Photograph not available.

How to Work Safely With Composite Materials

by
Robert A. Feeler,
Maintenance Consultant

The use of composite materials for aircraft fairings and secondary structures has been fairly common for many years. These composites were mostly what is commonly referred to as fiberglass.

More recent advancements in technology have brought about newer technology composite materials that are lighter, stronger and much easier to fabricate than metallic structures, and they are finding more widespread use as metal replacements than fiberglass. As more of these exotic materials come into use, however, the technician will be increasingly called upon to repair and maintain these materials.

In working with sheet metal, about all you needed to worry about was cutting your finger on a sharp edge and keeping drill chips out of your eyes. As you shift into working with composites, your exposure to potentially harmful materials will be multiplied.

A composite is an engineering term for a material consisting of various combinations of alloys, fibers, resins, fillers, plastics, solvents, and adhesives, combined to produce the desired strength and characteristics needed for the application. It is the harmful side effects of these various components that present additional hazards and risks for the technician

working with composite materials.

The technician who comes in contact with composites has to be concerned with:

- inhaling vapors or fumes from volatile solvents, adhesives and coatings;
- inhaling fumes created by sanding or cutting of materials;
- inhaling dust and fibers created by sanding or cutting of materials;
- eye damage from
  - fumes and vapors
  - fibers and chips;
- absorption of harmful chemicals into the body through the skin;
- absorption of harmful chemicals or fibers into the blood stream through cuts or scratches on the hands;
- direct ingestion of chemicals or fibers through inadvertent swallowing or eating food contaminated with such materials; and
- burns from heating pads or chemical reactions.

Working Safely with New Materials

While these hazards may seem too much to handle at first, just remember a few basic rules and stick with them.

- Know what you are working with.
- Use the proper tools and equipment.
- Use the appropriate protective equipment.
- Have appropriate first aid and antidote/treatment materials on hand with personnel available who are trained in their use and application.

Dealing with the Risks

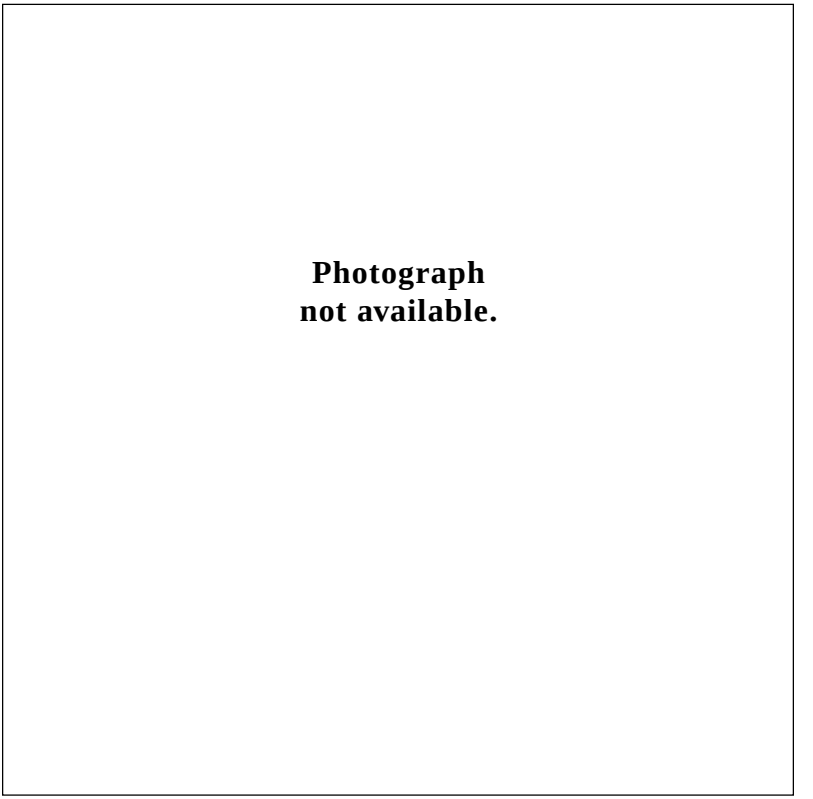
Inhalation — We have all been accustomed to using a paint mask or a dust mask for various operations in the past, and many of you will have a mask in your toolbox. But, just a mask is not enough. Be safe and refrain from using an old mask or one that was not specifically designed for the hazards associated with composite materials. Find out which composite you will be working with and secure the proper protective mask for working with that material.

Proper Fitting of Respiratory Protection

The main point in wearing a face mask is to ensure that all air ingested into the lungs is filtered; consequently, the initial fitting must ensure that no air bypasses the filter.

The process of fitting a face mask involves three basic steps: cupping the mask under the chin with the nose piece up, pulling the headband up to the back of the head and pressing the soft metal nosepiece to conform snugly with the contours of the nose.

The 3M Occupational Health and Environmental Safety Division includes more detail on fitting the dust and mist respirators it produces, reproduced here with the permission of 3M:



Assure that the mask conforms to your face; most good masks will have wire embedded in the sealing lips to bend and conform to your facial contours. This may necessitate shaving off a beard or mustache in order to get a proper seal and assure that you get the intended protection of the mask. An industrial mask approved for "airborne fiber" protection must be used whenever sawing, grinding or sanding composite materials. Replace the mask or any filter cartridges frequently, and clean the straps and sealing lips daily to ensure a good fit.

Become familiar with the properties of all chemicals, solvents and adhesives which you will be using. Review container labels and the Material Safety Data Sheet (MSDS) that accompanies the shipment of hazardous chemicals to determine acceptable exposure and assure that proper masks or breathing hoods are provided. A face shield is an excellent form of protection only if there is adequate ventilation to preclude the hazard of fumes being trapped under it. A safety hood with clean air flowing in from an outside source may be necessary in some instances. In other cases, a special mask can be provided to filter out harmful components or fumes.

Potential damage to sensitive eye tissues from fumes and vapors must be considered, and safety goggles or face masks are strongly recommended. Contact lenses should never be worn while working with solvents because fumes could actually "melt" the contact lens to the eye.

Dust, fibers and particles that can become irritants or carcinogens if inhaled into the breathing passages and lungs are also of concern to composite workers. If at all possible, work on a "downdraft table" which draws most of the potentially harmful by-products away from the worker as they are created. At the very least, have another suitably protected individual hold a portable vacuum unit close to the cutting area to collect the majority of the fibers.

Eye Protection — Aramid fibers can scratch the eyeball. Dust and fibers can cause infections. Chips and scraps can damage sensitive tissues. Fumes and vapors can irritate tissue and even melt contact lenses. The message is clear — protect your eyes.

If ventilation is adequate, a good face shield is an excellent form of eye protection. For protection from dust and airborne fibers, safety goggles with close fitting side panels are often used.

If in doubt, use the best protective device you can obtain. Do not skimp on eye protection. If harmful vapors or fumes are a factor, use a full hood with a fresh air source.

Last, but not least, keep your eye protection clean. Store your mask away from areas that are contaminated with chips and dust. Clean it before you put it on, especially the edges where it contacts your face so that harmful fibers or dust are not "scrubbed into" your skin.

Absorption — Many technicians do not recognize the harm that can result when certain chemicals enter the blood stream. Although healthy skin is a natural barrier to many harmful

Understanding the Material Safety Data Sheet (MSDS)

There are an estimated 575,000 existing chemical products used in various work places, and hundreds of new ones are introduced annually. Chemical exposure may cause or contribute to many serious health effects such as heart ailments, kidney and lung damage, sterility, cancer, burns, and rashes. Because of the seriousness of these safety and health problems, the U.S. Occupational Safety and Health Administration (OSHA) has issued a rule called "Hazard Communication," the basic intent of which is to ensure that employers and employees are informed about work hazards associated with each chemical and how to protect themselves.

The hazard communication standard establishes uniform requirements to ensure that the hazards of all chemicals imported into, produced, or used in U.S. work places are evaluated, and that this hazard information is transmitted to involved persons. Chemical manufacturers and importers must convey the hazard information by means of labels on containers and material safety data sheets (MSDS). Manufacturers and distributors are required by law to provide the MSDS with the product.

It is important to understand the terms and limitations stated on the MSDS so that you may take the proper precautions and be aware of the first aid and emergency treatment of each product.

The data on each MSDS is usually self explanatory; however, if you are in doubt about any aspect of the product, contact the manufacturer or your company medical office to clarify any concern you may have. Be especially alert in studying the "Health Hazard Data" section and review your emergency and first aid equipment to assure that you have the materials and understand their use.

In the "Hazardous Ingredients/Identity Information" section of the MSDS you will note two acronyms with which you may not be familiar:

OSHA PEL — This is the OSHA Permissible Exposure Limit which may be expressed as a time-weighted average or as a ceiling exposure limit.

ACGIH TLV — This is the American Conference of Governmental Industrial Hygienists Threshold Limit Value which is the ceiling exposure limit or the concentration that should not be exceeded even momentarily.

The ACGIH annually publishes a book which explains and lists the TLVs for various chemicals. This publication is available from ACGIH, 6500 Glenway Ave., Bldg. D7, Cincinnati, OH 45211 U.S. Telephone (513) 661-7881.

substances, there are few technicians who are without any cuts or scratches on their hands. Even the most mundane solvents can be very dangerous if held in contact with the skin for prolonged periods, and others are so potentially toxic that even a tiny amount can do irreparable damage to internal organs if allowed to enter the blood stream.

If, after researching the characteristics of the substances you will be working with, you remain in doubt about the proper protection to be used, contact your company medical office or the manufacturer of the product.

Many epoxy resin systems can damage eyes, face and exposed skin. Face shields should be worn whenever mixing and using such compounds. Gloves should extend well beyond your cuffs, and long sleeved clothing, coveralls, or protective sleeves should be used whenever handling epoxy compounds. Protection of arms can be accomplished with plastic sleeving; however, orthopedic stocking net is recommended to prevent perspiration and reduce irritation.

Cloth-lined rubber gloves are preferable because they absorb perspiration. If they are to be re-used, gloves should be turned inside-out to allow drying. Discard gloves after heavy usage to preclude being exposed to fungus infection or skin rashes.

Hands should be rinsed thoroughly before and after work, before eating or smoking, and before putting on gloves. Avoid extensive use of soaps that remove natural skin oils. Special "waterless" cleaners formulated for use with epoxies and solvents, which contain skin emollients that soften the skin, are recommended.

Do not use solvents to clean your skin. Methyl ethyl ketone (MEK) should never be used to clean your hands, or objects with which your hands come in contact.

Tools which become contaminated with epoxy resins, or clothing which becomes saturated with resins, should be either discarded or thoroughly cleaned before further use.

If skin becomes itchy or shows redness or scaling, refrain from further exposure until it returns to normal. A good routine for treatment to protect or restore your hands is:

- Soak your hands in lukewarm water for 20 minutes.
- While hands are still wet, massage them with white petrolatum jelly (Vaseline).
- Allow the ointment to remain on your hands for 20 minutes, then remove with a clean towel.

- Treatment may be repeated once or twice daily.

Ingestion — It is unlikely that you will swallow solvents or chemicals used in composite repair. However, if you should somehow allow any of these compounds to enter your digestive tract, immediate treatment is imperative. Here again, know what you are working with. Review the MSDS and keep it convenient to the work area so that you know the proper treatment if the material is swallowed.

The emergency treatment for swallowing various chemicals varies widely. Some call for you to induce vomiting while others specifically prohibit that procedure but, instead, call for drinking large quantities of water. Be aware of the recommended first aid treatment and get the affected person qualified medical attention as quickly as possible.

The risk of ingestion through eating, drinking or smoking while there is a residue of toxic chemicals on the hands is a more common concern for technicians working with composites. Be sure that you remove your gloves and rinse your hands thoroughly prior to eating or drinking. Keep lunch containers away from sources of possible contamination and do not eat or take your break in work areas where chemicals, dust or vapors are present.

Burns — The exposure to burns is a hazard not often present in working with sheet metal materials. Heat is used however, in the curing of composite materials, and the temperatures can be injurious to unprotected skin. Insulated mitts or pads should always be available and used to handle heat curing components.

The chemical reaction of certain epoxy components when mixed is an additional concern for technicians. The temperatures reached during the curing of some epoxy mixes can be sufficient to cause serious burns. Avoid the temptation to "see if it is done yet" by touching with an unprotected finger. You might find your finger tip glued to the piece and you can lose some skin in the process of separating it.

Shop Conditions — General housekeeping is especially important in a composite repair area, and directly impacts the safety of technicians involved. A few of these basic rules bear repeating:

- Aisles and areas around equipment should be kept clear and accessible.

- Maintain unblocked access to safety equipment such as eye wash and fire extinguishers. Remember that eye wash stations are not trash receptacles.

- Keep storage areas neat and orderly.

- Keep materials measuring and dispensing areas clean and neat. Wipe up spillage immediately, keep container lids closed and labels intact, and keep trash receptacles emptied.

- In lamination areas, discard mixing containers after use, keep fiberglass and bagging remnants swept up and keep solvent containers clean and supplied with fresh solvent.

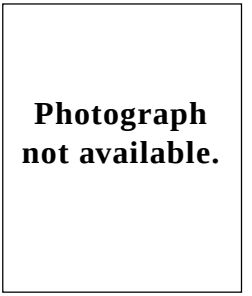
- Around sanding booths and downdraft tables, keep tables and surrounding areas clean and keep screens and filters clear of debris.

- Keep all work benches clean, neat and orderly.

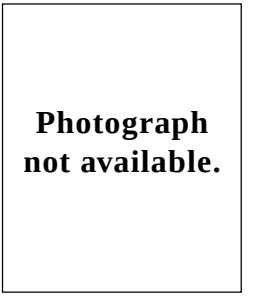
- Assure that first aid equipment is maintained and ready to use.♦

NEWS & TIPS

New AMB Editorial Coordinator Appointed



Robert A. Feeler



Robert B. Phillips

Robert A. Feeler has been appointed editorial coordinator of the Flight Safety Foundation (FSF) *Aviation Mechanics Bulletin*. He succeeds Robert B. Phillips, AMB editorial coordinator since 1980, who has retired from active direction of the publication.

Feeler is an independent maintenance consultant working with FSF and other organizations. His aviation career spans 38 years and includes experience as a mechanic to a vice president.

Feeler served as vice president of

technical services for Aspen Airways and director of maintenance and engineering for the Metro Express Division of Allegheny Airlines. He was director of quality control for Lake Central and Allegheny Airlines, after working his way up from mechanic to lead mechanic to inspector.

At Aspen Airways, Feeler reorganized the maintenance and quality control sections. He originated and directed an in-house safety and accident prevention program at Allegheny Airlines and directed safety inspections of work procedures and facilities. He also participated in accident investigations as a member of the U.S. National Transportation Safety Board (NTSB) team as a representative of the operator.

He also has participated in FSF aviation safety audits with emphasis on maintenance, quality control, facilities and support equipment.

Feeler is the author of more than 30 articles for various industry publications, including the *Aviation Mechanics Bulletin.* As a consultant, he has participated in more than 50 aviation safety audits and related projects with corporate and air carrier operators throughout the world.

As he leaves active involvement in the *Aviation Mechanics Bulletin,* Bob Phillips looks back upon an aviation career that has spanned a half century. He began with the acquisition of both pilot and mechanic certificates in 1938. He worked initially with William Lear, who was then developing aviation radio and autopilot equipment, and Bernarr MacFadden, an early aviation-minded publisher. During World War II, he taught at a U.S. Naval Air Service School in Florida.

Following the war, Phillips taught aeronautics in public schools until 1949, when he joined National Airlines and became director of training. In 1960, Phillips was employed by the U.S. Federal Aviation Administration (FAA) and served in the Flight Standards Service at the agency's Washington, D.C., headquarters. After retiring from the FAA in 1980, he began his association with Flight Safety Foundation as a writer and editorial coordinator for the *Aviation Mechanics Bulletin*.

Under Phillips' direction, the bulletin was dedicated to recognizing the role played by the air carrier and general aviation technician in aviation safety, and its editorial content offered practical information and advice that emphasized safety in maintenance practices. Phillips has continued his involvement with the Aviation Mechanic Safety Awards Program which he helped develop when he worked with the FAA.

Far from retiring to a rocking chair,

Phillips plans to continue his travels with his wife, Soula, in their Airstream travel trailer. His word processer will not be put to pasture, either; Phillips already has begun work on some personal writing projects he has "finally found time for."

AMTECH 91 Moves to Orlando

AMTECH 91, the aviation maintenance technology exposition sponsored by *Aviation Equipment Maintenance* magazine, is moving from its previous convention location in Dallas, Texas, U.S., to Orlando, Florida this year. The event will be held April 16-18, 1991, at the Orange County Convention/Civic Center in Orlando.

In moving the show to Florida, the sponsors are hoping to give the event a new appeal and make it more accessible to a larger percentage of the potential attendees by virtue of its easy access to international air travel and lower air fares.

Among numerous topics that will be covered during the three-day conference program are technical strategies, international training programs, new and advanced methods and repair procedures, computer-based training and trend monitoring for PT6 and JT15 engines.

In honor of the exposition, and to recognize all professionals in the aviation maintenance and ground support equipment industry, the mayor of Orlando, Bill Frederick, has declared the week of April 14-20 as "Aviation Maintenance Technology Week."

Anyone interested in participating should contact Alan Wallace with Andry Montgomery & Associates Inc. 6100 Dutchmans Lane, Louisville, KY 40205 U.S. Telephone (502) 473-1992.

Corrosion Prevention Program Affects Nearly 3,000 Aircraft

The U.S. Federal Aviation Administration (FAA) has issued directives for monitoring and correcting corrosion on 2,989 Boeing aircraft, of which 1,512 are registered in the United States. The directives affect Boeing 707, 727, 737 and 747 aircraft models.

The airlines operating the aircraft are required to develop corrosion prevention and control programs to prevent structural degradation due to corrosion and a combination of corrosion and fatigue. The deadline for compliance is December 12, 1991.

In a related action, similar corrosion

control programs were proposed by the FAA in a notice of proposed rule making (NPRM) that would affect McDonnell Douglas DC-8, DC-9 and DC-10 aircraft.

Minnesota Holds Technicians Conference

The Minnesota Department of Transportation (MDOT), Office of Aeronautics, in cooperation with the U.S. Federal Aviation Administration (FAA), will hold the 1991 Minnesota Aviation Maintenance Technicians Conference March 11-12, 1991, at the Thunderbird Hotel in Bloomington, Minnesota, U.S.

The seminar is intended for licensed mechanics, students, repairmen, aircraft refueling technicians and interested pilots. The program will include educational and safety presentations, industry exhibits and recognition of the outstanding aviation maintenance technician of the year.

For more information, contact Donald Goserud, Office of Aeronautics, at (612) 296-7285.

Go-ahead Given For Boeing 777

Boeing Commercial Airplane Group has announced that it will proceed with the long-awaited Boeing 777 aircraft with the receipt of an order from United Airlines for 34 firm delivery positions and 34 options.

The long-range, twin-engine widebody jetliner is sized between the company's 767-300 and 747-400, with seating proposed for 360 to 390 passengers.

Working closely with United and other major carriers in the design process, Boeing has worked to aim the aircraft at the broadest possible market. Among the developments emerging from discussions with the carriers are:

- A wing optimized for range and takeoff performance that provides the ability to take off and climb quickly from high-elevation, high-temperature airports with full passenger loads.

- Compatibility with existing gate and taxiway space. This was accomplished by developing upward-folding wing tips as an optional feature which reduces the span and allows the 777 to use gates and ramps sized for the shorter wings of DC-10s, L-1011s and Boeing 767s.

- Fly-by-wire control systems with a Boeing-patented two-way digital data bus that will allow

flight computers, instruments and systems to communicate with one another through a common wire path. The object, from a maintenance standpoint, is to simplify assembly, save weight and increase reliability through a reduction in wiring and connectors.

Photograph not available.

- Portions of the primary structure will be made of new composite materials in place of metal to save weight. These are formulated for greater strength than present composites and will be used in the horizontal and vertical tails and in the floor beams of the passenger cabin.

- New flat panel cockpit display screens for flight, navigation and engine information.

- Initial maximum takeoff weight of 506,000 pounds (229,520 kg) and a range up to 4,800 statute miles (7,700 km), with the capability to stretch the fuselage for future versions in a proposed 777 family of aircraft.

Boeing claims that new design and testing initiatives will help assure higher levels of service readiness and reliability on the very first 777 compared to what has been possible on previous jetliner introductions. Initial deliveries are targeted for May 1995. ♦

MAINTENANCE ALERTS

This information is intended to provide an awareness of problem areas through which such occurrences 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 accurate.

Exhaust Pipe Failures Result in Inflight Fires

Any reciprocating engine exhaust system is subject to fatigue cracks as a result of the heat and vibration inherent in these installations. Inspec-

tion of exhaust systems should always be included in the preventive maintenance scheduled for any such aircraft. Certain aircraft however, are subject to abnormal cracking and must receive special attention to ensure continued airworthiness.

Failure of exhaust components can result in overheating and damage to adjacent structures and in some cases, in-flight fires. U.S. National Transportation Safety Board (NTSB) accident records show that Piper models PA-32RT-300T and PA-32R-301T have been involved in four accidents, two of which involved fatalities, since February 3, 1990, as a result of in-flight engine fires. Other service difficulty reports (SDRs) have been submitted to the FAA involving similar failures on this aircraft.

Investigation of the recent accidents has disclosed that the engine fires in each instance resulted from fatigue cracking of the left intermediate exhaust pipe attachment flange. Cracking of the flange allows excessive movement of the pipe and may result in separation at the aft slip joint connection to the crossover tube.

This same installation was the subject of an earlier NTSB investigation in 1988. Following this earlier investigation, the U.S. Federal Aviation Administration (FAA) issued an airworthiness directive (AD 89-12-04) calling for frequent inspections and eventual modification to install improved parts. All of the aircraft involved in the accidents during 1990 had been modified in accordance with the AD. It appears, from the continuing incidents of exhaust system failures, that this modification is not an effective fix.

Technicians involved in the maintenance and inspection of PA-32RT-300T and PA-32R-301T aircraft should be especially alert when inspecting these exhaust systems. The NTSB has issued a safety recommendation calling for the FAA to issue an AD applicable to Textron Lycoming Model TIO-540-S1AD engines requiring within the next 10 hours of flight, and at appropriate recurring intervals thereafter, an inspection and alignment of the crossover exhaust assembly in accordance with Part I of Service Bulletin Number 484.

The manufacturer is requested to issue a service bulletin incorporating a new, improved design modification to the engine exhaust system in order to prevent inflight engine fires resulting from failure or separation of the left intermediate exhaust pipe.

The NTSB recommendation also calls for the FAA to issue an AD mandating the installation of the improved parts developed as a result of the service bulletin.

Loose Actuator Fitting Jams Landing Gear

The Boeing 727 landed with the right main landing gear partially extended after repeated attempts by the crew to extend the gear with the normal system, manually and by inflight maneuvers. Although no passengers or crew members were injured in the emergency landing, the aircraft was substantially damaged.

It was found that the right main landing gear had jammed against the inboard landing gear door, apparently because of an out-of-sequence condition.

The landing gear door actuators on the Boeing 727 are attached through a serrated plate (for rigging adjustments) to the inboard door. Proper operation of the doors is critical because the doors must be actuated to their full travel before hydraulic pressure can be routed to the actuators for the landing gear.

Investigation of this incident disclosed that the bolts securing the landing gear door actuator fitting were undertorqued. One bolt was tightened to only 10 foot-pounds and the other two could be turned by hand. The manufacturer's manual calls for these bolts to be torqued to 25 to 42 foot-pounds after door rigging is completed. An out-of-sequence condition as a result of loose bolts was substantiated during landing gear retraction tests previously conducted by the U.S. National Transportation Safety Board (NTSB) on Boeing 727 airplanes in connection with a similar landing gear malfunction incident.

The Boeing Commercial Airplane Group earlier had concluded that that a loose actuator fitting can prevent retraction of the affected main landing gear, and issued Service Letter Number 727-SL-32-47 in 1983. As a result of this latest incident, Boeing issued an notice to all operators of Boeing 727s, re-emphasizing the need to inspect the fittings in accordance with the service letter.

The installation of new, improved landing gear safety bars provides additional protection against interference between the doors and the landing gear in the event of an out-of-sequence condition. However, only about 20 percent of the Boeing 727 fleet has had this modification installed.

As a result of this situation, the NTSB has recommended that the FAA issue an airworthiness directive (AD) requiring immediate inspection of the landing gear door actuator fittings for security and proper bolt torque, and a subsequent modification of the fittings to ensure that they remain correctly and securely fastened.

Technicians involved with the maintenance and servicing of Boeing 727 aircraft should review Service Letter 727-SL-32-47 and the appropriate sections of the maintenance manual to assure that they are familiar with the affected installations.

Corrosion a Concern In Older Cessnas

The U.S. Federal Aviation Administration (FAA) has issued an alert, based upon malfunction and defect reports, that concern corrosion in the fuselage front and rear spar assemblies of Cessna Models 120, 140, 150 and 170 series aircraft with more than 10 years since date of manufacture.

Based upon reports of corrosion in the fuselage front and rear spar wing carry-through structure of these aircraft, it is recommended that the hat-shaped channel across the top of the fuselage be checked at every annual inspection. The manufacturer recommends one of the following procedures:

- Remove either wing and remove the spar bearing block. Inspect the interior of the hat section for corrosion or other discrepancies.

  OR

- Drill 1/2-inch holes in the cabin top skin on seven-inch centers along the center line of the hat-shaped section. The first hole should be on the fuselage centerline. Do not drill holes in the area of the spar bearing blocks. After completion of the inspection, smooth the edges of holes and apply a protective coating. Close the holes with grommets, fabric patches, or other suitable methods.

NOTE: If holes are drilled into the spar channel, reinforce the channel to provide equivalent strength.

Elevator Hinge Pin Suspected as Cause of Inflight Breakup

There were no survivors among the 50 passengers and three crew members when the Convair 580 crashed off the coast of Denmark. The aircraft had departed Oslo, Norway, for Hamburg, Germany, and while cruising at 22,000 feet, the aircraft disappeared from air traffic control radar over the North Sea. Most of the wreckage was recovered and transported to a facility near Oslo for examination.

The accident is being investigated under the authority of the Aircraft Accident Investigation Board of

Norway and the U.S. National Transportation Safety Board (NTSB). Preliminary indications are that the airplane experienced an inflight breakup while in cruise flight. During reconstruction of the wreckage, the accident investigators noted that one of the four right-hand elevator hinge pins was missing. Damage surrounding the location of the missing pin indicated that the pin was missing prior to the flight or was lost in flight.

The manufacturer, Convair Division of General Dynamics, is currently examining the effect of a missing pin or pins on aircraft stability and control. Field service reports received by Convair indicate that other operators performing inspections during routine maintenance have found evidence of bearing rotation, binding and wear on the elevator hinge pins. If these conditions continue undetected, the loss of an elevator hinge pin may occur that could possibly cause an inflight separation of the elevator and loss of control of the airplane.

The manufacturer has issued an alert service bulletin requiring a one-time inspection of the elevator hinge pins, bushings, nuts, bearing plates and bearings, plus the replacement of any worn or damaged parts. These inspections are recommended to be performed within the next 50 hours of aircraft operation.

The NTSB however, is convinced that the Convair service bulletins are of major significance and that compliance should be mandatory. The agency has therefore recommended that the FAA issue an airworthiness directive (AD) mandating compliance with Convair Alert Service Bulletin Number 640 (340D) No. 55-A5 for all CV-340/440/580/640 aircraft and 600 (240D) No. 55-A4 for all CV-240/600 aircraft.

Take Care with Those Cabin Windows

A Boeing 727 cabin outer window pane recently experienced a crack through a routed radius (mounting flange). The crack appeared to have started with a mark, or scoring, most likely made while trimming the seal upon installation. The manufacturer cautions technicians to make sure the routed radius is free of stress-raising marks, and to use care when trimming the seal to avoid surface damage.

A major U.S. airline reports that cabin window damage has cost the airline $73,050 in just six months; a single DC-10 window can cost as much as $630.

Damage occurs in several ways, but a significant portion of it has been found to be due to mishandling dur-

ing shipping. Careful attention to packaging and use of the proper shipping container can greatly reduce this problem. Most of the damage, however, occurs when the windows are outside the container while handling during removal or installation.

Prying with screwdrivers or other instruments is a definite no-no. Windows that have been removed usually can be salvaged, and should be treated with the same care as a new one.

Airworthiness Directives Issued for Boeing 747s and 767s

The U.S. Federal Aviation Administration (FAA) has issued three airworthiness directives (ADs) that require inspection, modification and replacement of parts in areas critical to maintaining structural integrity in certain Boeing 747 and 767 aircraft.

The first AD, affecting all 747s, is a follow-up to a telegraphic AD that requires inspection and repair, if necessary, of the nose wheel well top panel sections, vertical beam webs and clips, and the adjacent sidewall panel web. This AD was prompted by a report of extensive fatigue cracking and resultant distortion of the nose wheel well vertical beams on a Boeing 747, which if not corrected, could result in rapid decompression of the aircraft.

The second AD, applicable to Boeing 767-200/300 models, requires the installation of a mechanical power transfer unit between the left and right hydraulic power systems of each airplane.

This action was prompted by analysis that indicates airplane pitch control capability is marginal with adverse center-of-gravity and gross weight combinations when both left and right hydraulic systems become inoperative.

The third AD applies to all models of the 767. It requires modification of the vertical stabilizer forward closure rib by the installation of a cover plate and a panel assembly over lightening and access holes to provide an air flow path to the vertical stabilizer.

This action is necessary to prevent over-pressurization of the vertical stabilizer, which could cause structural failure in the event of a rupture of the fuselage under the dorsal fin.♦

NEW PRODUCTS

Reference Book For Composites

The ASTM (American Society for Testing and Materials) has published *ASTM Standards and Literature References for Composite Materials, 2nd Edition*. The newly revised publication includes standard test methods for high modulus fibers and for composite materials reinforced by high modulus fibers, as well as applicable standards used to support standard tests on high modulus fibers and composites.

The publication is available in soft cover or loose-leaf format from ASTM, 1916 Race Street, Philadelphia, PA 19103 U.S. Telephone (215) 299-5400.

Telescoping Towbar For Safer Operation

Tronair Inc., manufacturer of ground support equipment, has developed two telescoping tow couplers, one designed for aircraft weighing less than 100,000 pounds and a larger model for heavier aircraft.

The telescoping coupler is said by the manufacturer to be safer and to offer manpower savings as well, since one man can attach the towbar to the aircraft quickly. In operation, the towbar operator pulls up to the aircraft to within six inches of the tow point, removes the tow bar from the tug and attaches it to the aircraft. The tow coupler is then released and telescoped out to attach the tow bar to the tug.

Photograph not available.

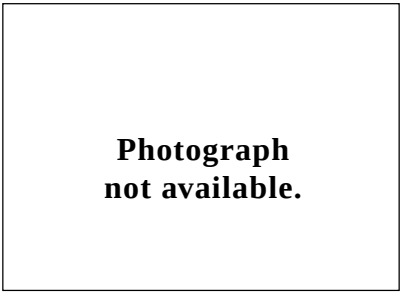
The operator then returns to the driving position, pulls the tug forward to lock the hitch in place and is ready to tow. No mirrors are needed and the exposure to operator back injuries is greatly reduced, according to the manufacturer.

For more information, contact Ron Dossat, Tronair Inc., 1740 Eber Road, Holland, OH 43528 U.S. Telephone (800) 426-6301. Fax (419) 867-0634.

Combination Socket Fits Square and Hex Fasteners

The Wright Tool Co. has developed

an eight-point combination socket that can be used on both square and



hex fasteners of the same size. The dual-purpose sockets can reduce the number of tools required for technicians involved in maintaining ground equipment in addition to aircraft.

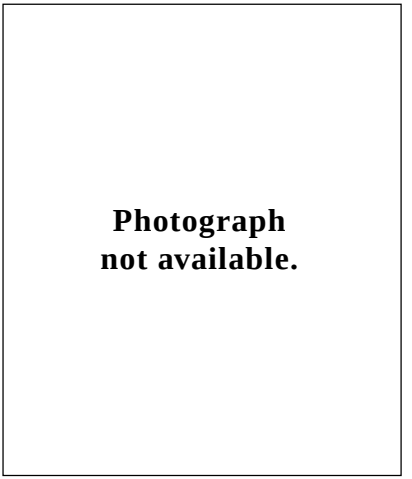
The manufacturer states that these sockets provide full bearing and snug fit on both types of fasteners. Sockets are available in 1/4-, 3/8-, and 1/2-inch drive sizes.

More information is available from the Wright Tool Co., One Wright Place, Barberton, OH 44203 U.S.

Spiral Wrap Protects Wiring

The M.M. Newman Corp. supplies spirally cut cable wrap in six materials and seven sizes. The materials can be supplied on spools or in payout boxes for ease of use in maintenance applications.

Heli-Tube Cable Wrap is an expandable plastic cable harness and abrasion protector which is recognized by Underwriters Laboratories (UL) for specific temperature and flammability ratings. Technicians can protect exposed wiring runs or flex-



ible hoses from abrasion and chaffing by the installation of the proper type of wrapping. The spiral cut of the wrap allows it to be installed around existing wire runs and installed plumbing without disconnecting or disturbing the installation.

For more information contact the M.M. Newman Corp., 24 Tioga Way, P.O. Box 615, Marblehead, MA 01945 U.S.

Temperature Monitoring Decals Detect Overheats

Wahl Instruments Inc. has developed a line of high temperature decals that are capable of measuring surface temperatures as high as 500 degrees F. The Temp-Plate decals are available in a variety of shapes and sizes with from one to 15 separate temperature increments.

Technicians can use these irreversible temperature decals to monitor the temperature of bearing housings, heat exchangers, avionics or any component which is subject to damage from overheating. The manufacturer claims that the decals stick to most clean surfaces and resist exposure to solvents, fuels, grease, oil, water and steam.

Temp-Plates are lot tested for accuracy and can be used to detect temperatures from 80 to 340 degrees F in Mylar material and from 350 to 500 degrees F in Kapton material. Stainless steel decals can be used at temperatures up to 1,100 degrees F.

For additional information, contact Wahl Instruments, Temp-Plate Division, 5750 Hannum Avenue, Culver City, CA 90231 U.S. Telephone (800) 421-2853. Fax (213) 670-2840. ♦