



ON THE
JOB
SERIES

REAL PEOPLE
WORKING *in*

**MECHANICS,
INSTALLATION,
AND REPAIR**



VGM CAREER HORIZONS

**ON THE
JOB
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REAL PEOPLE WORKING *in*

MECHANICS, INSTALLATION, AND REPAIR

Blythe Camenson



VGM Career Horizons
NTC/Contemporary Publishing Group

Library of Congress Cataloging-in-Publication Data

Camenson, Blythe.

On the job : Real people working in mechanics, installation, and repair /
Blythe Camenson.

p. cm. — (On the job series)

ISBN 0-658-00017-9 (cloth). — ISBN 0-658-00018-7 (pbk.)

1. Machinery—Maintenance and repair Vocational guidance.
2. Mechanics (Persons) Vocational guidance. I. Title. II. Title:
Mechanics, installation, and repair. III. Series.

TJ157.C36 1999

621.8'023—dc21

99-34060

CIP

Cover design by Nick Panos

Published by VGM Career Horizons

A division of NTC/Contemporary Publishing Group, Inc.

4255 West Touhy Avenue, Lincolnwood (Chicago), Illinois 60712-1975 U.S.A.

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NTC/Contemporary Publishing Group, Inc.

Printed in the United States of America

International Standard Book Number: 0-658-00017-9 (cloth)

0-658-00018-7 (paper)

00 01 02 03 04 05 VL 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

Acknowledgments

The author would like to thank the following people for providing information about their careers.

- J. G. Barr, automotive mechanic
- Pete Bennett, elevator mechanic
- Stan Clay, aircraft maintenance supervisor
- Robert Cravey, Jr., airframe and powerplant mechanic
- Adam Dodds, tractor mechanic
- Jim Foreman, musical instrument repairer
- Harry Forman, automotive mechanic
- Juan Garcia, heavy equipment mechanic
- Thérèse Heckel, switching equipment technician
- Robert Holland, owner of a vending machine sales and repair business
- Michael John, computer bench technician
- Troy Scott McClure, owner of a refrigeration, heating, and air conditioning business
- Roger Pryor, transmission builder
- Joe Robertson, small engine mechanic
- Michael Sanchez, owner of a power tool sales and repair business
- Thomas Walker, field maintenance worker
- Kirk Woodruff, heavy equipment mechanic

How to Use This Book

On the Job: Real People Working in Mechanics, Installation, and Repair is part of a series of career books designed to help you find essential information quickly and easily. Unlike other career resources on the market, books in the *On the Job* series provide you with information on hundreds of careers, in an easy-to-use format. This includes information on:

- the nature of the work
- working conditions
- employment
- training, other qualifications, and advancement
- job outlooks
- earnings
- related occupations
- sources of additional information

But that's not all. You'll also benefit from a first-hand look at what jobs are really like, as told in the words of the employees themselves. Throughout the book, one-on-one interviews with dozens of practicing professionals enrich the text and enhance your understanding of life on the job.

These interviews tell what each job entails, what the duties are, what the lifestyle is like, and what the upsides and downsides are. All of the professionals reveal what drew them to the field and how they got started. And to help you make the best career choice for yourself, each professional offers you some expert advice based on years of personal experience.

Each chapter also lets you see at a glance, with easy-to-use reference symbols, the level of education required and salary range for the featured occupations.

So, how do you use this book? Easy. You don't need to run to the library and bury yourself in cumbersome documents from the Bureau of Labor Statistics, nor do you need to rush out and buy a lot of bulky books you'll never plow through. All you have to do is glance through our extensive table of contents, find the fields that interest you, and read what the experts have to say.

Introduction to the Field

If you like to work with your hands and are good at it, chances are you're already considering a career in which you can put your talents to good use. Jobs in mechanics, repair, and installation are plentiful and can allow you to make a good living doing something you love.

Glancing through this book's table of contents will give you an idea of all the choices open to you in these fields. But perhaps you're not sure of the working conditions the different areas offer or which area would best suit your personality, skills, and lifestyle. There are several factors to consider when deciding which sector to pursue. Each field carries with it different skill levels and responsibility. To identify occupations that will match your expectations, you need to know what each job entails.

Ask yourself the following questions and make note of your answers. Then, as you go through the following chapters, compare your requirements to the information provided by the professionals interviewed inside. Their comments will help you pinpoint the areas that would interest you and eliminate those that would clearly be the wrong choice.

- How much time are you willing to commit to training? Some skills can be learned on the job; others can take much longer and require a year or more of formal training.
- How much of a people person are you? Some jobs, such as aircraft mechanic, offer few opportunities for personal contact; other positions, such as vending machine repairer, require significant interaction with others.
- How much time away from home are you willing to spend? Some jobs will have you working odd and long hours, while others will give you free weekends.

- How much money do you expect to earn as a beginner, and then as an employee with a few years' experience? In general, those areas that pay the most also require the largest investment of time for training.
- Will the work offer enough challenge? Will it provide you with a sense of accomplishment, or will it become tedious after you've learned the ropes?
- How much independence do you require? Do you want to be your own boss, or will you be content as a salaried employee?
- How much stress can you handle? Would you prefer to avoid work that could be emotionally draining?

Knowing what your expectations are and comparing them to the realities of particular jobs will help you make informed choices.

Although *On the Job: Real People Working in Mechanics, Installation, and Repair* strives to be as comprehensive as possible, not all jobs in this extensive field have been covered or given the same amount of emphasis. If you still have questions after reading this book, there are a number of other avenues to pursue. You can get more information by contacting the sources listed at the end of each chapter. You can also find professionals on your own to talk to and observe as they go about their work. Any remaining gaps you discover can be filled by referring to the *Occupational Outlook Handbook*, available in most libraries online at <http://stats.bls.gov/ocohome.htm>.

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CHAPTER 1 Aircraft Mechanics

EDUCATION

H.S. Preferred
License (Other)

SALARY

\$23,000 to \$48,000

OVERVIEW

To keep aircraft in peak operating condition, aircraft mechanics and engine specialists perform scheduled maintenance, make repairs, and complete inspections required by the Federal Aviation Administration (FAA).

Many aircraft mechanics specialize in preventive maintenance. Following a schedule based on the number of hours the aircraft has flown, calendar days, cycles of operation, or a combination of these factors, mechanics inspect the engines, landing gear, instruments, pressurized sections, accessories (brakes, valves, pumps, and air conditioning systems, for example), and other parts of the aircraft and do the necessary maintenance. They may examine an engine through specially designed openings while working from ladders or scaffolds, or use hoists or lifts to remove the entire engine from the craft. After taking the engine apart, mechanics may use precision instruments to measure parts for wear, and use X-ray and magnetic inspection equipment to check for invisible cracks. Worn or defective parts are repaired or replaced. They also may repair sheet metal or composite surfaces, measure the tension of control cables, or check for corrosion, distortion, and cracks in the fuselage, wings, and tail. After completing all repairs, mechanics must test the equipment to ensure that it works properly.

Mechanics specializing in repair work rely on the pilot's description of a problem to find and fix faulty equipment. For example, during a preflight check, a pilot may discover that the aircraft's fuel gauge does not work. To solve the problem, mechanics may check the electrical connections, replace the gauge, or use electrical test equipment to make sure no wires are broken or shorted out. They work as fast as safety permits so that the aircraft can be put back into service quickly.

Mechanics may work on one type or many different types of aircraft, such as jets, propeller-driven airplanes, and helicopters; or, for efficiency, they may specialize in one section of a particular type of aircraft, such as the engine, hydraulic, or electrical system. As a result of technological advances, mechanics spend an increasing amount of time repairing electronic systems such as computerized controls. They also may be required to analyze and develop solutions to complex electronic problems. In small, independent repair shops, mechanics usually inspect and repair many different types of aircraft.

Mechanics ordinarily work in hangars or in other indoor areas, though they may work outdoors—sometimes in unpleasant weather—when the hangars are full or when repairs must be made quickly. This occurs most often to airline mechanics who work at airports, because minor repairs and preflight checks might be made at the terminal to save time. Mechanics often work under time pressure to maintain flight schedules or, in general aviation, to keep from inconveniencing customers. At the same time, mechanics have a tremendous responsibility to maintain safety standards, and this can make the job stressful.

Frequently, mechanics must lift or pull objects weighing as much as seventy pounds. They often stand, lie, or kneel in awkward positions and occasionally must work in precarious positions on scaffolds or ladders. Noise and vibration are common when testing engines. Aircraft mechanics generally work forty hours a week on eight-hour shifts around the clock. Over-time work is frequent.

TRAINING

The majority of mechanics who work on civilian aircraft are certified by the FAA as *airframe mechanic*, *powerplant mechanic*, or

repairer. Airframe mechanics are authorized to work on any part of the aircraft except the instruments, powerplants, and propellers. Powerplant mechanics are authorized to work on engines and to do limited work on propellers. Repairers, who are employed by FAA-certified repair stations and air carriers, work on instruments and propellers.

Combination airframe-and-powerplant mechanics—called A&P mechanics—can work on any part of the plane, and those with an inspector's authorization can certify inspection work completed by other mechanics. Uncertified mechanics are supervised by those with certificates.

The FAA requires at least eighteen months of work experience for an airframe, powerplant, or repairer's certificate. For a combined A&P certificate, at least thirty months of experience working with both engines and airframes are required. To obtain an inspector's authorization, a mechanic must have held an A&P certificate for at least three years. Applicants for all certificates also must pass written and oral tests and demonstrate that they can do the work authorized by the certificate. Most airlines require that mechanics have a high school diploma and an A&P certificate.

Although a few people become mechanics through on-the-job training, most learn their job in one of about 192 trade schools certified by the FAA. Student enrollment in these schools varies greatly; some have as few as 50 students while at least one school has about 800 students. FAA standards established by law require that certified mechanic schools offer students a minimum of 1,900 actual class hours. Courses in these trade schools generally last from twenty-four to thirty months and provide training with the tools and equipment used on the job. For an FAA certificate, attendance at such schools may substitute for work experience. However, these schools do not guarantee jobs or FAA certificates. Aircraft trade schools are placing more emphasis on newer technologies such as turbine engines, aviation electronics, and composite materials—including graphite, fiberglass, and boron—all of which are increasingly being used in the construction of new aircraft. Less emphasis is being placed on older technologies such as wood-working and welding. Employers prefer mechanics who can perform a wide variety of tasks. Mechanics learn many different skills in their training that can be applied to other jobs.

Some aircraft mechanics in the armed forces acquire enough general experience to satisfy the work experience requirements for the FAA certificate. With additional study, they may pass the certifying exam. Generally, however, jobs in the military are too specialized to provide the broad experience required by the FAA. Most mechanics have to complete the entire training program at a trade school, although a few receive some credit for the material they learned in the service. In any case, military experience is a great advantage when seeking employment; employers consider trade school graduates who have this experience to be the most desirable applicants.

Courses in mathematics, physics, chemistry, electronics, computer science, and mechanical drawing are helpful because many of their principles are involved in the operation of an aircraft, and knowledge of the principles often is necessary to make repairs. Courses that develop writing skills are also important because mechanics are often required to submit reports.

As new and more complex aircraft are designed, more employers are requiring mechanics to take ongoing training to update their skills. Recent technological advances in aircraft maintenance necessitate a strong background in electronics for both acquiring and retaining jobs in this field. New FAA certification standards will make ongoing training mandatory. Every twenty-four months, mechanics will be required to take at least sixteen hours of training to keep their certificate. Many mechanics take courses offered by manufacturers or employers, usually through outside contractors.

Aircraft mechanics must do careful and thorough work that requires a high degree of mechanical aptitude. Employers seek applicants who are self-motivated, hard-working, enthusiastic, and able to diagnose and solve complex mechanical problems. Agility is important for the reaching and climbing necessary for the job. Because they may work on the top of wings and fuselages on large jet planes, aircraft mechanics must not be afraid of heights.

As aircraft mechanics gain experience, they have the opportunity for advancement. Opportunities are best for those who have an aircraft inspector's authorization. A mechanic may advance to lead mechanic (or crew chief), inspector, lead inspec-

tor, or shop supervisor. In the airlines, where promotion is often determined by examination, supervisors may advance to executive positions. Those with broad experience in maintenance and overhaul have become inspectors with the FAA. With additional business and management training, some open their own aircraft maintenance facilities.

JOB OUTLOOK

Aircraft mechanics held about 137,000 jobs in 1996. Over three-fifths of all salaried mechanics worked for airlines, nearly one-fifth for aircraft assembly firms, and nearly one-sixth for the federal government. Most of the rest were general aviation mechanics, the majority of whom worked for independent repair shops or companies that operate their own planes to transport executives and cargo. Very few mechanics were self-employed.

Most airline mechanics work at major airports near large cities. Civilian mechanics employed by the armed forces work at military installations. A large proportion of mechanics who work for aircraft assembly firms are located in California or Washington. Others work for the FAA, many at the facilities in Oklahoma City, Atlantic City, or Washington, D.C. Mechanics for independent repair shops work at airports in every part of the country.

There should be an improved outlook for aircraft mechanics over the next ten years. The smaller numbers of younger workers in the labor force, together with fewer entrants from the military and a larger number of retirements, should mean more favorable employment conditions for students just beginning training.

Job prospects for aircraft mechanics are expected to vary among types of employers. Opportunities are likely to be the best at the smaller commuter and regional airlines, at FAA repair stations, and in general aviation. Because wages in these companies tend to be relatively low, there are fewer applicants for these jobs than for jobs with the major airlines. Also, some jobs will become available as experienced mechanics leave for