The Transition from Mechanic to Technician: Attitude Is the Key to Better Training

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It is not uncommon for a mechanic to become leery when faced with an electrical or avionic system problem. Many mechanics have spent years skinning their knuckles, having hot oil drip off their elbows and washing hydraulic fluid out of their eyes. Nasty jobs, but the mechanics were comfortable with these systems. This same mechanic may, however, be uncomfortable about "loose electrons" that cannot be seen or touched, at least not without getting a shock or being flung back into his toolbox if he inadvertently comes into contact with a high-voltage system.

Times and technology are changing at an incredible rate. A successful airframe and powerplant (A&P) worker must also change. In making a transition from mechanic to

technician, he or she can no longer afford to leave the sophisticated electronic equipment to the person sometimes nicknamed "Sparky." Electronics are no longer limited to communications and navigation equipment and each new aircraft relies more heavily on electronics than the previous generation. The aircraft rolling onto the ramp today demand that technicians have attitudes and skills that allow them to cope with the variations and complexities of these electronic marvels.

A similar leap forward in technology was faced in the transition from the reciprocating engines to turbine engines during the late 1950s and 1960s. Some of the "old-timers" who thought nothing of dealing with cylinder changes on radial engines were intimidated by the new technology of turbine engines, which they did not initially understand. Ironically, reciprocating engines were far more complex and required levels of mechanical knowledge and manual dexterity far beyond those necessary to cope with the intricacies of turbine engines. These piston engine specialists soon learned that turbines were not magic, they were just different. And so it is with electronics and avionics — these current-day systems are just different.

Change is a challenge and change should be fun! We in aviation have some of the most fascinating "toys" in the world to work with and we should be looking forward to taking on those challenges.

New Age of Electronics Has Arrived

"Avionics" is an acronym for **AVI**ation electr**ONICS**. Defining the term avionics is not easy. There is still a lot of discussion about what avionics includes. It used to be simple. Communications and navigation largely covered the whole avionics spectrum. Then autopilots were added. Flight directors came along. Mechanical instruments were rapidly replaced by electronic units and even many of the barometric instruments were replaced by their electronic counterparts. Few systems have been unaffected by the electronic revolution. Even structures were affected with the advent of “smart skins” for self-monitoring stress and fatigue of metal, which Boeing is developing for the 777. Thus, technicians must be better prepared than ever before to deal with avionics.

Specialization Is Not the Answer

The military, most large airlines and many manufacturers have had specialized electricians or avionics tech-

nicians for years. If it had electricity going to or through it, call the specialist. But this has proven to be inefficient and the proliferation of electronics into every aircraft system will make this impractical in the future. There is a difference between line avionics and bench avionics, and specialized training and work assignments for bench technicians may continue to be the norm.

For the line technician, however, increased specialization is not the answer. No employer can afford to have three or four specialists involved in troubleshooting a single reported discrepancy. Broad-based troubleshooting or simply changing components one after the other is also not cost effective. Some operators report that 50 percent or more of the line replaceable units (LRUs) routed to shops are found to be false removals. With such units typically costing $10,000 or more each, no operator can afford such ineffective maintenance for long. The best method to increase efficiency is training.

Avionics Training Must Start with the A&P Schools

Some certified A&P training institutions are really museums. Students are trained on obsolete equipment and mock-ups of aircraft that they will never see again, unless they happen to work for a collector of old aircraft. In other instances, the training is a show-and-tell exercise, but the students never get an opportunity to put their hands on operating systems and units. The U.S. Federal Aviation Administration (FAA), the Professional Aviation Maintenance Association (PAMA) and other industry groups are currently involved in a study of A&P training criteria and certification issues. Results of the study are pending, but it is certain that there will be significant and important changes in the training arena. The current 1,900-hour training program is thought to be grossly inadequate by many in the industry. But to be competitive and attract students, the typical school or college may be reluctant to add additional hours to the curriculum and price themselves above the competition.

Adding more subjects in the same total number of classroom hours just further complicates the issue for the aspiring technician. The student learns all the "buzz words" and graduates with the A&P license, but is prepared poorly to work effectively in a line maintenance environment. Until the required A&P training curriculum includes at least entry level skills in avionics topics (including hands-on experience with real aircraft or functional mock-ups), industry will continue to provide

training in avionics basics.

Some schools have supplemented the routine A&P course with an additional avionics curriculum that in many cases has proven to be beneficial to mechanics aspiring to become qualified technicians.

The greatest burden of teaching technicians to perform line-level avionic maintenance has, however, been shouldered by employers. Airlines, corporate operators and larger repair stations have found it necessary to implement their own training programs or to contract with specialized agencies and/or manufacturers to train their technicians. Even these specialized courses are sometimes ineffective when the manufacturer combines line-level maintenance with design technology, bench-level repair and system calibration in a single course.

Technician Training Is Often Difficult to Justify

Many employers have a difficult time convincing their accountants that technician training is really cost effective. Return on investment for maintenance training may be difficult to quantify. However, inadequate training will eventually show up in the following:

- Reduced productivity;
- Increased component repair costs;
- Poor reliability; and,
- Increased exposure to technician error.

Many industry experts feel that the need for technician training, particularly recurrent or up-grade training, will not receive adequate attention until such training is mandated by regulation, as is done for pilots.

Avionics Training Is a Win-Win Situation

Everybody benefits from additional avionics training of maintenance technicians.

The employer benefits by:

- Getting the aircraft repaired more quickly at less cost;
- Reducing delays and aircraft out-of-service time; and,
- Increasing productivity without increasing manpower.

The technician benefits by:

- Attaining increased job skills

for promotion;

- Being better able to adapt in a changing industry; and,

- Having job satisfaction by becoming the master of one's trade.

The public benefits by:

- Having more knowledgeable technicians enhance safety; and,

- Experiencing fewer delays and canceled flights due to faulty maintenance troubleshooting.

Technicians Share the Obligation to Learn

The person aspiring to become an A&P technician is typically eager to learn. He or she is motivated by the need to get a job and will take advantage of whatever opportunities are available to improve the chances of landing a good job.

A technician with many years of experience may be more difficult to motivate. This individual may not have opened a book to study in 20 years and often has not had any exposure to electronics in previous training.

Teachers can encourage, inspire and exemplify; but motivation to learn, to change one's outlook or drive must come from within.

Properly prepared A&Ps have a foundation of knowledge that can be built upon. Encouragement is the key. Technicians should not be intimidated by acronyms, buzz words and technical talk among the electronic specialists. The men and women working in these areas are not magicians. They just have more training.

The working A&P should be seeking opportunities to increase his or her knowledge of avionics. The information is readily available in most cases. Electronics itself has brought with it the advent of computerized training programs that can be self-paced on a relatively simple personal computer.

Technician's Responsibility for Avionics Airworthiness

Who is responsible for signing the airworthiness release of an aircraft when work has been performed on an avionics system? This question is now asked more frequently than ever before. In resolving the answer it might be helpful to review the definition of airworthiness (see FAA *Airworthiness Inspector's Handbook*, #8300.9).

With this in mind, remember that the only avionics work that requires a specific U.S. Federal Communications Commission (FCC) certification is the adjustment or calibration of a transmitter. This affects communications, radar and transponder transmitters. *All other avionics work can (and must) be certified by a technician who is trained and qualified to perform that task.* In signing the airworthiness release, the A&P is certifying that he or she has determined that the aircraft conforms to its type design, that proper components are installed and functioning within the specified limits and that the aircraft is in a condition for safe operations.

Avionics is becoming an integral part of every A&P technician's life. Every technician should ensure that he or she receives adequate training to cope with the demands of the electronic age in aviation and avoid becoming obsolete. ♦

About the Author

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FAA Licensing Exams Offered by Sylvan Testing Centers

Sylvan Learning Systems in Columbia, Maryland, is offering testing services for U.S. Federal Aviation Administration (FAA) licenses and certificates through its network of more than 100 centers throughout the United States. Tests include mechanic (general, airframe, and powerplant) and pilot (recreational, private, commercial, instrument, instructor, flight engineer and air transport).

Candidates qualified to take the FAA written exams can select a convenient time to schedule an appointment at the local center. Payment of $50 for each test is accepted by credit card or personal check.

Exams are administered on IBM personal computers under the supervision of experienced testing center staff members. Test results are computed and printed immediately at the close of the testing session and examinees are provided with a certified score sheet prior to leaving the test site.

For information about test locations or to register for testing, contact Sylvan Technology Centers at telephone (612) 920-6951.

Poster Aid for Troubleshooting Common Fuel Filter System Problems

The Velcon Filter Co. has created a color poster that details common problems in fuel filtration equipment used in aircraft fuel storage and dispensing systems. The poster describes proper operation of eight important filter system components, including differential pressure gauge, automatic air eliminator and sump and drain heaters.

Information is also included to aid in repairing equipment that is leaking or clogged, as well as guide in dealing with sluggish gauges, warm vessel interiors and water and dirt in system sumps.

The poster is available upon request from Velcon Filters Inc., 1750 Rogers Avenue, San Jose, CA 95112, U.S. Telephone (408) 436-6525.

Boeing Forecasts Continued Expansion In Air Cargo Operations

The Boeing Commercial Airplane Group has released a report summarizing its analysis of the worldwide market for air cargo services through the year 2005. According to the report, an unusually high five-year spurt in the expansion of air cargo began to moderate at the end of 1989. As the world gross domestic product declined in 1991, for the first time since 1930, there was also a small decline in air cargo operations.

In spite of this reduction, Boeing sees a continuing growth of air cargo revenue ton kilometers (RTKs) of about 6.5 percent annually through the end of the decade and into the 21st century. Total worldwide air cargo traffic is expected to increase nearly two and one-half times by the year 2005. This would result in an anticipated need for an additional 365 large-capacity freighters (of more than 50-ton payloads). The need for more smaller freighters with a capacity of less than 30 tons is expected to be met by the conversion of existing passenger aircraft. Boeing added that the need for medium-capacity freighters, such as the B-757, is expected to be less because these aircraft will operate at considerably higher utilization rates than the older generation aircraft they are replacing.

Although the overall demand for cargo services will expand, the actual share carried by all-cargo airplanes will decrease. The number of wide-body passenger planes with relatively large lower cargo hold capacity will more than double, while many older freight-only aircraft will be retired. As a result, the all-freighter capacity share of this burgeoning market will fall from its current level of 41 percent to about 37 percent by 2005.

WWII Aircraft Recovered After 50 Years Beneath the Ice

A World War II Lockheed P-38 was recovered 50 years after it landed on the Greenland ice cap en route to Europe in 1942. A flight of six P-38s and two B-17s were being ferried to England when they ran low on fuel (caused by erroneous navigation information) and were forced to land on the Greenland ice fields. All the pilots survived and were rescued, so the approximate location of this "lost squadron" was well known.

Snow and ice gradually entombed the aircraft. A group was formed in 1981 to attempt the recovery of one

or more of the aircraft, and the site was identified in 1990 with the use of sophisticated electronic equipment. The group was able to melt a shaft down to the aircraft and create a cavern within the ice around the P-38 to enable it to be disassembled and raised to the surface in pieces. The airplane was found to be in excellent condition. One of the original pilots and one of those who participated in his rescue were on the scene on July 15, 1992, as the final sections were raised to the surface — 50 years to the day after landing on the ice.

The group intends to restore the aircraft to flyable condition. It will be one of only six flyable P-38s left in the world. The entire operation is being video-taped and will be the subject of a future documentary describing this unique undertaking. ♦

MAINTENANCE ALERTS

This information is intended to provide an awareness of safety problems so that they may be prevented in the future. Maintenance alerts are based upon preliminary information from government agencies, aviation organizations, press information and other sources. The information may not be entirely accurate.

Further Safety Recommendations Follow Investigation of EMB-120 Crash

The crash of an Embraer-Empresa Brasilia de Aeronautica EMB-120 operated by a commuter carrier in the southwestern United States was addressed in the May-June 1992 *Aviation Mechanics Bulletin*. The chain of events leading to the loss of the horizontal stabilizer leading edge and the causal factors that allowed the maintenance error to go undetected were discussed in detail. However, on Aug. 14, 1992, the U.S. National Transportation Safety Board (NTSB) issued additional safety recommendations (A-92-79 and 80) that focus on the managerial functions of maintenance and inspection activities.

The NTSB safety recommendation states: "In this accident, the evidence clearly indicates that the events during the maintenance and inspection

of the airplane the night before the accident were directly causal to it. The upper row of screws had been removed from the leading edge of the left horizontal stabilizer in preparation for a replacement of the deicing boot. Subsequently, a decision was made to postpone the deicing boot replacement and return the airplane to service. That the screws had already been removed was undetected because the maintenance, supervisory and the quality control personnel, who were all charged with evaluating the airworthiness of the airplane, did not follow the approved procedures in the general maintenance manual. Despite the fact that the work was on a critical assembly of the airplane (the horizontal stabilizer leading edges), the board found that there were no special inspections conducted of the stabilizer leading edge. Moreover, there was no indication in the airplane's log book that such work had been performed."

U.S. Federal Aviation Administration (FAA) regulations governing air carriers (Federal Aviation Regulations Parts 121 and 135) include a requirement that the operator include in its manual a designation of maintenance and alteration items that must be inspected (required inspections or RIIs), including those that could result in a failure, malfunction or defect endangering the safe operation of the aircraft. In reviewing the operator's manual and procedures, it was found that there was confusion and uncertainty about whether the replacement of a deicer boot should be considered as an "RII item." The assigned inspector performed only a cursory inspection and did not discover that the screws attaching the top of the stabilizer leading edge to the structure had been left out following the aborted deicer boot change.

In view of this confusion and the potential for such misunderstanding in other critical areas, the NTSB issued Recommendation A-92-79 to the FAA that states: *"In cooperation with aircraft manufacturers and airlines, conduct a review of the regulations, policies, and practices related to establishing required inspection items (RIIs) for airline maintenance departments with the view toward developing more specific identification of RIIs."*

For air carriers operating under U.S. Federal Aviation Regulations (FAR) 121 or 135, the designation of RIIs and procedures to ensure that each such item is properly inspected is well defined. However, for the general aviation community, including the vast majority of corporate aviation operators operating under FAR Part 91, there is no regulation calling for any such RII designation nor is there a regulation specifying that operators have any policies and procedures requiring a double inspec-

tion of critical work items. Part 91 operators are not immune to similar errors of omission. Indeed, with smaller work crews and more instances of a single technician working alone, the general aviation community has a greater exposure to the inadvertent omission of a critical fastener, lockwire or other installation that could have catastrophic results.

Even though not required by regulation, Part 91 operators should review their internal policies and procedures governing the double inspection of critical work items. The "buy back" or re-inspection of work performed by another technician is often considered a routine task and may not be accorded proper attention to ensure that nothing has been overlooked. In a small work crew, there is a natural tendency to assume that each technician does his or her job properly.

In many instances, there is no other technician on duty to perform the second inspection and there is reluctance to require someone on overtime just to perform this "nuisance double inspection." Part 91 operators must, therefore, be especially alert to these special problems and take steps to ensure that a suitable system of checks and balances is in place to preclude the overlooking or omission of a critical step in maintenance activities.

No technician should consider it demeaning or unnecessary to have his work rechecked by another individual. If another technician is not on duty, review with the aircraft's pilot what has been done and ask him to look at the work. This may not provide an equal level of expertise, but it does at least give someone with a fresh outlook the opportunity to review things and make sure nothing has been omitted or overlooked.

The NTSB safety recommendations also addressed the issue of getting the pilot(s) involved. In the accident cited earlier, replacing the deicing boot was scheduled maintenance, and it was the practice of the operator not to include any log book entry for such items. As a consequence, the pilot was unaware that the horizontal stabilizer leading edge had been disturbed when he performed the normal walk-around inspection and did not make any effort to ensure that it was properly installed. This aircraft has a T-tail configuration and the horizontal stabilizer is nearly 20 feet above the ground. No one knows if the pilot would have taken the trouble to obtain a stand or to look at the top of the stabilizer from an upper level of the terminal if he had known that the leading edge had undergone maintenance. But with no knowledge of these facts, he had no reason to consider a more detailed examination of the horizontal stabilizer.

This accident underscores the importance of ensuring that pilots are aware of all work performed during the previous layover of an aircraft. In safety recommendation A-92-80, the NTSB recommended that the FAA "require that airlines operating under Parts 135 and 121 study the feasibility of developing a means to advise flight crews about recent maintenance, both routine and nonroutine, on the airplanes that they are about to fly, so that they have the opportunity to be alert to discrepancies during preflight inspections and possibly to make an additional inspection of critical items, such as required inspection items, that may affect the safety of flight."

General aviation and corporate operations under FAR Part 91 will not be affected by this recommendation. However, as with the RII issue, they are not immune from the same potential problems and should consider voluntarily adopting a similar internal procedure to notify pilots of work performed since the aircraft was last flown. In the typical general aviation or corporate situation where the number of individuals is small and schedules are normally not critical, a few extra minutes for the flight crew to discuss any maintenance performed and perhaps do a more thorough check on items of concern certainly is good insurance.

All maintenance organizations should consider the old adage "When in doubt, check it out!" If there is some confusion whether the maintenance performed falls under the RII criteria, perform the double inspection to be sure. If there is some doubt as to whether the pilot is aware of maintenance performed, tell him or her about it and give him or her the option of doing a more thorough preflight inspection in those areas.

Inflight Failure of Prop Hub Attributed To Fatigue Cracking

In September 1991, a Mitsubishi MU-2B-60 aircraft operating on a cargo flight for a Canadian operator sustained substantial damage when a propeller blade separated in flight over northern New York state. The airplane was climbing through 19,000 feet when the pilot felt a strong vibration, followed shortly by a loud bang. The vibration became so severe that the crew had difficulty controlling the airplane. They eventually executed an emergency landing with no injuries.

Subsequent examination of the airplane revealed that one of the four arms of the propeller hub on the number two engine had separated, releasing one of the four propeller blades in flight. The blade struck an adjacent blade on the same engine

and ripped a 12-inch hole in the pressurized fuselage. The severe vibration caused by the imbalanced propeller assembly caused substantial twisting and wrinkling of the wings and a partial separation of the number two engine nacelle from the truss mounts. The released blade and associated blade clamp, pilot tube and the separated portion of the hub were not recovered.

Metallurgical examination of the broken Hartzell Model HC-B4TN-5DL propeller hub by the U.S. National Transportation Safety Board (NTSB) disclosed that the failure was caused by a fatigue crack that initiated from multiple sites on the inside diameter surface of the arm and progressed through 70 percent of the arm cross section before final separation. The fatigue crack initiation area was approximately in line with the inboard end of the pilot tube that is assembled into the hub arm bore with an interference fit. The inside diameter surface of the separated hub arm contained scratch marks that extended over about one-half of the hole wall circumference and from the fracture surface to a position slightly inboard of the plane of the fracture. The fatigue origin area was located within this area of scratches. Examination of the three remaining intact hub arms after removal of the pilot tubes disclosed evidence of scratch marks similar to those found in the failed area. The normal propeller blade loads are such that this fatigue initiation area was not in the location most highly stressed by centrifugal or bending loads, thus lending further evidence that the fatigue initiated from the scratches, rather than a normal stress or overload condition.

The separated hub was manufactured in 1977 and had been overhauled in 1983 and again in 1988. Records of the first overhaul were not available. Records of the later overhaul disclosed that the pilot tubes in two of the four arm locations had been replaced at that time. The NTSB concluded that the scratches were probably not the result of the tube replacement, but were more likely produced during the original manufacturing of the hub.

The NTSB is concerned that similar conditions could exist on other propellers and that a hub failure could result in a catastrophic accident. The design of this hub and the manufacturing processes involved to make this model propeller are very similar to the HC-B3 three-bladed and HC-B5 five-bladed propellers manufactured by Hartzell. In all, about 30,000 three-, four-, and five-bladed propeller hubs of this type have been manufactured. The NTSB issued three safety recommendations to the Federal Aviation Administration (FAA):

Safety Recommendation A-92-81

"Develop, with the assistance of Hartzell Propeller, a nondestructive inspection technique capable of detecting hub arm cracks stemming from the inside diameter surface of the hub arm at the approximate location of the inserted end of the pilot tubes on Hartzell Model HC-B4 propeller hubs, and issue an airworthiness directive requiring that HC-B4 hubs with 3,000 hours or more be inspected using this technique the next time this propeller is overhauled for any reason, or at the next annual inspection (or equivalent), whichever is first."

Safety Recommendation A-92-82

"Determine, based on the results of the inspections requested in Safety Recommendation A-92-81, if the hub arms on Hartzell Model HC-B4 propeller hubs with 3,000 hours or more should be inspected at periodic intervals. If such inspections are warranted, issue an airworthiness directive, as appropriate, requiring periodic inspections."

Safety Recommendation A-92-83

"Determine if Hartzell Model HC-B3 and B5 propeller hubs, based on similarity of design and fabrication processes with the HC-B4 propeller hub, should be inspected for cracking in the hub arms. If such inspections are warranted, issue an airworthiness directive, as appropriate, requiring periodic inspections."

Safety Recommendations May Affect Technicians Performing Flight Attendant Duties

In the course of investigating several recent air carrier accidents, the U.S. National Transportation Safety Board (NTSB) found that although flight attendants provided valuable assistance to passengers during emergency situations, they did not always follow prescribed emergency procedures or perform their emergency duties in accordance with their initial training. Maintenance technicians in corporate/executive and some general aviation operations are often assigned to function as flight attendants and may therefore benefit from the knowledge and recommendations contained in this series of recommendations.

Air carriers operating under U.S. Federal Aviation Regulations (FAR) Parts 135 and 121 are required to have an approved flight attendant emergency training program, including periodic recurrent sessions. Operations under Part 91 may be exempt from these regulatory requirements. However, when functioning as a flight attendant, each

technician has an obligation to ensure that he or she is properly trained and qualified to perform the emergency duties that may be required.

One of the findings of the NTSB analysis was that flight attendants became used to the normal operation of doors and, when confronted with an emergency, sometimes reverted to habit and attempted to open the door in the normal manner rather than use the emergency procedure. It was found that the most effective initial and recurrent training gives each flight attendant the opportunity to actually operate each door and exit window personally, rather than to view the operation in a group or with audiovisual aids.

Similarly, flight attendants were sometimes confused about the actual location of emergency equipment and lost valuable time trying to locate the item(s) in an emergency. Here again, the fact that the equipment is so seldom used creates complacency and one soon forgets where it is.

Technicians serving as flight attendants on a part-time or occasional basis are subject to some of these same problems. Corporate operators in particular have an excellent safety record and the need for emergency training of flight attendants is sometimes overlooked, especially for technicians performing this as an ancillary duty. Technicians involved in either training of professional flight attendants or in personally performing flight attendant duties should review these recommendations and ensure that the following points are addressed within their operation.

Safety Recommendation A-92-68

Ensure that flight attendant training programs include instruction on human performance of crew members (flight attendants and pilots) and passengers under stressful situations, and on methods to compensate for such behavior.

Safety Recommendation A-92-69

Ensure that flight attendant training programs provide detailed guidance on the relative probability of hazards associated with emergency situations such as fire, toxic smoke and explosion.

Safety Recommendation A-92-70

Require flight attendant hands-on proficiency drills for each type of airplane exit, and ensure that flight attendants are evaluated individually by an instructor and that a record is kept that the attendants have performed and successfully completed such drills.

Safety Recommendation A-92-77

Require that flight attendants receive

crew resource management training that includes group exercises to improve crew member coordination and communication.

Underwater Acoustic Beacon Found Faulty

In the course of investigating the off-shore crash of a helicopter, the U.S. National Transportation Safety Board (NTSB) was unable to locate the wreckage using underwater search equipment designed to pick up the underwater acoustic beacon (UAB) attached to the airframe for this purpose. The wreckage was eventually located by underwater divers based on the last reported location and line of flight, an expensive and time-consuming process.

After recovering the wreckage, the UAB was removed and subjected to a detailed investigation. The beacon was found to contain a battery that was almost completely discharged, even though it had been recently replaced by the operator. With a fresh battery, this beacon should have had an operating lifetime, after submersion, of 30 to 45 days, depending on the environment.

Further examination of the UAB by the manufacturer and the NTSB disclosed small metal filings between the water-activation switch and the metal case. These metal filings were suspected of causing an intermittent short of the water switch, causing an undesired activation of the beacon. The filings were identified as residue from the mechanical scraping of excess material on the water switch post during the manufacturing process.

The overall reliability of UABs has been high and the number of faulty units is understood to be quite low. However, the UAB is an emergency unit and must function perfectly every time for it to be effective when needed. To enhance the reliability of the UABs, the manufacturer provides a technical manual that recommends maintenance procedures including testing the beacon every 90 days and replacing the battery every two years.

The two-year battery replacement requirement is an industry-accepted standard, and the U.S. Federal Aviation Administration (FAA) requires this mandatory replacement on all aircraft that must have a UAB installed on the flight data recorder (FDR) and cockpit voice recorder (CVR). The other functional testing recommended by the manufacturer is not mandatory. The NTSB has issued a recommendation to the FAA suggesting that all U.S. air carriers be required to include the UAB manufacturer's recommended functional testing procedure in their required maintenance schedules.

This recommendation pertains only to Model Number N15F210B UABs manufactured by the Dukane Corp., the most widely used UAB unit. Technicians involved in maintenance and inspection of such units are urged to review the manufacturer's maintenance manuals and consider adopting the recommended testing and inspection procedures. ♦

NEW PRODUCTS

User "Friendly" Screwdrivers

A new generation of screwdrivers called Power Grip was recently introduced by the Magna Tool Co. The screwdriver handles are said to be ergonomically designed with oversized, tri-oval handles intended to produce more torque with less effort and strain. In addition to the comfort of the handle, the screwdriver tips are made with a special anti-camout feature that the manufacturer claims will prevent slippage and reduce damage to fasteners and the surrounding materials.

The Power Grip line includes the most popular sizes and styles, covering more than 90 percent of all applications. The tools may be obtained individually or in sets. For more information, contact Primark Tool Group, 1350 South 15th Street, Louisville, KY 40210 U.S. Telephone (502) 635-8100.

Ultraviolet-absorbing Eyewear Protects Operator's Eyes

Ultraviolet (UV) light is an invisible band of electromagnetic radiation just beyond the violet end of the visible spectrum.

It is a natural part of our environment, most commonly found in sunlight. Everyone is exposed to UV sources, natural and artificial, on a daily basis. But unprotected and prolonged exposure to any form of UV can result in cataracts and possibly cancer. Even brief exposure can be hazardous if the UV intensity is very high. Thus it is advised that the eyes always be shielded. When using medium- or short-wave UV sources, the face and skin should be

Photograph not available

protected too.

The Spectronics Corp. has recently introduced a line of protective face shields, goggles and eyeglasses for use by technicians operating UV light sources used in nondestructive testing. The UV-absorbing eyewear and face shield are designed to protect the user against most UV light sources that emit ultraviolet radiation.

These protective devices prohibit UV transmission in the entire UV range and have been tested and accepted to meet the National Industrial Occupational and Health (NIOSH) standards as stated in document HSM 73-11009. A special formula reduces eye fatigue, eliminates "blue haze" and improves contrast.

The goggles and face shield are recommended for use by individuals regularly using high intensity UV sources. The use of the protective spectacles is recommended only for sporadic use or lower intensity UV sources. For more information contact: Spectronics Corp., 956 Brush Hollow Road, P.O. Box 483, Westbury, NY 11590 U.S. Telephone (516) 333-4840.

Unique Mail-order First Aid Kit Service Offered

A supplier of professional first aid kits has introduced a new program designed to ensure that kits in industrial and shop areas are always supplied with the proper inventory of essential items. The service, called "First Aid On Call," is offered by the Masuen Company in Tonawanda, New York, U.S. Along with the basic kit, the program claims to enable customers to re-order supplies as they run low and have them shipped immediately with no freight charges.

Photograph not available

Said to be especially useful for out-of-the-way installations such as airports, the service utilizes a specially designed kit with labeled bins of necessary emergency items. As the items are used, the customer simply checks the item off on the card provided and mails the card to the company for immediate shipment of the replacement supplies.

The service includes a quarterly newsletter reviewing the latest workplace health and safety developments and safety requirements. It also offers suggestions promoting health and well-being. For further information, contact Masuen First Aid Company, 490 Fillmore Avenue, Tonawanda, NY 14150 U.S. Telephone (716) 695-4999.

Reusable Self-Pressurizing Aerosol Sprayer Claimed Environmentally Safe

The J.K. Rogers Co. recently introduced a reusable and refillable aerosol sprayer that has a built-in air pump housed in the bottom of the container. The manufacturer claims that a few quick pumps of the bottom provide adequate pressure to dispense the contents of the container under normal use.

Developed to replace the traditional aerosol spray applicators that have been found to pollute the atmosphere with the propellant gas, this device uses only normal air to provide the pressure source to dispense the product without the need for triggers or pumps. The unit, called AeroPure, can be filled with up to 11 fluid ounces of any sprayable lubricant or solvent by simply removing the top to the 2 $^{1}/_{2}$ inch opening. After reinstalling the top, the self-contained pump in the bottom assembly provides the air power with a built-in safety relief to prevent overpressuring or expansion due to heat.

The manufacturer claims costs are significantly reduced because fluids can be bought in bulk quantities and the unit is easily cleaned for reuse or refilling with other lubricants or solvents. For further information, contact J.K. Rogers Co., Box 11096, Oakland, CA 94611 U.S. Telephone (510) 655-2862

Side Windows Put in Welders Helmet for Greater Safety

An improvement to the Speedglas welders helmet by the Hornell Speedglas Co. now provides side view windows so that the operator has some peripheral vision of adjacent activity in the work area. Before, a welder or plasma spray operator was

limited to viewing only the immediate work area as illuminated by the arc. With this helmet, side vision windows have been added to allow the operator to see potentially hazardous objects or activity, without having to lift the helmet or stop working.

The side windows, used exclusively for peripheral vision, are a fixed shade No. 5. The center working lens is unique Speedglas that automatically darkens in 1/500th of a second after the arc is struck, thus enabling the operator to position work and prepare to strike the arc with normal vision through the working lens while keeping the helmet in place. According to the manufacturer, protection from ultraviolet/infrared radiation is constant. For more information, contact Hornell Speedglas, Inc., 2374 Edison Boulevard, Twinsburg, OH 44087 U.S. Telephone (216) 475-3202.

SAFT Offers Recycling/Disposal of NICAD Batteries

The SAFT America Corp. has established a comprehensive battery recycling program for its nickel cadmium (NICAD) battery customers.

A recognized leader in NICAD technology, the company is offering its customers a means of safely and properly disposing spent and unserviceable NICAD batteries. Although reusable/rechargeable NICAD batteries can be recharged many times, they eventually become unusable and must be disposed of properly. Recognizing that these units have component parts with hazardous contents, SAFT initiated a program to recycle and recover the raw materials from spent batteries to make sure they are disposed of correctly.

In operation since 1988, the SAFT program accepts batteries shipped to its facility in Greenville, North Carolina, where they are sorted. They are then shipped to a processing facility in Sweden where the spent batteries are dismantled. All materials go to a furnace where the cadmium is distilled for use in the manufacture of new batteries. The nickel and iron residues are also recovered and recycled into other units.

When nickel cadmium batteries need to be recycled, contact the SAFT Nife Reclamation Center at (919) 830-1600.♦