea."

While the ITT was busy working on the Wasp's flight deck, a group of maintainers from VMX-22, the V-22 operational test and evaluation squadron based at MCAS New River, were in the hangar bay conducting maintenance demonstration testing. Tests included removing both engines, jacking the aircraft and cycling the landing gear, and removing prop-rotor hubs and blade assemblies. The VMX-22 team's findings will serve them well during the squadron's upcoming operational evaluation.

Geyer was quick to attribute the ITT's success to their hosts. "The Wasp was excellent," he said. "The bridge team went out of its way to get us the winds we needed, and the Air Department was always willing to go the extra mile to get the job done for us. Overall, it was the best experience I've ever had at sea while conducting tests."

### **BELL announces win of U.S. Customs & Border Protection solicitation at NBAA**

The Department of Homeland Security, Border and Transportation Security, Immigration & Customs Enforcement, U.S. Customs and Border Protection posted official notice that Bell Helicopter has been awarded a contract for Bell 430 helicopters for Border Protection's twin turbine medium utility helicopter requirement.

The contract is worth an estimated \$164 million.

Speaking of the win, Michael Redenbaugh, chief executive officer of Bell Helicopter, said, "Bell Helicopter made a commitment several years ago to increase our focus on supporting airborne law enforcement and non-Department of Defense U.S. federal organizations. Our products are the best in the world and our Homeland Security enforcement agencies deserve nothing less. Bell is exceptionally proud that our people and products won the confidence of the U.S. Customs and Border Protection as the best value for their important mission."

The Bell 430 has proven an exceptional aircraft in Homeland

Security mission environments. Currently in operation with such notable organizations as the New York State Police and the State of Louisiana, the Bell 430 is already on the frontlines of law enforcement. The reliability record of the Bell 430 and Bell's customer support reputation position Bell products to succeed in the demanding work environment of the U.S. Customs and Border Protection mission.

The Bell 430 combines long flight endurance capability with a smooth ride and a large useful load. A modern glass cockpit coupled with a high reliability rate make it a tremendous aircraft for the U.S. Customs and Border Protection's important mission. Endurance, comfort and enough room for multi-mission flexibility make the Bell 430 prepared to accomplish any task while defending America's borders. The Bell 430 will greatly extend the U.S. Customs and Border Protection capability. The Bell 430 is built from suppliers in over 25 different states in the United States.

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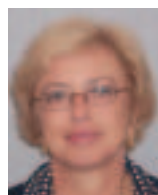
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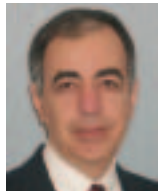
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# AB139 ACHIEVES FAA CERTIFICATION

Setting new standards for speed, range, safety, versatility, and comfort, the AB139 medium twin, a product of the joint venture Bell/Agusta Aerospace Company, is one of the most significant and exciting developments in recent rotorcraft history. It is truly the benchmark for all modern aircraft on the market. The aircraft was awarded FAA certification Dec. 20.

Ground and flight testing was completed at the Agusta facility in Casina Costa, Italy, and at the Honeywell facility in Phoenix, Ariz. High altitude trials were conducted in Colorado, while hot weather tests were conducted in Palm Springs, Calif., and cold weather tests in Corunna, Sweden.

In June 2003, the AB139 achieved initial ENAC (Italian Airworthiness) IFR certification with a three-screen digital cockpit. To enhance overall cockpit management, a four-screen cockpit has been introduced, and the AB139 has now been awarded full IFR certification by ENAC/EASA and the FAA to cover day and night IFR. The four-screen Honeywell Primus Epic Electronic Flight Instrumentation System provides decreased pilot workload and enhances the overall capabilities of the AB139.

The existing Primus Epic architecture has remained the same, but new state-of-the-art Honeywell systems have been added. The initial standard configuration contained Radio Management Units for tuning the radio frequencies with no additional capability. In the latest iteration, two Multifunction Control Display Units (MCDU) with an integrated Flight Management System (FMS) have replaced these Radio Management Units. The AB139 FMS includes a GPS and provides extensive capability to the flight crew, providing multiple tools to develop flight plans, manage single or multiple missions and tune radio frequencies. In addition to the FMS, visibility and accessibility in the cockpit have also been improved by adding an additional 4th LCD display. Now



both the pilot and the co-pilot have an independent means of interfacing with the aircraft systems and functions via their own Cursor Control Device (CCD), a simple joystick used for navigating the screens. With two screens per crew, failures of a display will be managed with even greater ease. In the unlikely event of a failure of the Multifunction or Primary Flight Display, a single composite screen will be shown on the remaining functioning display with the combined pertinent data from both screens. Both sides of the cockpit will be capable of this, through swift execution of automatic reversion.

The AB139 is a JAR/FAR 29 certified aircraft with benchmark performance and a superior cockpit. Certification flying demonstrated that the AB139 has lower operating costs and higher productivity than any competitive aircraft in its 5- to 8-ton class. These productivity advantages are all achieved while providing Category "A" (Class 1) performance without payload loss at maximum take-off weight.

Currently, final assembly of the AB139 is in Italy at Agusta's Vergiate plant, near Milan. However, a U.S. assembly facility in Texas will commence in 2005, with the completion and delivery of the first U.S. aircraft in first quarter 2006. Bell/Agusta Customer Service Centers (CSC) will be

strategically located throughout the world to provide spare parts, tools and maintenance services. Customers will be supported with the most effective training programs available using computer based training, flight simulators and maintenance training devices.

Currently, Bell/Agusta has an order book of over 80 aircraft slated for more than 40 customers worldwide. To date, AB139s have been delivered to Elilario (an Italian helicopter public transport company), the government of Namibia, and the Aga Khan Development Network for ferrying personnel and material for construction of university campuses in Central Asia.

## Proper Application of ROTOR BRAKES — *Why It's Important*

By A. Wayne Brown, Senior Instructor Pilot, Customer Training Academy

One of the most frequently asked questions at the Bell Customer Training Academy involves the recommended procedure for rotor brake application. The question is certainly understandable because flight manuals offer little guidance for application.

For example, the flight manual tells you to engage the rotor brake at a certain rpm. Then it recommends you apply the rotor brake to the "full on" or "over center" position until the rotor comes to a complete stop. By going to the "over center position," hydraulic pressure is actually reduced and a constant pressure is placed upon the system.

We recommend you release the brake just prior to the rotor coming to a complete stop to avoid the "kick-back" at full stop.

If you do not follow this procedure "chattering" can occur. Chattering is the most common problem that can occur during rotor

brake application. Several factors such as warped disc, grease or oil on the pads (pucks), or worn calipers can cause chattering. Attempting to control chattering by modulating the rotor brake application will only make it worse. This can cause uneven heating of the disc (which can cause warping) and certainly does not aid in a smooth reduction of rotor rpm.

Whatever the cause, you should either minimize or eliminate chattering if you consider it severe enough to be detrimental to the helicopter. You should write up the rotor brake in the logbook so maintenance can determine the cause of the problem.

Ultimately, proper rotor brake application should stop the rotor in a smooth efficient manner and eliminate "kick-back."

**Editor's Note:** reprint from July/August 1992 Vol. 42 No 1.

# FAILURE EVIDENCES:

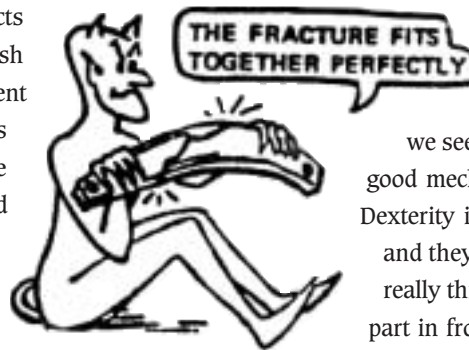
Customers or certifying agencies ask Bell Helicopter, on occasion, to investigate why a part does not meet customers' expectations and/or design requirements. In those cases, it is clear that evidences become important factors, which help us understand *why* a component did not perform as expected. Evidences, as we all know, are facts upon which we can base judgment, establish proof for the real cause of a problem or an event that took place. Without evidences, it becomes "clear as mud," and hard for us to determine the real cause of a problem and how to find the best solution for it.

These evidences, in the minds of our customers/operators, should therefore be considered extremely important. Unfortunately, often we see component parts returned from the field, for investigation, with evidences missing or altered. Everyone understands that it is in the nature of every mechanic today to try to comprehend and determine why a part failed or did not work as designed. But the simple little things individuals do in an effort to achieve this can become nightmares for our Field Investigation Laboratory (FIL) personnel. Their worst nightmares are normally associated with fractured pieces in general.

As said before, most mechanics will probably try to determine or comprehend first, why a part has failed. That is part of their job, mentally and culturally. It is not uncommon to see them trying to put the broken parts or pieces together in their original position. This, perhaps, helps them to understand while they visualize the complete component with the fracture in place. Well, perhaps! But the folks from our FI lab will tell you that this is not desired. What you think is a harmless action could, in fact, affect or disturb the origin of the fracture or the accuracy of striation/band counts that we need to perform on the fractured pieces.

Some people will even try to push their initiative further by removing fragments from the fractured surfaces. Great, you may think? All colleagues present at work that day will have a chance to have a good glance at these fragment(s) and take

a wild guess at the cause of the fracture. Well, guys, thanks for your help, but *no thanks!* You've just added up a few more nights of insomnia for our FI lab folks. Now, they have to determine where these small bits and pieces came from on the fractured surfaces. This is, of course, if all small bits and pieces were sent with the rest.



There is also one other problem we see with fractured parts. We all know that good mechanics have magic fingers and hands. Dexterity is probably one of their best qualities, and they surely know how to use it. So, do you really think that now that they have a fractured part in front of them, they will just turn around and walk away without feeling those fractured surfaces under these magic fingers? One can expect that they will want to touch and feel these failed parts. *Eh!* What else can you expect from people who spend their lives looking and searching for cracks and fractures? To them, there is probably nothing comparable to the sensation of running their fingers and hands over fractured surfaces. The feel of those ridges, cavities, and peaks, Wow!!! What a great feeling!!! Right guys? Well, think again!! This is another bad move. We all have natural acids on our hands, or other contaminants,

which may precipitate corrosion and falsify or affect the investigation results.



And last, do not clean or wash the failed component. Leave the part as is. External irritant may have contributed to the failure. Washing or cleaning this irritant away can jeopardize the investigation.

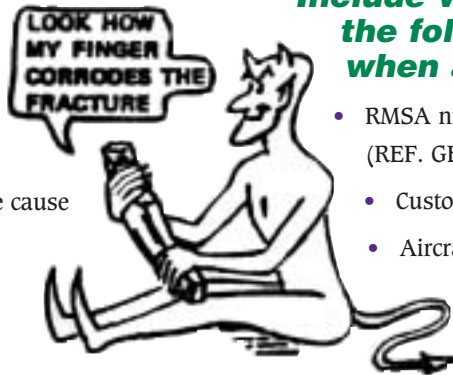
As you can see now, it is not that simple to have a part investigated. It is therefore important that every BHT customer understands the importance of existing evidences relative to a failed part. Valuable gains can be obtained from a thorough and complete evaluation of the discrepancy when an appropriate conclusion can be made.

Therefore, if one day you get involved with BHT investigating a part or component (electrical or mechanical), here are a "To Do" list and a "Not To Do" list you should follow:

# DO NOT fool with them!

## NOT TO DO:

- Be extremely cautious about electrical and mechanical parts. Do not try to investigate on your own if you feel you do not have the competences or you may not find the cause of the problem. Do not run part through several electrical cycles before it is sent to BHT or original evidences may disappear.
- Resist the temptation to fit the fractured pieces back together. This could damage or change the nature of the microscopic features and invalidate our investigation.
- Do not try to pick or remove fragments from the fractured pieces with tweezers, dentist's pick or other tools. Leave these fragments in their original location, as found.
- Avoid running your fingers or hands on the fractured surfaces to detect how sharp, deep or rough it is. Your hands and fingers contain natural acid or possibly other contaminants, which could damage or change the nature of the fine features.
- Do not use cleaning agent or solvent to clean the parts. Leave them as found.



## Include with your shipment the following information, when available:

- RMSA number obtained from BHT (REF. GEN-04-98)\*
- Customer/operator identification.\*
- Aircraft model and serial number from which the part came, with details about configuration (i.e., equipment on board, kits, landing gear, etc.) or any other details which customer feels may have contributed to the failure.\*
- Point of contact (with telephone, fax or E-mail address) in case we have questions to ask.
- Part number and serial number (if available) of the part.
- Total airframe time (TTAF) of the helicopter it came from.
- Date of failure.
- Total time since new (TTSN) and total time since overhaul (TTSO) for the part (if available).
- Send a copy of the Historical Record Sheet (if applicable).
- Describe clearly the reason why you want BHT to get involved with an investigation.
- Any other information you may think of that might be worth considering during lab evaluation of the part.



## TO DO:

- Avoid running electrical or cycling mechanical part before sending it to BHT for investigation.
- Leave the part(s) as in the same state as initially found. *Do not alter or modify the failed part(s).* Put the part(s) in a sealed protective plastic bag in the condition as it came off the helicopter or as found. For fractured pieces, put each individual piece in a separate bag. Wrap fractured parts with protective padding before shipment to prevent shipping damage, which could mislead the investigation.
- Refer to General Information Letter GEN-04-98 and follow the prescribed procedure to obtain a RMSA number from BHT for the part(s) being returned.
- If the part is filthy or dirty, leave it in its found condition and ship it to BHT that way.

\* *Mandatory information to be provided.*

In conclusion, and for investigation purposes, the same level of attention should be given to a failed component/part as you would for a serviceable one. Inadequate or lack of appropriate protection of a failed part could possibly destroy those so-precious existing evidences. Without evidences, our investigation may simply not be capable of defining the real origin of a fracture – the *real cause* of a failure or defect.

*The resultant lab report can be significant to you and to us, and as such, merits some extra care being given, before and when shipping parts.*

**Q:** What is the difference between transducers P/N 412-074-101-101 and P/N 412-074-101-103?

**A:** The difference between Control Motion Transducer (CMT) P/N 412-074-101-101 and P/N 412-074-101-103 is that the -101 is a single-element CMT (it has one potentiometer) and the -103 is a dual-element CMT. P/N 412-074-101-103 has been used on the Model 412 from S/N 36037 and subsequent, and Model 212 from S/N 35049. This coincides with the introduction of Flight Data Recorder (FDR) provisions as standard equipment. One potentiometer provides *control motion information* to the Automatic Flight Control System (AFCS) and the second provides *control position information* to the FDR.

**Q:** The 412/412EP Flight Manuals Limitation Sections state the lateral CG limit is 4.5 inches left and right. The 412 Maintenance Manual Figure 4-1 (Longitudinal/Lateral CG Envelope for Hoist Operations) shows a lateral CG limit of plus or minus 6.0 inches. What is the reason for the difference in Lateral CG?

**A:** The Lateral CG limit of 4.5 inches left and right shown in the Flight Manuals is for normal operations. The plus or minus 6.0 inch limit is for hoist operations only. The same chart that is in the 412 MM Chapter 4 can also be found in the two internal hoist Flight Manual Supplements (BHT-FMS-7 and BHT-FMS-26). The figure in the 412 MM Chapter 4 defines the C of G penalty region. Each hoist operation in the penalty region requires an additional 4 hours to be logged against the main rotor yoke, mast and lower cone seat.

**Q:** BHT-412-IPB, Figure 62-1, lists the mast cap rivet part number as MS20427M4. What is the required length, as Vista does not recognize this part number?

**A:** The part number listed in the IPB is the basic part number without the dash length. Due to variations in tolerance stack up, the dash number can vary. In most cases an MS20427M4-6 will be suitable. To calculate the exact length required for this application, add 0.187 inches to the measured grip dimension (thickness of material to be clamped). The rivet lengths are in 1/16-inch increments. MS20427M4-6 rivets have been superseded by MS20427M4C6 rivets (same rivet with cadmium plating).

**Q:** What is the purpose of shims under transmission mount, engine legs and oil cooler blower hanger bearing supports?

**A:** They allow proper alignment of the drivetrain components from main transmission through oil cooler blower. Angle between these components is very important and must not be disturbed. Always remove your components with care to avoid damaging the shims bonded to the airframe.

**Q:** What should I do if I lose these shims?

**A:** The thickness of these shims is determined from a Bell-approved fixture only; they are recorded at factory and should also be recorded for any aircraft going through an approved fixture for repair. Only the last fixture record is valid; for any aircraft that has never been repaired, these numbers are available from Product Support Engineering.

**Q:** How do I troubleshoot FADEC problems?

**A:** Reference the *Rolls Royce Operation and Maintenance Manual* for the *Fault Isolation Manual*.

## DESTROYED AIRCRAFT

The following Bell Helicopter aircraft identification data plates have been returned to Bell, were subsequently destroyed and documented as such. The serial numbers have been retired. Additionally, Bell has recommended to the certification offices of the FAA and Transport Canada that the aircraft serial numbers be removed from the applicable type certificate data sheets.

Model	Serial Number
206B . . . . .	4129

The following Bell Helicopter aircraft were reported by official aviation investigation authorities as destroyed. Based upon that finding, Bell has

recommended to the certification offices of the FAA and Transport Canada that the aircraft serial numbers be removed from the applicable type certificate data sheets.

Model	Serial Number
206B . . . . .	1782, 1714, 761, 3064
206L-1 . . . . .	45788
206L-4 . . . . .	52020
212 . . . . .	30613
47G5 . . . . .	25041

It is very important that owners and operators understand the significance of an aircraft officially reported by an accident investigation authority as

destroyed, or where the aircraft data plate has been destroyed. Bell Helicopter furnishes listings of destroyed aircraft and destroyed data plates as a service to customers, the FAA and Transport Canada and worldwide certification authorities. Bell does not represent that these lists constitute all of the aircraft or data plates that have been destroyed. Listed are only those aircraft where Bell has recently received final reports from official accident investigation authorities describing the aircraft as destroyed or where Bell has destroyed the aircraft identification plate as requested by others.

# DIRECT OPERATING COSTS FOR 2005

Dick Dodge  
Manager, DOC Programs

## Reflects \$2.25 per Gallon Fuel and \$65 per Hour Labor Costs

This year's published estimate for the Bell's current production line shows a marked increase over previous years. *But don't be alarmed!* The normal adjustment due to 2005 spares pricing comprises just approximately 3% of the increase in parts cost for most models. This year, however, Bell is using fuel and labor costs that should be much closer to what operators are experiencing on the average. This change in the Bell estimate assumptions pushed the DOC up another 14% across the board.

**Fuel Costs.** You will note that my assumptions for fuel increased from \$1.50 per US gallon to \$2.25 per gallon this year. We all know that fuel costs are a fluctuating right now. Many operators are experiencing much higher costs, while others are obtaining fuel at costs lower than my \$2.25 figure. As I frequently recommend to operators in DOC conversations, adjust the Bell number using your own experience to obtain a more realistic number for your operation.

**Maintenance Labor Costs.** I also adjusted the cost of labor in the Bell estimate from \$50 per maintenance man-hour to \$65 per man-hour. This is the rate Bell charges at our Bell Tennessee Component overhaul shop and serves as a fair average cost. Again, shop rates vary regionally, so adjust the Bell number according to your situation.

**Good news for Bell 407 operators and potential buyers!** We recently extended the overhaul intervals (TBO) for the Transmission and Tailrotor Gearbox, which lowers the effects DOC by around \$6.00 per flight hour. Check TB407-04-60, *Extension of Transmission and TR Gearbox Assembly Overhaul Inspection Interval* to see how to incorporate this extension on your Bell 407.

**Needing Maintenance Costs Data.** Bell continues to collect maintenance costs data to assist in validating our numbers. Please contact me, if you would like to participate in providing maintenance costs data with us (with complete anonymity to other operators). We would appreciate the help and will feed your data back to you in the form of useful information. This year we collected helpful information on Bell 430 costs, which are reflected in this year's estimate resulting in a 9% increase over our previous forecasts. Please contact me anytime if you have any questions regarding the Bell forecast DOC. I can also help with out-of-production aircraft if you need it.

- Remember my assumptions for these estimates:
- New production helicopter DOCs
- Basic VFR helicopter with no optional equipment
- No consideration for warranty benefits
- Normal operating conditions, i.e. no provision for exceedances, conditional inspection costs, unusual corrosion costs because of harsh operating environments, etc.
- Fuel burn rate calculated using the H.A.I. *Guide for the Presentation of Direct Operating Costs*:  
Gross Weight: 10% less than maximum certified  
Cruising Speed: 10% less than VNE for that weight  
Altitude: 1,000 feet, ISA day

For any assistance with your cost planning, contact me at:

Phone: 817-280-3542

E-mail: [ddodge@bellhelicopter.textron.com](mailto:ddodge@bellhelicopter.textron.com)

Facsimile: 817-278-3542



## 2004 Direct Operating Cost Estimates (3)

	206B3	206L4	407	427 (4)	430	412
<b>Fuel and Lubricants</b>						
Fuel (1)	63.00	85.50	103.50	155.25	198.00	254.25
Lubricants (3% of fuel costs)	1.89	2.57	3.11	4.66	5.94	7.63
<b>Fuel &amp; Lubr. Sub Total</b>	<b>\$64.89</b>	<b>\$88.07</b>	<b>\$106.61</b>	<b>\$159.91</b>	<b>\$203.94</b>	<b>\$261.88</b>
<b>Labor (2)</b>						
Inspection	20.13	21.50	10.73	23.76	23.00	30.94
Overhaul	6.42	6.08	8.22	6.64	4.46	6.87
Unscheduled and On-Condition	24.65	22.73	54.10	48.35	38.04	39.14
<b>Labor Sub Total</b>	<b>\$51.20</b>	<b>\$50.31</b>	<b>\$73.05</b>	<b>\$78.75</b>	<b>\$65.50</b>	<b>\$76.95</b>
<i>MMH/FH</i>	<i>0.79</i>	<i>0.77</i>	<i>1.12</i>	<i>1.21</i>	<i>1.01</i>	<i>1.18</i>
<b>Parts</b>						
Inspection	2.48	2.68	1.63	3.24	1.04	9.09
Retirement Parts	35.24	52.14	57.91	101.69	78.15	92.96
Overhaul	17.73	19.77	44.38	35.12	37.79	39.57
Unscheduled and On-Condition	32.30	56.56	67.09	76.70	109.25	163.49
<b>Part Sub Total</b>	<b>\$87.75</b>	<b>\$131.15</b>	<b>\$171.01</b>	<b>\$216.75</b>	<b>\$226.23</b>	<b>\$305.11</b>
<b>Airframe Sub Total</b>	<b>\$138.95</b>	<b>\$181.46</b>	<b>\$244.06</b>	<b>\$295.50</b>	<b>\$291.73</b>	<b>\$382.06</b>
<b>Powerplant Direct Maintenance</b>						
Direct Maintenance Costs (5)	51.94	55.15	67.11	131.50	141.92	204.00
Line Maintenance Labor	4.33	4.33	4.33	7.75	8.50	21.77
<b>Powerplant Sub Total</b>	<b>\$56.27</b>	<b>\$59.48</b>	<b>\$71.44</b>	<b>\$139.25</b>	<b>\$150.42</b>	<b>\$225.77</b>
<b>Total Average Cost per FH</b>	<b>\$260.11</b>	<b>\$329.01</b>	<b>\$422.11</b>	<b>\$594.66</b>	<b>\$646.09</b>	<b>\$869.71</b>

Notes: (1) Fuel costs calculated at US\$2.25 per Gallon

(2) Labor costs calculated at \$65 per maintenance man-hour.

(3) Basic VFR helicopter.

(4) Increased Gross Weight Kit adds \$4.50 per FH.

(5) Engine DMC represents total costs of maintenance including overhauls, accessory maintenance, unscheduled maintenance, and accruals for scheduled maintenance and life limited parts. Costs due to FOD, excessive corrosion, or operating the engine outside limits are not included.

# Introduction of ELECTRONIC TECHNICAL PUBLICATIONS

Bell Helicopter is pleased to announce a new, state-of-the-art Technical Publications service for our Customers. This long-awaited offering provides up-to-date technical manuals via the World Wide Web and CD-ROM.

Customers will have access to the WEB and CD-ROM documentation in February of 2005, with the 407 suite of publications being the first to be offered. Introduction of the 412, 206, 430 and 427 publications will follow throughout 2005. All commercial helicopter models from the Bell 47 forward will benefit and the plan will be to follow with the remaining models

## Customers will see many benefits associated with this new service:

- Worldwide availability of electronic documentation via the internet
- Instantaneous web updates concurrent with revision release
- Improved remote location availability of documentation via CD-ROM
- Prompt CD-ROM updates ensuring accuracy and the latest released information, eliminating page-by-page revision effort
- Interim CD-ROM updates for bulletins and continued Safety of Flight documents available over the web
- Historical and current documentation associated with each model

- A Bell-approved source for up-to-date documentation meeting regulatory requirements for documentation revision status
- Consistent viewing presentation and user functionality/features for both the WEB and CD-ROM
- E-commerce capability to order parts on-line through VISTA
- Electronic IPBs with built-in shopping cart feature
- Ability to print pages as required
- Full search capability
- Related links to other Bell Helicopter sites

## How to obtain your subscription:

Beginning February 6, 2005, register online by accessing:

<http://www.bellhelicopter.com/en/support/>

At the left navigation column look for:

- **Product Support** and then ...
- 
- **Comm Publications**
- 

A link will be available from the Comm Publications page to access the registration page and the Electronic Technical Publications.

- Registration includes a 1-year free combined WEB and CD-ROM subscription service, including all updates, for each model documentation set as it is

released. The free subscription period for each model will begin upon initial release of the specific model documentation set and will last for one year.

- Registration ensures that Bell has all the required information to set up your user ID and Password and ship your CD-ROM.
- Before the free subscription expires, registered customers will be contacted to confirm that subscription renewal is desired.
- Pricing structure is being developed, and our commitment is to provide Bell customers the best value in WEB and CD-ROM products in the industry for the best possible cost.
- Bell Helicopter plans to continue to provide free hard copy publications to bona fide users. We will also continue to provide free and unrestricted access to our bulletins and Safety of Flight documentation via the existing Bell Customer WEB site.

We are convinced that our WEB and CD-ROM products will prove themselves to be viable tools for all of our customers, and gain worldwide acceptance as the new industry standard. If you would like to learn more about our WEB and CD-ROM products, please contact Bell Helicopter Product Support Engineering.

## Need Help? HERE'S HOW TO CONTACT US

The following group e-mail addresses, phone and Fax numbers are identified by type aircraft in each dedicated group.

pselight@bellhelicopter.textron.com (E-mail for models 47, 206, 407)

Phone 450-437-2862 or 800-363-8023

Fax 450-433-0272 (for models 47 & 206)

450-971-6407 or 800-243-6407 (for model 407)

pseinter@bellhelicopter.textron.com (E-mail for models 222, 230, 427, 430)

Phone 450-437-2077 or 800-436-3036

Fax 450-433-0272

psemedium@bellhelicopter.textron.com (E-mail for models 204, 205, 212, 412)

Phone 450-437-6201 or 800-363-8028

Fax 450-433-0272

psemil214@bellhelicopter.textron.com (E-mail for models 214/Surplus Military)

Phone 817-280-2481

Fax 817-280-2635 (for model 214)

Phone 817-280-8779

Fax 817-280-2635 (for model OH-58A/C)

Phone 817-280-4074

Fax 817-280-2635 (for model UH-1 series military surplus & Huey II )

## A New Era for Bell Customer Support & Services (Cont. from pg. 3)

Bell Customer Training Academy. We stand alone in the industry in making this kind of commitment to ensure the safest possible training environment for our customers.

The Customer Training Academy has opened its new doors with a welcoming ceremony for the first wave of students on January 10, 2005.

### Our New Address:

13901 Aviator Way

Fort Worth, TX 76177-4319

On behalf my family and myself, and the management team at Bell Helicopter, I wish you a safe and prosperous 2005, and look forward to your next visit.

Best regards,

**Carey Bond**

VP Customer Support & Services



# Proof Approval

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**3**  
**NUMBER**

To: Mike Dewey Date: 1/20/05  
Job Number & Name: 91848 Rotorbreeze  
Global Group Contact: Kathryn Hebert / Bennie Stevens

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- Proof approved as is. Proceed with production.
- Proof approved with corrections/changes indicated below or on the proof. No additional proof required. (Additional charges will be incurred for customer changes.)
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