Do You Want to be an FAA Safety Inspector?

The U.S. Federal Aviation Administration (FAA) finally has convinced the U.S. Congress that there is a need for additional experienced aviation safety inspectors (maintenance) in the FAA field offices to closely monitor maintenance concerns of both aging and newer aircraft (see "Aircraft Aging is a Growing Maintenance Concern," March/April *Aviation Mechanics Bulletin*). This action is in response to the strong concerns expressed by the public and the media related to the safety of public transport aircraft after recent incidents of apparent structural failures caused by corrosion and metal fatigue.

The FAA intends to hire some 900 field inspectors. Although all of this number cannot be funded at once, an official noted that the current hiring program will help assure that proper maintenance standards are maintained in the air transport industry. During the Fiscal 1988-90 budget period, the agency is expected to hire about 300 additional inspectors per year, and that by 1991 there should be double the number of inspectors that were available during the early years of former U.S. President Ronald Reagan.

A related congressional concern is compliance with safe maintenance practices by the air carriers and fixed base operators which also is an aspect of safety that can be monitored by alert and qualified maintenance inspectors.

Recognition of the critical role of the safety inspector as a key element in the safety of air travel brings along with it a heavy responsibility to those who follow this career path. The newly hired aviation safety inspector faces the need to learn quickly and "get up to speed" with the requirements of expanding traffic and technology. He or she must be prepared to face the fact that the newly hired inspector may be regarded as not possessing adequate experience in established aviation maintenance practices. Further training must be accepted to ensure that the inspector looking over the shoulder of a mechanic on the job, who frequently is highly experienced, knows as much

if not more than the technician he is observing.

The inspector also must quickly gain the insight to sense when an operator, through his mechanics, may be cutting corners on maintenance and emphasizing economics to the detriment of safety.

The need, the recognition and the rewards are there for maintenance safety overseers. The FAA—and the traveling public—expect reliable aircraft, and the Congress has awakened to the need to stimulate the expansion of the means to assure the attainment of this goal. Mechanics are a critical cornerstone of aviation safety; safety inspectors help keep that cornerstone aligned with maintenance standards and abreast of new developments and techniques so necessary to keep up with the increasing challenges.

Aviation safety inspectors currently earn up to $53,000 per year, have opportunities for advancement, are afforded benefits that include up to 26 days of paid vacation a year, plus sick leave and retirement benefits. U.S. citizenship is required at the time of application. If you are interested in becoming an FAA aviation safety inspector, send a postcard with your name and address to: FAA, P.O. Box 26650, Dept. PPAO4, Oklahoma City, OK 73126 U.S.♦

NEW PRODUCTS

Information on the following products, services and literature is published in the interest of improving aviation safety through a well-informed, better-equipped aviation mechanic.

Wrap Protects Hoses and Wires

Spirally cut cable wrap called Heli-Tube® from M. M. Newman Corp. applies like tape to hydraulic lines, hoses and wires to protect them from abrasion. The product also can be used to bundle, insulate and dampen vibration effects on these components.

The wrapping material is available in six sizes for bundles from 1/16 inch to 5 inches outside diameter, and operates in temperatures ranging from -232 degrees C to 260 degrees C (-450 degrees F to 500 degrees F). It is non-flammable and is chemically inert.

No special tools are needed to install Heli-Tube, which conforms to MIL M-20693, AMS 3651B, AMS 3653, AMS 3654, and AMS 4655. Aircraft applications include dampening vibration for electrical wires and as a chafe guard on high temperature, steel-braided teflon hoses

and hydraulic lines.

The spiral tape is priced according to size and quantity requirements and is available from M. M. Newman Corp., 24 Tioga Way, P.O. Box 615, Marblehead, MA U.S. 01945 (Telephone 617-631-7100; FAX 617-631-8887).

Video Tape Describes Fastener Safety

A 12 1/2-minute video presentation explores the nuts and bolts of fastener safety. Titled "For Safety's Sake: The Fastener Audit," the video tape was produced by Bowman Distribution, a direct-to-user distributor of maintenance and repair products.

The video presentation instructs the viewer on methods of protection against the hazards of inferior quality and counterfeit fasteners. (In recognition of the prevalence of the bogus parts problem, Flight Safety Foundation is preparing a detailed report on the subject.) The film deals with mismarked and misrepresented bolts, nuts, washers and other fasteners being sold to manufacturers and maintenance services.

The distributor of the video tape claims that both the buyer and installer of fastening devices can benefit from it. Possible uses can include showing at aviation technology schools or lunch-break viewing at maintenance facilities.

The video tape is available free with a charge of $6.95 to cover the cost of packing and mailing. It may be ordered from: Bowman Distribution, Barnes Group, Inc., 850 East 72nd Street, Cleveland, OH 44103 U.S. (Telephone 1-800-877-8800).

Brochure Describes Corrosion Protection

A full-color brochure from Sermatech International, Inc., describes a diffused aluminide coating, SermaLoy J, designed to protect gas turbine hot section components from hot corrosion and oxidation. The coating is made of diffused aluminide with a silicon-enriched outer layer, designed to protect gas turbine hot section components at temperatures up to 1204 degrees C (2,200 degrees F).

Photograph not available.

According to Sermatech, the mechanisms of high-temperature metal

degradation in older turbine engines were isolated within different stages of the hot section and could be addressed separately. In the newer, hotter and more efficient engines, however, low-temperature hot corrosion (LTHC) and high-temperature hot corrosion (HTHC) are no longer segregated within the engine but now occur on the same part. The air-cooled blades and vanes in these engines experience drastic temperature gradients and require special protection, according to Sermatech.

The silicon in the coating is claimed to prevent thermal fatigue cracking caused by unequal rates of heating and cooling between the surface and interior of a component, a common cause of cracking when using coatings without this protection.

SermaLoy J is applied by an international network of coating facilities operated by Sermatech Technical Services division. According to the company, one operator using Pratt & Whitney PT-6 engines reported savings of up to $20,000 per engine as a result of a reduced need for parts after using the coating

Further information is available from Sermatech International, Inc., 155 South Limerick Road, Limerick, PA 19468 U.S. (Telephone 215-948-5100; Telex 84-6335).

Rigid Borescope Offers Safer Inspections of Hard-to-Reach Areas

A rigid fiberoptic borescope from the Lenox Instrument Company is intended to replace slow, tedious feeler gauges for surface inspections. Measurement of grooves, rings, slots, holes, and other internal surface features of parts and equipment is said to be more accurate and faster than with conventional inspection methods.

Photograph not available.

The borescope was developed for measuring O-ring grooves in bearings where tolerances are in thousandths of inches and is available with features that allow it to be adapted to high-tolerance gradation.

Different models are available with variable magnification (zoom) and interchangeable micrometer eyepieces. Viewing sections are available in lengths from six inches to

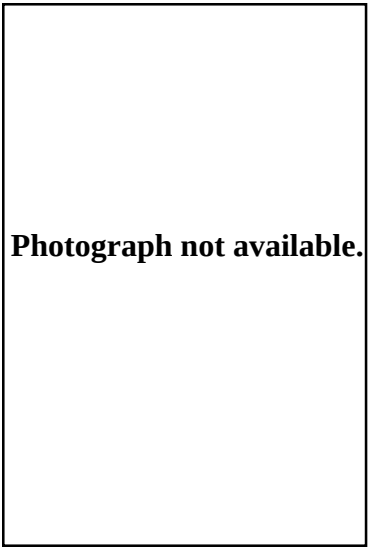
more than 50 feet. The unit can be used with closed-circuit television systems, motion picture cameras and many formats of still cameras including 35 mm, 2 1/ 4-inch square and 4-by 5-inch. It is available in diameters ranging from 3/16-inch through 2 3/4- inch and with various directions of view.

The measuring borescope can be retrofitted to existing borescopes, fabricated in the unusual configurations for special uses, and is radiation-resistant. Light sources include incandescent and fiberoptic with AC or rechargeable DC electrical power. An explosion-proof fiberoptic light is available for applications that require this protection. Offset eyepieces are available.

Details are available from the Lenox Instrument Company, 265 Andrews Road, Scottsville Industrial Park, Trevose, PA 19047 U.S. (Telephone 215-322-9990).

Personnel Lifts Built For Steadiness, Safety

A newly designed line of hydraulic-powered personnel/maintenance lifts is intended to offer the aviation mechanic the capability to lift as much as 300 pounds to working heights of up to 21 feet, with the



safety of a steady platform to prevent tipping the operator or damaging an adjacent aircraft.

Designated the Bally/Lift/Two by the manufacturer, Ballymore Company, the unit is equipped with three-speed hydraulic hand pumps for quick, easy lifting or a choice of AC and DC electric drive motors. Platform-mounted pushbutton power controls are included with the electric-drive models.

New features incorporated in the Bally/Lift/Two include built-in access ladders, adjustable leveling stabilizing jacks at each corner of the base and work platforms that are enclosed on all sides by steel rails for operator safety.

The angled access ladder used to

reach the platform when it is in the fully lowered position is constructed with three-inch-deep, anti-skid ladder steps and side-mounted handrails. Self-storing leveling jacks are positioned at each corner of the base of the lift to provide convenient leveling and stabilization on uneven surfaces.

Three models of the platform are available, including one with a cantilevered platform. The units conform to OSHA standards and ANSI A92.3 19890 codes.

For more information contact the Ballymore Company, 220 Garfield Ave., West Chester, PA 19380-0397 U.S. (Telephone 215-696-3250).

Anti-Corrosion Agent Blocks Electrolysis

Marketed by Corrosion Block, Inc., the anti-corrosion chemical ACF-50 is claimed useful on moving parts as well as for entire airframes. The material separates metal from moisture and is said to block the action of the electrolytic process that produces corrosion that can lead to structural failure of aircraft parts and structures.

Although common waxes can seal moisture into corrosion pits and allow the destructive process to continue, ACF-50 is claimed to actually dry out the moisture on metal surfaces and penetrate into the base of the corrosion cell. It is an ultra-thin compound applied under high pressure. A powerful attraction for metal causes the compound to spread and penetrate into fuselage skin laps, around rivets and screws and blind spots not directly sprayed. It is said to separate water from metal, leaving an ultra-thin insulating layer that prevents further oxidation through electrolytic action.

Photograph not available.

According to the supplier, ACF-50 remains effective for about 18 months and gradually disappears as it is chemically consumed, leaving no residue. The product is available for spot treatment in 13-ounce aerosol cans or one- and five-gallon containers with hand sprayers.

More information is available from Corrosion Block, Inc., 4901 Keller Springs, Suite 108, Dallas, TX 75248 U.S. (Telephone 1-800-638-7361.

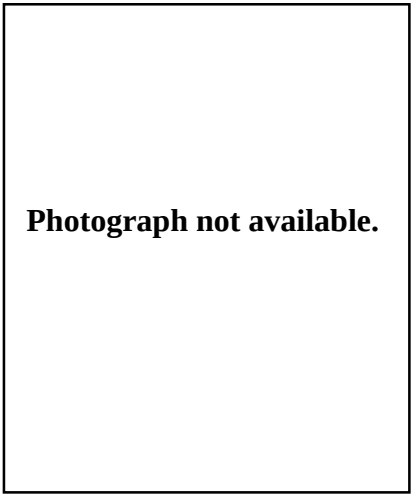
Disposable Urinal Aids Pilot, Mechanic Alike

The safety aspects of a portable urinal are easily evident for the pilot flying an aircraft without on-board facilities, especially when the use of such an aid helps avoid an unplanned landing in the middle of a flight just when the weather is at its worst. Its benefits to the aviation mechanic are less obvious, but nevertheless offer a measurable contribution to his ability to keep the aircraft in top shape.

Mechanics have found that the use of makeshift toilet facilities aboard aircraft can present insidious threats to safety. The problem is with the effects of acidic urine that can come in contact with aircraft structure and systems through leakage or accidental bursting of an inappropriate container that may have been pressed into service. The insidious action of acid on aluminum, electronics or electrical and mechanical mechanisma, to say nothing of upholstery, could eventually degrade structural integrity or operational viability.

One of these would be good insurance in a mechanic's tool box. It could come in handy for that time of need when the technician is working on an airplane parked far from a restroom and he doesn't want to leave his valuable toolbox unprotected.

One portable, disposable urinal is the Brief Relief™ distributed by American Innotek, Inc. The product is claimed to be convenient to use, leakproof and tough enough, even when full, to sustain rough handling that includes being dropped from a height of six feet or being stepped on.



The unit is a specially designed spill- and splash-proof plastic bag filled with a non-toxic, absorbent powder that changes the liquid into an odorless semi-solid on contact. A plastic closure slide seals the opening after use. The company claims that the bag, with a built-in funnel, is designed so that even if the closure slide is lost and the bag is accidentally stepped on, the gel will not be squeezed out.

The product is usable by men, women and children, and each bag will hold up to 16 ounces of fluid. Each bag folds flat for ease of storage and measures 4.5 inches by 6.5 inches. Instructions are printed on each bag and a non-alcoholic washup towelette is included.

More information is available from American Innotek, Inc., 334 Via Vera Cruz, Suite 251, San Marcos, CA 92069 U.S. (Telephone 619-471-1549).

Polish Improves Vision Through Windshields

Two products from Novus, Inc. are designed to rejuvenate and protect plastics such as aircraft windows.

Plastic Polish 1 is a cleaner, shiner and protector. Designed to be applied in one operation, the highly concentrated formula polishes to an even glaze that is said to resist fingerprints and dust buildup, and to be antistatic and antifogging. The other product, Plastic Polish 2, removes fine scratches and haze. It is a polishing compound that restores and protects damaged plastics, and when it is used the manufacturer recommends that it be followed up by application of Plastic Polish 1.

The two products are also useful for cleaning and protecting aluminum surfaces. The manufacturer states that they are non-toxic and are not irritating to skin or eyes.

Contact Novus, Inc., 10425 Hampshire Ave., So., Minneapolis, MN 55438 U.S. (Telephone 612-944-8800).

Aeronautical Dictionary

Aviation mechanics seem to keep running into new words and phrases in maintenance and overhaul manuals, technical literature and trade publications. They, as much as pilots, need to keep abreast of industry terminology to avoid unsafe conditions brought on by communications misunderstandings.

One way to keep up with the latest terms is to consult the 1989 edition of the *Dictionary of Aeronautical Terms*. Along with their normal library of maintenance manuals, many maintenance technicians keep this type of aeronautical reference work near at hand. The publication defines more than 5,000 aviation terms used in engineering, avionics, maintenance and government documents.

The dictionary is available from ASA Publications, 6001 Sixth Ave., S., Seattle, WA 98108 U.S. (Telephone 206-763-0277).♦

NEWS & TIPS

Maintenance Technician Honored in Michigan

Peter G. Tanis received the annual Minnesota General Aviation Maintenance Technician of the Year Award at the General Aviation Maintenance Conference in Minneapolis this spring. Sponsored by the Minnesota Department of Transportation (Mn/DOT) and the U.S. Federal Aviation Administration (FAA), the award recognizes the importance that maintenance technicians play in the role of aviation safety.

Tanis, a pilot and aircraft mechanic since 1959, was nominated for the award for his many contributions to aviation safety and for his invention of an aircraft preheater system. The patented device allows an aircraft to take off with little delay in cold weather.

In addition to operating a small company and distributing thousands of preheaters in 49 states and seven foreign countries, Tanis maintains and performs annual inspections on aircraft in his local community of Glenwood.

A former teacher of aviation mechanics, Tanis also has been a corporate pilot, flight instructor mechanic examiner, and an accident prevention counselor. He has spoken at many aviation conferences in the United States and has published articles in a number of aviation magazines.

Photograph not available.

Peter G. Tanis (r) receives the Minnesota Maintenance Technician of the Year Award from Raymond Rought, Director of the Office of Aeronautics, Minn. DOT.

Do You Understand The New MEL Rules?

The U.S. FAA's most recent ruling concerning minimum equipment lists (MELs) permits certain aircraft to be operated with inoperative instruments and equipment not essential for the safe operation of the aircraft. Amendment Numbers 43-30 and 91-206 to the U.S. Federal Aviation Regulations (FARs) permit rotorcraft, nonturbine-powered airplanes, gliders, and lighter-than-air aircraft, for which an approved master minimum equipment list (MMEL) has not been developed, to be op-

erated with inoperative instruments and equipment not essential for the safe operation of the aircraft.

These amendments also allow general aviation operators of small airplanes, gliders and lighter-than-air aircraft, for which an MMEL has not been developed, the option of operating either under the MEL or in accordance with the provisions of the new rule, as follows: The pilot-in-command, owner or operator will be required to identify the inoperative instruments or equipment, consult the aircraft's approved flight manual or owner's handbook, and review FAR Part 91.30[d]. After the pilot ensures that an inoperative instrument or equipment is not required, the aircraft may depart provided:

a. The inoperative instrument or item of equipment is deactivated or removed, the cockpit control of the affected instrument or item of equipment is placarded with the word "Inoperative," and the discrepancy is recorded in the aircraft's maintenance records (If the inoperative instrument or item of equipment is being removed from the aircraft or if deactivation requires maintenance, a certified and appropriately rated maintenance person will be required to accomplish the removal and maintenance task.); and,

b. At the next required inspection, the inoperative instrument or item of equipment is repaired, replaced, removed or inspected as appropriate.

Copies of these amendments are available from the U.S. Government Printing Office, Superintendent of Documents, Washington, DC 20402-9325 U.S. (Telephone 202-783-3238).

Where Credit is Due ...

In the January issue of this publication, the article on page 15, "U.S. Maintenance Technician Receives Recognition," omitted mention of the National Business Aircraft Association (NBAA) as a cosponsor of the program. In fact, that organization chaired the 25th awards ceremony.

Are You Looking For ACs or NPRMs?

A number of our readers have requested information on how to receive FAA Advisory Circulars (ACs) and Notices of Proposed Rule Making (NPRMs). To receive these publications, write to the Department of Transportation, Distribution Requirements Section, M-494-1, 400 7th Street, S.W., Washington, DC 20590 U.S.

The ACs are issued to make public many announcements concerning or explaining new rules or procedures, and they affect almost everyone who has anything to do with the operation or maintenance of aircraft.

NPRMs are notices of proposed revisions to Federal Aviation Regulations (FARs) or new ones, and they usually offer the opportunity to respond with comments and to influence the outcome.

Ask to receive all ACs and NPRMs that pertain to general aviation or transport aircraft. Request all issuances if your area of activity is within the scope of both categories.

MAINTENANCE ALERTS

The following information on accidents and incidents is intended to provide an awareness of problem areas through which such occurrences may be prevented in the future.

Misread X-Rays

The Douglas DC-3, operated by a Canadian carrier, was used primarily for cargo work in northern communities. After its last hauling job of the day, delivering a cargo of fuel, the aircraft was returning to Pickle Lake, Ontario. The late afternoon weather was clear and the two crew members were the only occupants.

As the aircraft approached the destination, the captain, a company training pilot, told the company dispatcher that prior to landing he would give some instruction to the copilot, who was scheduled to upgrade to captain status the following month. The aircraft entered a holding pattern at the airport's non-directional beacon (NDB) and the pilot announced over the radio that they would execute an NDB approach. He subsequently reported that they were in the procedure turn inbound to the airport.

Approximately three minutes later, two other pilots who were flying a de Havilland Twin Otter nearby and who had seen the DC-3 in the holding pattern and outbound for the approach, witnessed the cargo aircraft diving steeply with the left wing folded upwards beyond 90 degrees. The DC-3 continued its descent inverted and crashed into the muskeg surface at a descent angle of about 70 degrees. The two pilots were killed instantly. The nose and fuselage sections sustained massive damage, and the tail assembly had twisted sharply but was relatively intact. Both engines were torn from their mounts. The left wing was found 650 feet away and had landed flat, sustaining very little damage. There was no fire.

Investigators later determined that the left wing had failed under normal flight loads as a result of a fatigue crack in the center section lower wing skin. The final report that was produced by the Canadian Aviation Safety Board also stated that "Anomalies in the radiographs (X-rays) taken during mandatory NDT [non-destructive testing] inspections were not correctly interpreted."

Among the report's conclusions were the following:

- A 15-inch fatigue crack was visible in radiographs taken at the normal inspection cycle, 297.8 hours of flight time before the accident, but was not interpreted by the radiographer;

- The radiographs taken at the normal inspection cycle showed that three bolt fasteners and an adjacent rivet were missing from the bottom of the front spar in the vicinity of station 127.750, where the fatigue failure had occurred;

- Had a thorough visual inspection been completed following a radiographic inspection on November 23, 1986, during subsequent periodic inspections, a number of missing fasteners would have been detected;

- All the radiographic examination reports, except for the one performed by a different company on February 25, 1980, stated that there were no apparent defects;

- The visual inspection done by the operator following the February 1980 inspection, which stated there was a crack indication at station 127.750, was not documented in the aircraft log books;

- The requirement of a February 1966 service bulletin was not fulfilled on this aircraft and on some other DC-3s operating in Canada. The service bulletin (SD263), subsequently revised, from McDonnell Douglas, responded to DC-3 wing cracking problems by stipulating dye penetrant checks in conjunction with radiographs of certain areas including station 127.750;

- There were no recorded instances of hard landings or flight through turbulence that could be considered contributory to the accident;

- The structural failure was not the result of aircraft system malfunction or

pilot-induced maneuvers; and,

- The aircraft weight and center of gravity were within prescribed limits.

Gear Mechanism

A Boeing 747 pilot had to declare an emergency during the approach for landing at Sydney, Australia, when a landing gear malfunction occurred. The flight was en route from Honolulu, Hawaii, and Auckland, New Zealand.

The aircraft made a safe landing and there were no injuries. Witnesses reported that a piece of wing material fell off as the aircraft landed and that there was some fuel leakage. Some hydraulic fluid also was reported to have leaked, but there was no fire. The aircraft was towed to the international terminal where the passengers deplaned through the normal exits.

After inspection, it was found that a mechanism which controls the main pivot in the starboard main landing gear had failed, producing localized damage that resulted in the punctured fluid lines.

Frayed Wires?

The pilot of the Cessna 404 checked that the landing gear down lights were illuminated during the pre-landing checks, found everything was all right, and executed a normal landing.

During the rollout after touchdown, the nose continued to lower beyond the normal position and the propellers hit the runway surface. The aircraft came to rest on the center of the runway on its nose, which along with the propellers and pitot tubes, was damaged.

Upon later examination, the nose gear actuator showed a number of defects. No electrical continuity was found across the leads from the microswitch assembly regardless of the microswitch plunger position. An internal examination revealed that the two microswitches that made up the assembly were serviceable, but that all the leads were damaged at the point where they entered the base. Also, the O-ring seal under the lock piston had been cut and showed signs of having extruded.

Tripped by Corrosion

The Boeing 727 was being towed from a passenger loading gate at Stapleton International Airport, Denver, Colo, U.S. when the left main landing gear collapsed. The 113 passengers and seven crew members exited without injury.

Investigators found that the accident was caused by metal fatigue in a trunnion assembly that had corroded. The trunnion had been scheduled for inspection in the summer of 1990 and had never had been removed from the aircraft, which was eight years old.

Three Greens No Good

The Cessna 404 was being test flown to check the repair of defects noted during a previous flight for the renewal of the certificate of airworthiness. According to the pilot, one of those defects was that the right main gear green light remained on despite four retractions.

The gear was recycled twice during the test flight and the cockpit indications from the gear "locked-down" and "unsafe" lights operated properly. When the aircraft was returned at the end of the test flight, the pilot got three green gear lights and made a normal touchdown. Shortly, however, the right wing lowered and the propeller on that side struck the runway. The pilot stopped the aircraft without losing directional control and saw the three green lights still glowing. Later examination showed that the right main gear had partially collapsed, but there was no apparent mechanical failure that could have caused it.

The design of the main gear operating mechanism on this aircraft utilizes a hydraulic actuator that incorporates an internal mechanical lock which engages as the gear mechanism reaches the fully extended position. Upon gear retraction, the locking mechanism is disabled by hydraulic pressure. There is a microswitch on the side of the hydraulic gear actuator that, through the action of a plunger, senses the fully extended position of the gear and serves two purposes; it sends a signal to illuminate the green "locked-down" light in the cockpit and, in conjunction with similar switches on the other gear legs, turns off the hydraulic pump. As the landing gear extends, the last gear leg to reach the down and locked position is the one to stop the hydraulic pump.

The right gear actuator, found in the partially retracted position, was sent to an overhaul facility for a tear-down inspection. There it was found that the switch operating plunger was jammed by corrosion.

Investigators reasoned that the right leg was the last to extend and, with the switch operating plunger stuck in the "locked-down" position, a premature signal was sent to the hydraulic pump. When the second of the three gear legs locked in the down position, the hydraulic pump was turned off, stopping pressure

to the right gear actuator before it extended that leg to the fully down and locked position. For the same cause, the switch with the jammed plunger sent a signal that illuminated the respective green light, indicating to the pilot that all was well.

Cessna has since distributed a service newsletter that deals with the problem of moisture affecting the mechanism, and describes a means of sealing the switch.

Door Opens in Flight

As the Boeing 737 was approaching an airport in northeastern India, a door opened, depressurizing the aircraft. Four persons were injured before crew members were able to close the door.

After landing, the injured passengers were taken to a hospital for treatment and the aircraft again took off. The door again opened and the aircraft returned to the airport where maintenance was accomplished. The aircraft later was put back into service with no further reported problems involving the door.

Fire in the Hole

Shortly before takeoff, with 122 passengers and a crew of six aboard, the Boeing 737 had to be evacuated after a small fire broke out in the aircraft's auxiliary power unit (APU) which supplies power for heat and lights while the aircraft is on the ground.

Although the incident involved only a minor fire, the passengers were taken off by use of the emergency chutes and window exits as a precaution. The fire was quickly extinguished and only one minor injury was reported.

Total Power Loss

The flight instructor was conducting a dual check ride of the private pilot. After all internal and external preflight checks had been completed, they started the engine and taxied out for takeoff. The power check of the Piper PA-28 Warrier's engine was all right and they took off.

At a height of between 50 and 100 feet the aircraft suffered a total power loss. When the instructor took control and lowered the nose, the engine surged to full power but quit again after about four seconds. With little altitude and few alternatives, the aircraft was landed in a plowed field. The main gear dug in and the nose gear collapsed after touchdown, following which the propeller struck the ground. The right main gear sank into the soft earth,

causing the right wingtip to contact the ground with enough force to bend the wing back. The three occupants, who were wearing shoulder harnesses, were uninjured other than for bruises suffered by the occupant in the right front seat. They all were able to leave the aircraft with no difficulty.

Later inspection revealed that the fuel tanks were about three-quarters full and that the electric fuel pump properly supplied fuel to the carburetor. However, it was noticed during recovery of the aircraft that fuel was flowing from the fuel filter drain valve — the quick drain used to drain the filter during preflight checks. This was the Curtiss-type valve that is opened by pushing in on a cross-bar against spring pressure; it can be locked in the open position by twisting the cross-bar into the "shelf" formed by the "L" shape of the slot along which the cross-bar travels.

This valve normally is opened for only a few moments during the preflight inspection while the pilot allows the required amount of fuel to drain and then is released to close. The evidence indicated that the drain valve of the accident aircraft had inadvertently been left locked open after the check, and the oversight had gone unnoticed because the main fuel selector valve had been in the "off" position, creating an air lock and causing fuel drainage from the Curtiss valve to cease after a short time. Some initial fuel draining from the filter may occur when the drain valve is opened even with the fuel selector in the "off" position.

After opening the fuel selector valve, the pressure loss associated with an open drain valve may not be enough to prevent fuel from reaching the carburetor and supplying the engine normally until the pressure at the filter inlet is reduced somewhat by takeoff and climb fuel flows. Therefore, the engine can be started and run, apparently normally, with the drain valve open, but it can suffer fuel starvation to the carburetor during takeoff and climb.

A number of similar instances had occurred to PA-28 aircraft that were attributed to the locked-open configuration of the drain valve, and a recommended modification of the valve was accomplished by filing off the shoulder of the "L" channel to remove the step that locked the valve's cross-bar, thereby rendering the locking feature of the unit inoperative.♦