Proper (Stressed) Skin Care Is Basic To Aviation Safety

Recent incidents, and current recommendations in the form of warnings from the U.S. National Transportation Safety Board (NTSB), have brought to light that maintenance of the skin on pressurized aircraft requires constant vigil and careful techniques.

The NTSB was alerted to improper aluminum skin care by some maintenance personnel when two decompression incidents and the ensuing investigations revealed fuselage skin ruptures resulting from cracks that had developed from the scoring of the fuselage skin. The NTSB said "It is believed that in both incidents the scratch or score damage to the surface of the fuselage skin was probably caused by maintenance personnel using improper tools in marking the metal while performing a repair to the structure."

The use of a graphite pencil to mark a section or piece of aluminum could lead to failure of that portion of the skin or structure on pressurized aircraft. As innocent and as handy-in-the-pocket as a graphite pencil may appear to be, it can be the cause of skin failure since a graphite pencil actually scores the skin and alters the stresses imposed on the stressed skin surface.

The two decompression incidents, said the NTSB, "…indicated that pressurized fuselage skin panels are particularly sensitive to surface damage, especially in the longitudinal direction."

Certificated aviation schools do teach the use of proper marking implements when working on stressed skin, and they emphasize not using graphite pencils on these surfaces because they score the skin.

All maintenance personnel should keep in mind that any minor surface scratch can reduce the service life of the skin and could result in premature failure in the area affected. Non-certificated sheet metal maintenance personnel also should take note of this fact, as should any personnel who have the opportunity to make pencil marks on aircraft skin, such as fuelers, baggage handlers, food service, and exterior de-icing personnel. All personnel should extend a "scratch

awareness" beyond graphite pencils to anything that can score aluminum — tools, sharp edges on cleaning equipment, sharp items in pockets and metal clothing buttons, sharp-edged jewelry, abrasive cleaning agents, etc.

Aviation mechanics inspecting skin areas should observe any scorings or abnormal skin appearances as blackened skin, dark lines, scratches, dents, kinks, bends, punctures and any abnormal surface indications that appear out of normal.

The NTSB recommended that FAA maintenance inspectors be alerted to review the practices of all maintenance personnel within their jurisdictions to ensure that the proper tools and techniques are used for marking aircraft structures for repair and painting.♦

NEWS & TIPS

FAA Proposes ADs For Older Jets

The U.S. Federal Aviation Administration (FAA) recently took a major step toward ensuring the continued operational safety of aging aircraft by proposing Airworthiness Directives (ADs) that would decree extensive structural modifications to older Boeing 727s, 737s, and 747s. These are the first in a series of ADs that will deal with the safety of older aircraft designs. (See related item, "Task Force Offers…")

This action reflects a change in the FAA's philosophy for maintaining the airworthiness of older aircraft. In the past, the agency has relied primarily on continuing structural inspections to identify needed repairs due to corrosion, cracking and other indications of metal fatigue. These inspections tend to become more frequent and demanding as an aircraft gets older and approaches the manufacturer's "economic design goal," which is the point in an aircraft's life at which the cost of maintenance is expected to increase significantly.

Under the new approach, the FAA would require airlines to make strengthening modifications to basic critical structures to prevent fatigue problems as aircraft reach their economic design goal. Also, some parts, such as the landing gear, will have to be replaced after a specific number of flight hours or cycles.

The proposed ADs initially would affect 115 U.S.-registered Boeing aircraft — 67 B727s, 28 B737s, and 20 B747s. The estimated cost of modifications is $142 million over a four-year period. Additional aircraft may be covered as they accu-

mulate time in service and reach the threshold for modifications.

Due to the magnitude of the modification program, the FAA anticipates that the work will be staggered over a period of time and generally coordinated with other scheduled maintenance. Accordingly, the airlines will be allowed four years to incorporate all of the changes. In the interim, operational safety will be provided by the individual operator's structural inspection program, regular maintenance, inspection modifications required by previous ADs, increased FAA surveillance, and the special Supplemental Structural Inspection Program for older aircraft.

Compact Discs Come To The Shop

Maxwell Data Management (MDM) of Costa Mesa, California, claims a major development in the handling of large technical documents, such as maintenance and overhaul manuals, for aircraft. The new system utilizes CD-ROM (compact disc-read only memory) based information retrieval systems which have enormous data storage capability.

Maintenance personnel, whether in engineering, in the hangar or on the line, can use the CD-ROM source to rapidly obtain information on maintenance tasks. At the same time, they can quickly reference a list of needed tools and parts.

In an application for the Aerospatiale Airbus A320 (shown below), the maintenance manual, containing 16,000 pages of text and over

Photograph not available.

7,000 illustrations, was put on the CD-ROM disk. In another instance, MDM put on CD-ROM more than 40,000 pages of text and graphics of the Boeing 757 maintenance manual and illustrated parts catalog for British Airways.

The current Aerospatiale application uses this system for handling both text and graphics. An experienced maintenance technician can select a maintenance task by choosing the relevant chapter, section, page block and task from a list on the computer screen. Access to that information is then achieved in a matter of seconds. Alternative search methods, including the use of a table of contents or a comprehensive word search operation, can also provide quick access.

Task Force Offers Corrosion Guidelines

An aviation industry task force has sent the U.S. Federal Aviation Administration (FAA) its guidelines for a program to prevent, inspect and repair corrosion on Boeing commercial airplanes.

Made up of airline maintenance experts, Boeing structural specialists and observers from the FAA and foreign regulatory agencies, the group studied corrosion data available from airline reports, FAA records and Boeing's two-year-long aging fleet survey. The study covered all models of the Boeing 707, 727, 737 and 747.

The task force recommended a corrosion protection, inspection and repair program for each section of the aircraft covered by the study. The report included a timetable for inspection, a repeat inspection interval and specific tasks to be accomplished at each stage.

The tasks include definition of repair standards as well as inspections of all structures, cleanup and removal of corrosion in problem areas, restoration of finishes and application of corrosion inhibitors.

Task force recommendations were submitted for the FAA to study and to propose an Airworthiness Directive (AD) which will make the program mandatory for U.S. registered carriers. Foreign regulatory agencies are expected to adopt the program for aircraft registered in their countries. (See related item, "FAA Proposes ADs…")

New Flush-head Rivet Claimed Corrosion-Resistent

A new controlled-expansion, flush-head aircraft rivet has been developed by Lockheed Aeronautical Systems Company. The patented rivet is claimed to offer several advantages over current designs. Most important to the mechanic is that it can be worked with standard tools. Further, it is said to be corrosion-resistent, a plus for aircraft use in that corrosion areas are often found around riveted areas. The rivet also weighs less because of its smaller cross-section, and can be reworked in-place, which can result in a significantly reduced rejection rate.

Although this rivet will be tried first on a military aircraft now in production (P-7A anti-submarine warfare aircraft), it will be in full scale-production and marketed in 1992 for applications on many other aircraft of different manufacturers.

Maintenance Organization Aims To Update Aviation Mechanics

Recognizing the need to keep updating aviation mechanics in the state of the art, Greenwich Air Services (formerly Batch-Air) has embarked on a diverse training program, using modern training methods, to offer courses on particular aircraft, their powerplants and components. Courses can be taken at the Greenwich facilities in Florida, U.S., or produced in audio-visual form such as video tapes for use at the user's base of operation.

A 40-hour familiarization course for the JT-8D engine is now available, and a flexible familiarization course for the DC-8 aircraft is offered as well. A Course Completion Certificate is issued to certify that the student has attained a good working knowledge of that particular engine or aircraft. Formal classes also can be conducted on the user's premises.

The courses are not only for the aviation mechanic but can be of benefit to the managers of maintenance facilities as well. They can be used as brush-ups in specific skills and can be used when convenient and as often as desired. The tapes are helpful to those who want to see a specific procedure performed and the viewer can repeat subject matter as many times as desired by merely pressing the tape rewind button.

At present, all video tapes must be viewed on the premises at Greenwich Air, however the training department will produce tapes for organizations wishing to build their own video library tuned to the user's equipment, and used for updating mechanics or for training new employees. For further information, contact Bruce Rubin Associates, 2655 LeJuene Road, Coral Gables, FL 33134 U.S. Telephone: 305-448-7450.

Avionics Course Aims To Fill Void

Modern aircraft are 40 percent electronics, says Mike Batey, avionics director for Colorado Aero Tech, an aviation technical school in Brookfield, Colorado, U.S. This, plus the fact that many avionics technicians who began working during the Korean War have retired, has created an increasing demand for trained electronic generalists to maintain avionics on new aircraft and retrofit older ones.

To respond to the need, the school has added an avionics curriculum

that includes 1,980 hours of training divided into 11 courses. Courses range from basic electronics to aircraft flight control, communication, navigation, radar and computer systems. During the program, students spend 50 to 60 percent of their time on "hands-on" training, completing over 200 individual projects.♦

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. Maintenance Alerts are based upon preliminary information from government agencies, aviation organizations, press information and other sources. The information may not be complete.

Hot Air Leak Prompts Fire Alert

The Boeing 747 had just taken off from New York for a flight to London. A fire fault indication occurred followed shortly by a fire warning. The pilot shut down the engine and the warning stopped, so the fire bottle was not discharged. The crew jettisoned nearly 80,000 pounds of fuel to bring the aircraft weight within landing limits and returned safely to New York.

Later inspection revealed that the fire warning had resulted from hot air leakage from a circumferential crack adjacent to the welded end flange joint in the 15th stage HP compressor air supply pipe to the thrust reverser blocker valve.

The operator started a crack detection program for that pipe at engine overhaul and advised that several cracked pipes and ducts had been discovered in other aircraft during recent operations. Maintenance personnel were advised to be on the alert during zonal inspections and when checking out reports of high nacelle temperature.

Leaky Pipes Curtail Flight

A Boeing 727 with 123 passengers and a crew of seven was en route from Lima, Peru, for Guayaquil, Equador, at 32,000 feet. One hundred thirty miles into the flight, trouble developed in the cabin pressurization piping and pressurization was lost. The pilot descended to 12,000 feet and returned to Lima along the Pacific Coast to avoid the Andes mountains. The aircraft was repaired and placed back into service.

Where's the Net?

The pilot of an ex-military North American F-100 Super Sabre was returning from a local flight. After touchdown, the drag chute failed to deploy and the aircraft ran off the end of the runway. The single-engine jet crashed into a number of approach light assemblies and sustained substantial damage. There was no fire and the pilot was unhurt.

Drop in Oil Pressure Grounds Widebody

The Boeing 747 was on a scheduled flight from Los Angeles to Sydney. While in cruise, the pilot noticed a loss of oil pressure in the aircraft's Number Two engine, and made a precautionary landing on the island of Fiji. The passengers were flown to their destination by other airlines.

Hydraulic Leak Hits Hot Brakes?

A Boeing 737 was on a scheduled flight when smoke appeared inside the aircraft. The pilot made an emergency landing and passengers evacuated via the emergency escape chutes. There was no fire and no damage to the aircraft. However, one passenger was slightly injured during the evacuation. The source of the in-flight smoke was traced to hydraulic fluid leaking onto part of the landing gear.

Whoa Nellie!

The pilot of a motorized glider was taxiing out for a local flight when the throttle control fell off in his hand. He lost control of the power and the aircraft scraped and damaged a clubhouse and two automobiles before it could be stopped. There were no injuries but the aircraft sustained damage to the propeller and a wing.

Corrosion in Bearing Causes Heavy Controls

The Boeing 757 was making an approach to London's Heathrow Airport after a flight from Athens. When the captain disconnected the autopilot, he found the aileron control was extremely heavy. However, the aircraft was landed safely.

After-landing checks revealed that there was no aileron travel with right hydraulic system operation. The problem was traced to a corroded bearing on the right outboard aileron lower control unit input rod. The bearing was changed and the system was lubricated and re-rigged; system response was checked and found to be satisfactory. The bearing that had caused the problem was a sealed bearing with no routine lubrication requirements.

Misrigging Leads to Fatigued Flap Shaft

After the Boeing 747 taxied in from a scheduled flight from London to Boston, the ground engineer found that one section of the leading edge flap had not retracted. However, all position lights on the flight deck had normally extinguished.

When maintenance personnel checked into the matter, they found a sheared torque tube and changed it and two ball screw assemblies that had stretched; a leading edge flap motor was also changed as a precautionary measure.

Reason for the incident was traced to shaft failure adjacent to its end fitting because of fatigue that resulted from marginal rigging.

Re-enactment Flight Almost Makes It

The pilot of an 80-year-old Bleriot monoplane was attempting to re-enact the historic first flight across the English Channel by Louis Bleriot, heading from Calais to Dover.

Barely two miles from making landfall over the Kent, coast the engine overheated and the pilot was forced to land in the sea. The pilot was rescued by a Royal Air Force helicopter within three minutes but the aircraft sustained substantial damage.

Loose Safety Wire Has Domino Effect

The McDonnell Douglas DC-10 was cruising between Gatwick, U.K. and Atlanta, Georgia, U.S., when the Number One hydraulic system quantity indicator reading went to zero. The appropriate procedures were carried out and the aircraft landed at its destination without further problems.

Investigation by maintenance personnel revealed that the left-hand engine-driven hydraulic pump case had split and that the pressure line at the filter inlet was loose. Repair action included replacement of the pump and tightening of the pressure line.

Inspection of the failed pump showed that there were two splits in the case. These were caused by the head of a piston-shoe hold-down retainer plate screw having broken and becoming jammed between the rotating cylinder block and the pump case. Further analysis of the pump revealed that it had been incorrectly lock-wired. The wire locking had contacted the cylinder block and broke off, allowing the screw to loosen until its head contacted the cylinder block.

When Little Things Make the Difference

While carrying out flight deck predeparture checks, the first officer noticed that the on-board fire extinguisher stall had a split pin installed in the trigger guard. The pin is installed by the manufacturer or recharger to prevent inadvertent discharge during shipment. After the unit is installed in the aircraft, the pin should be removed. In the case reported, the split pin could not be removed by hand; a pair of pliers was needed.

Air Leak Leads to Trouble Before Taxi

The twin turboprop HS 748 regional carrier aircraft was ready to depart the gate for a scheduled flight. Both engines were running and the ground engineer was advised that the aircraft was cleared for pushback.

Before the aircraft brakes had been released, however, the tow tug moved forward, the nose gear collapsed and the nose of the aircraft sank onto the roof of the tug cab. Both propellers were quickly feathered and the engines secured. The aircraft passengers were unloaded through normal exits. There were no personnel injuries, but the aircraft sustained substantial damage to the nose landing gear and the front fuselage structure.

During investigation of the incident, the tug driver said that the vehicle had moved forward with no input from him. Further checking revealed a major air leak in the rear brake of the tug, which could have started the chain of events that led to the vehicle moving without input from the operator.

For Lack of a Bolt …

The single-engine light plane remained in the traffic pattern after takeoff and became established on the downwind leg preparing for a landing when the control tower called the pilot. The controller advised that one of the aircraft's wheels had fallen off and was lying on the runway. A flyby confirmed that the right wheel, brake and lower landing gear were missing.

With emergency equipment standing by, the pilot landed the low-wing Piper PA-28 on the left main and nose wheels, and he and his one passenger evacuated the aircraft without injury. There was no fire and the aircraft suffered only minor damage to the right flap.

After the aircraft was recovered, it was found that the lower torque link

bolt was missing, allowing the entire lower section of the landing gear assembly to slide out. The bolt normally is retained by a nut secured by a split pin.

The pin was visually inspected approximately 30 hours before the incident, and had not been disturbed since a 150-hour inspection had been accomplished 100 hours before the occurrence.

Gear Scare

The Boeing 737 was about to land at Eugene, Oregon, U.S. When the gear was lowered, the green nose-gear light failed to illuminate.

The crew switched light bulbs to check the possibility that the light bulb may have burned out. This was not the case, however, so a flyby was performed during which the gear appeared to be down according to control tower personnel. A visual check through the viewport confirmed the appearance of all gear down and locked.

The pilot decided to land and the cabin attendants prepared the passengers for a possible evacuation. The airliner landed uneventfully and passengers deplaned normally. After the gear light problem was investigated by maintenance personnel, the terminal plate assembly was replaced and all systems checked out satisfactorily.

'O' Ring Couldn't Take the Pressure

The Boeing 767 was en route from Washington's Dulles Airport to Chicago's O'Hare. During cruise, the hydraulic system quantity decreased from full to .70 and continued to decrease.

The appropriate procedures were followed, and as the center pumps were turned off the fluid loss halted. Emergency services were requested and the landing was made with no further problems using alternate gear and flap procedures. The aircraft was taxied to the gate using the reserve hydraulic system.

Maintenance personnel traced the loss of hydraulic fluid to a failed 'O' ring in the center hydraulic system. It was replaced.

Things That Go Bump in the Flight

While the Boeing 737 was at cruise altitude, a flight attendant reported hearing a bumping noise beneath the floor of the aft galley. The first officer was sent to investigate but the sound stopped before he arrived at the galley area. A walkaround at

the next stop revealed nothing abnormal and the aircraft departed on its next leg.

Back in cruise flight, the flight attendant again reported a bumping noise, and this time the captain went to investigate. The bumping was felt in the floor of the aft galley and the flight officer, who was flying the aircraft, reported that he felt a vibration in the control yoke. When the aircraft was slowed down, the bumping stopped.

At the next stop, a thorough investigation revealed that the right-hand inboard elevator tab hinge was loose. This was secured and no further problem was experienced.

Playing Games With Gear Lights

The Boeing 727 was en route from Buffalo, N.Y., U.S., to Chicago when the right main landing gear red and green lights illuminated. The pilot slowed the aircraft to 270 knots and the gear handle was placed from the off to the up position. The gear lights remained on. The gear selector handle was returned to the off position and the lights went out.

Approaching the destination airport, the landing gear was lowered at 220 knots and gear down indications were normal. However, the crew completed the unsafe gear indication procedure and the second officer verified that the gear was down by checking through the viewport. The landing was accomplished with no further incident.

After maintenance checked out the system, the A-8 and A-10 circuit boards in the landing gear accessory unit were replaced. The landing gear was recycled numerous times and all indications were normal.

Quick Decisions On Takeoff

On departure for a flight from Denver to San Francisco, the DC-10 would have a tailwind, so the crew used the limit thrust of 104.2 percent for takeoff.

When the aircraft had accelerated to 80 knots, the Number 2 EGT amber warning light illuminated. The thrust was reduced to 99 percent and the light went out. The takeoff was continued. Moments later, the same warning light illuminated again. A further reduction in thrust put the light out. Shortly afterwards, the engine fail light illuminated and the takeoff was aborted at 120 knots.

The aircraft returned with no further problems. Maintenance checked the inlet and exhaust of the Number 2 engine and found no damage or cause for the light indications.

Just Needed Topping Off

The Douglas DC-8 was taxiing out for takeoff from Washington, D.C., to Seattle. While performing pre-takeoff checks, the crew was unable to perform control freedom-of-movement checks satisfactorily. The aileron control wheel restricted movement out of neutral, and when displaced would not return to neutral. The aircraft returned to the gate.

Inspection revealed that the right ground spoilers were in the up position but no light indication had been showing in the cockpit. The system appeared normal after the ground spoilers were operated and the ailerons cycled several times. However, the reservoirs for the spoilers and ailerons were found to be low and were serviced.

Gear Hang-up Causes Belly Scratch

The vintage MiG-15 was arriving at Salt Lake International Airport for on its way to an air show at nearby Wendover, Utah, U.S. On final approach, the pilot noticed that the gear down light for the right main gear was not illuminated. He notified the control tower and made a low pass for visual confirmation.

He got it.

The ground observers advised the pilot that the right main gear was indeed still retracted. The pilot tried to lower the balky gear by bouncing on the runway with the other main wheel but the maneuver failed to dislodge it. He then went around again and retracted the other two landing gear and made a wheels-up landing. The aircraft's belly and wing tanks were damaged during the ensuing slide but the pilot was not injured.

Moth Carries The Flame

The de Havilland HD 60 Gypsy Moth was over the English countryside on a midday cross-country flight when the engine failed. The pilot made a forced landing in a field of wheat. The pilot was able to land safely without damaging either himself, his one passenger or the aircraft.

However, the dry vegetation was ignited by the aircraft engine's hot exhaust and the field burned out — the aircraft along with it.♦

Ground Safety Handbook Published

The U.S. National Safety Council has recently produced the fourth edition of its comprehensive safety manual *Aviation Ground Operation.* In announcing publication of the handbook, the NSC stated, "Safety is an integral part of the airline industry. What happens in the shop, hangar, on the grounds and ramps, and in the terminals directly affects the safety of passengers."

The handbook is designed to guide the user in the prevention of accidents that may result in injuries to employees and the general public, and in damage or other loss to customers' and company property or equipment. It sets forth the guidelines for safely accomplishing most ground operations associated with aircraft. Applications include: all air carriers, fixed base operators, corporate fleet operators, airport operators and aircraft service contractors.

In addition to the material in the text, the reference sections at the end of each chapter list many codes or standards. This handbook uses standards that apply in the United States. Other standards may apply outside the United States. Readers should refer to these codes or standards in their jurisdiction to obtain more information.

Aviation Ground Operation tells management and employees how to establish and maintain the safest, most profitable ground operations possible.

Photograph not available.

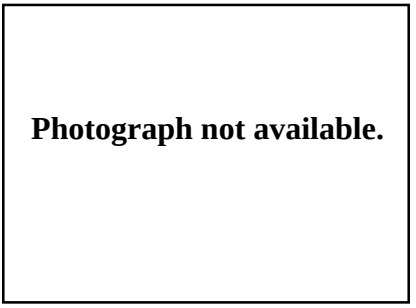
Topics include airport buildings and fixed facilities, mobile ground service equipment, hangar and shop operations, hazardous materials and processes, and emergency planning.

For more information about the manual, contact B. J. Dembski, Industrial Department, National Safety Council. 444 North Michigan Avenue, Chicago, IL 60611-3991 U.S. Telephone: 312-527-4800 Ext. 8105.

Leak Detector 'Sniffs' Helium

A portable microprocessor-controlled detector is designed to locate extremely small pressurized aircraft system leaks faster and more accurately than conventional soaping and bubbling methods. Attachments allow use of the unit in a variety of test situations such as oxygen, pitot-static, pneumatic and fuel systems.

The medium used is Helium, which can be easily injected into the lines for testing. Helium is an ideal tracer gas because it is non-toxic,

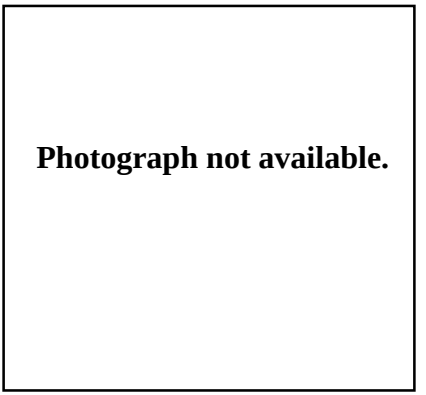


inert, and inexpensive as well as being readily available. The second smallest molecule, helium penetrates minute leaks and dense materials more rapidly than almost any other substance. Because helium does not occur naturally in significant concentrations, any reading of helium is definitive evidence of a leak. The entire unit affords ready access to hard-to-reach areas, weighs in at 6-1/2 pounds and measures 4-1/8 by 7-1/2 inches. Its 12-volt rechargeable gel cell battery gives at least 8 hours of continuous operation on a single charge.

Further details may be obtained from Mark Products, Inc., 575 N. Pastoria Ave., Sunnyvale, CA 94086 U.S. Telephone: 1-800-621-4215.

Film Promotes Hand Tool Safety

The subject may be elementary to many aviation technicians, but look around at the bandages and lost work hours due to injuries received while using ordinary hand tools. We can cite a multitude of preventable hand tool accidents, but more graphically, this is accomplished in a 30-minute



film, shot on location, that visually reveals more than 100 recreated instances of do's and dont's that apply to aviation mechanics using hand tools on the job. Throughout the

film, viewers are alerted to hand tool safety practices as well as the dangers of hand tool misuse that can result in serious injury. The presentation can be used for initial or recurrent use, and the half-hour spent watching it could save many lost work hours due to mechanic injury on the job.

For details, contact the Hand Tool Institute, 25 N. Broadway, Tarrytown, NY 10591 U.S. Telephone: 914-332-0040.

Driver Bits Claim Toughness

A line of insert and power screwdriver bits is claimed safer and longer-lasting. The Magna ISO-TEMP bits are designed to not shatter under maximum torque.

The bits are the result of advances in metallurgy that will resist drive bit chaffing, spreading, splitting,

Photograph not available.

rounding, and other problems encountered by the aviation mechanic when driving fastening devices on aircraft. This new industrial power screwdriver bit is available with slotted, Phillips, square, recess or Torx bits.

The safety features of a solid hold and resistance to slipping are a plus for the mechanic working in close or tight areas, or when perched on a work platform, stand or ladder.

More information is available from Magna, 1001 West Park Rd., Elizabethtown, KY 42701 U.S. Telephone: 502-737-3311.

Catalog Offered For Fuel Handling Products

A comprehensive catalog on aviation fuel handling products is available from Facet Quantek, Inc. The publication contains information on filter separators, clay treaters, prefilters, water coalescers and fuel monitors. In addition, the catalog provides technical data. Copies are free from Facet Quantek, Inc., P.O. Box 50096, Tulsa, OK 74150 U.S. Telephone: 800-888-9129.

Catalog Describes Training Aids

This 48-page catalog contains photos, illustrations and descriptions of aviation training publications and products, and is available from IAP,

Inc. Listed are more than 100 maintenance-related items in book, computer diskette and video tape formats. Listings include the U.S. Federal Aviation Regulations (FARs) for Aviation Mechanics; Acceptable Methods, Techniques and Practices for Aircraft Alterations; a Standard Aviation Maintenance Handbook, the Inspection Authorization Study Guide; and the second edition of the Aircraft Technical Dictionary.

Others include the textbooks, study guides and workbooks for the Airframe & Powerplant certificates. Specific training publications include separate texts on Aircraft Sheet Metal, Aircraft Fabric Covering, Aircraft Painting and Finishing, Aircraft Bonded Structures, Applied Science for the Aviation Technician, Basic Electronics and Radio Installation, Electronic Circuit Devices, and DC Circuits.

The catalog is available, free of charge, by writing IAP, Inc., P.O. Box 10000, Casper, WY 82602-1000 U.S. Telephone: 1-800-443-9250.

Cable Wrap For Small Wires

A comprehensive selection of spirally cut cable wrap is available in a variety of materials and sizes for the bundling and protection of small-diameter wires that are subject to vibration, fire, ultraviolet rays, or chemicals.

The miniature Heli-tube® spirally cut cable wrap comes in six of the standard sizes from one-eighth to one-inch outside diameter and is manufactured from UV-resistant polyethylene, clear polyethylene, fire-resistant polyethylene, UV-resistant nylon, self-extinguishing nylon, and chemically inert, non-flammable Teflon® for use in critical applications.

Photograph not available.

For more information, contact the M.M. Newman Corp., 24 Tioga Way, P.O. Box 615, Marblehead, MA 01945 U.S. Telephone: 617-631-7100.♦