DOCUMENT RESUME

ED 158 120 CE 017 770

TITLE	Air and Water Transportation Occupations. Reprinted from the Occupational Outlook Handbook, 1978-79 Edition.
INSTITUTION	Bureau of Labor Statistics (DOL), Washington, D.C.
REPORT NO	Bull-1955-16
PUB DATE	78
NOTE	25p.; Photographs in this document will not reproduce well; For related documents see CE 017 756-797
AVAILABLE FROM	Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 ($0.50 per reprint; $8.00 for set of 42)
EDRS PRICE	MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS	Aircraft Pilots; *Employment Opportunities; *Employment Projections; *Employment Qualifications; Employment Trends; Government Employees; Information Sources; Job Skills; Job Training; *Occupational Information; Occupational Mobility; Promotion (Occupational); Salaries; *Transportation; Travel; Wages; Work Environment
IDENTIFIERS	*Aircraft Personnel; Air Traffic Controllers; *Merchant Marines

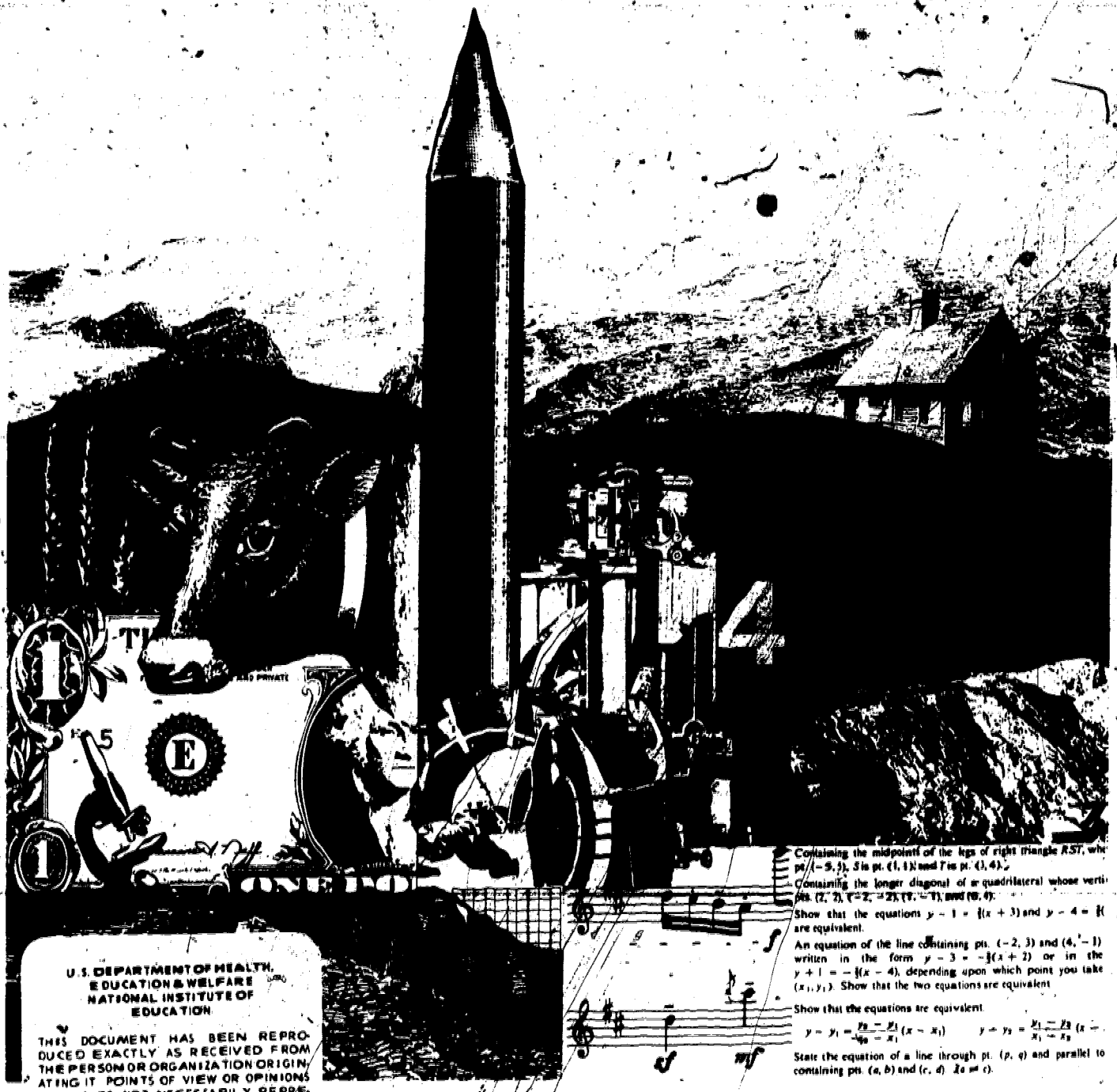
ABSTRACT

Focusing on air and water transportation occupations, this document is one in a series of forty-one reprints from the Occupational Outlook Handbook providing current information and employment projections for individual occupations and industries through 1985. The specific occupations covered in this document include civil aviation workers, air traffic controllers, air plane mechanics, airplane pilots, flight attendants, reservation/ticket/passenger agents, and occupations in the merchant marine industry. The following information is presented for each occupation or occupational area: a code number referenced to the Dictionary of Occupational Titles; a description of the nature of the work; places of employment; training, other qualifications, and advancement; employment outlook; earnings and working conditions; and sources of additional information. In addition to the forty-one reprints covering individual occupations or occupational areas (CE 017 757-797), a companion document (CE 017 756) presents employment projections for the total labor market and discusses the relationship between job prospects and education. (BM)

Air and Water Transportation Occupations

Reprinted from the
Occupational Outlook Handbook,
1978-79 Edition.
U.S. Department of Labor
Bureau of Labor Statistics
1978

Bulletin 1955-16



Containing the midpoint of the legs of right triangle *RST*, whe
pt. $(-5, 3)$, S is pt. $(1, 1)$ and T is pt. $(3, 4)$.

Containing the longer diagonal of a quadrilateral whose verti
pts. $(2, 2)$, $(-2, -2)$, $(5, -1)$, and $(0, 4)$.

Show that the equations $y - 1 = \frac{1}{2}(x + 3)$ and $y - 4 = \frac{1}{2}($ are equivalent.

An equation of the line containing pts. $(-2, 3)$ and $(4, -1)$ written in the form $y - 3 = -\frac{1}{2}(x + 2)$ or in the $y + 1 = -\frac{1}{2}(x - 4)$, depending upon which point you take (x_1, y_1). Show that the two equations are equivalent.

Show that the equations are equivalent.

$y - y_1 = \frac{y_2 - y_1}{x_2 - x_1}(x - x_1)$ $\quad y + y_2 = \frac{y_1 - y_2}{x_1 - x_2}(x -$

State the equation of a line through pt. (p, q) and parallel to containing pts. (a, b) and (r, d). $\exists a \neq c$.

CIVIL AVIATION

The rapid development of air transportation has increased the mobility of the population and has created many thousands of job opportunities in the civil aviation industry. In 1976 over 425,000 people were employed in a variety of interesting and responsible occupations in this industry.

Characteristics of the Industry

Many different organizations and activities are involved in civil aviation. The most familiar are airlines that provide transportation for passengers and cargo. Airlines account for almost four times as much intercity passenger travel as buses and railroads combined. Other commercial transportation is provided by air taxi companies that use small planes to provide passenger and cargo service, often to and from small airports not serviced by the airlines.

The civil aviation industry includes other kinds of flying activities. For example, many businesses transport executives in company planes. Some firms and individuals use their own planes for crop dusting, inspecting pipelines, and other activities. The government-licensed shops that repair and inspect smaller airplanes also are included in the industry.

The Federal Aviation Administration (FAA) and the Civil Aeronautics Board (CAB)—both part of the Federal Government—regulate the civil aviation industry. The FAA develops air safety regulations, coordinates flights, operates ground navigation equipment, and licenses some personnel, including pilots and aircraft mechanics. The CAB makes policy on airline rates and routes.

In 1976, about 303,000 employees worked for the airlines. Most of the remaining civil aviation employees worked for air taxi companies, for firms that use airplanes to transport executives, and for firms that rent, service, or repair aircraft. The rest worked for the Federal Government; in 1976, the FAA employed about 58,000 people, the CAB less than 1,000.

About half of all airline employees work at airports near New York, Miami, Los Angeles, San Francisco, Chicago, Atlanta, and Dallas, the cities where major airlines are based. Others work at airports scattered throughout the country. Most other civil aviation employees work at airports near large cities.

Civil Aviation Occupations

Over two-thirds of all civil aviation employees work in ground occupations. Many of these are mechanics and aircraft maintenance personnel who refuel, clean, inspect, and repair the planes between flights. Other large groups make reservations and sell tickets for the airline companies. Some are air traffic controllers and flight service specialists for the FAA. Flight service specialists assist pilots before the flight by suggesting routes and altitudes and providing them with information on their particular area, such as terrain and weather peculiarities. Other groundworkers include cargo and freight handlers, dispatchers, and clerical, administrative, and professional personnel.

Flight crewmembers make up the remaining one-third of civil aviation employment. They include the pilots who fly the planes and the flight attendants who assist passengers. Detailed discussions of most of the principal occupations in civil aviation are presented elsewhere in the *Handbook* in the section on Air Transportation Occupations.

Training, Other Qualifications, and Advancement

Jobs are available to persons with a wide variety of training and backgrounds. Some jobs require previous training and may require certificates

Over two-thirds of all civil aviation employees work in ground occupations.

Reservation agents use computer terminals to make reservations.

Controllers at an air traffic control center coordinating flights to prevent collisions.

from the FAA. Others can be learned on the job.

Pilots must have a commercial pilot's license from the FAA when they begin work. Many also have an air transport license. They must have an instrument license to fly when the weather is bad. As a rule new airline pilots begin as flight engineers and must have a flight engineer's license.

Interested persons may obtain pilot training from military or civilian flying schools. Physical requirements are strict. With or without glasses, pilots must have 20/20 vision, good hearing, and no physical handicaps that prevent quick reactions. In addition, airlines generally require 2 years of college and prefer college graduates. Advancement for pilots usually is limited to better flying jobs.

Applicants for flight attendant jobs must be in excellent health, and those who have some college and have experience in dealing with the public are preferred. Applicants are trained for their jobs at company schools. Advancement opportunities are limited, although some attendants become customer service directors, instructors, or recruiting representatives.

When hiring airplane mechanics, employers prefer graduates of airplane mechanic trade schools who are in good physical condition. Most mechanics remain in the maintenance field, but they may advance to head mechanics, inspectors, and in a few cases, to supervisory and executive positions. Some jobs require aircraft mechanics to be certified by the FAA.

New reservation, ticket, and passenger agents are trained by the company. A good speaking voice and a pleasant personality are necessary, because these workers deal directly with the public. A high school education is required.

Air traffic controllers work for the FAA and are selected through the competitive Federal Civil Service System. Applicants must pass a rigid physical examination and a written test. The FAA trains new workers on the job and at the FAA Academy. All workers must be certified by FAA examiners before they can work as controllers. Controllers can advance to supervisory positions and to higher management jobs in air traffic control.

Completion of commercial courses in high school or business school is usually adequate for entry into general clerical occupations such as secretary or typist. However, additional on-the-job training is needed for specialized clerical occupations such as bookkeeper.

Administrative and sales positions usually are filled by college graduates who have majored in business administration, marketing, accounting, industrial relations, or transportation. Some companies have management training programs for college graduates in which trainees work for brief periods in various departments to get a broad picture of air transportation operations before they are assigned to a particular department.

Employment Outlook

The total number of workers in civil aviation occupations is expected to increase about as fast as the average for all occupations through the mid-1980's. Besides the job openings that will be created by employment growth, many openings will arise as experienced workers retire, die, or transfer to other fields of work. Job opportunities may vary from year to year, however, because the demand for air travel fluctuates with ups and downs in the economy.

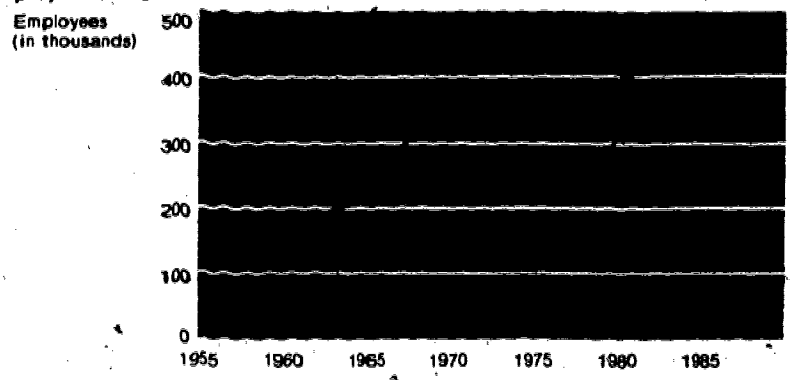
Airline employment is expected to increase as passenger and cargo traffic grows in response to increases in population, income, and business activity. Employment in other civil aviation activities is expected to rise as more aircraft are purchased for business, agricultural, and recreational purposes.

Earnings and Working Conditions

Airline employees earned an average of $20,900 a year in 1976, over twice the average for all nonsupervisory workers in private industry, except farming. Among the major occupations, salaries ranged from $800 a month for new reservation agents to $6,500 a month for experienced airline captains. As an additional benefit, airline employees and their immediate families are entitled to reduced-fare transportation with their own and most other airlines.

Employment in civil aviation is expected to experience moderate long-term growth, following a rapid increase during the late 1960's

Wage and salary workers in transportation by air, 1958-76 and projected 1985



Source: Bureau of Labor Statistics

Because airlines operate flights at all hours of the day and night, personnel in some occupations often have odd hours or work schedules. Flight and ground personnel may have to work at night, on weekends, or holidays. Flight personnel also may be away from home bases about one-third of the time or more. When they are away from home, the airlines provide hotel accommodations. Ground personnel usually work a 5-day, 40-hour week. They generally receive extra pay for overtime work or an equal amount of time off.

Sources of Additional Information

For information about job opportunities in a particular airline, write to the personnel manager of the company. Addresses of companies are available from:

Air Transport Association of America, 1709 New York Ave. NW., Washington, D.C. 20006.

For information about FAA-approved schools that offer training for airplane mechanics, pilots, or other technical occupations in aviation, write to:

Research and Inquiry Division, Office of Information Service AIS-230, Federal Aviation Administration, Washington, D.C. 20591

AIR TRAFFIC CONTROLLERS

(D.O.T. 193.168)

Nature of the Work

Air traffic controllers are the guardians of the airways. Controllers keep track of planes flying within their assigned area, giving pilots instructions that will keep the planes separated. Their immediate concern is safety, but within this framework, controllers must direct planes efficiently to minimize delays. Some regulate airport traffic; others regulate flights between airports.

From the control tower, airport traffic controllers can see the planes that are on the ground and in the air nearby. Planes that are farther away or at a higher altitude show up on the radar screen. As planes approach an airport, pilots radio ahead to inform the tower of their presence and request permission to land. If the way is clear, controllers direct the pilots to a runway; if the airport is busy, controllers fit the plane into a traffic pattern with other aircraft waiting to land. They also provide pilots with information about conditions at the airport, such as the weather, the speed and direction of the wind, and the visibility. Controllers constantly observe the planes under their direction, and if a controller notices that two planes are on a collision course, one of the pilots will be instructed to turn or change altitude.

A similar procedure is used for takeoffs. If necessary, a temporary break in traffic is arranged, the plane is instructed to depart, and a controller observes it on radar to guide the pilot around other planes.

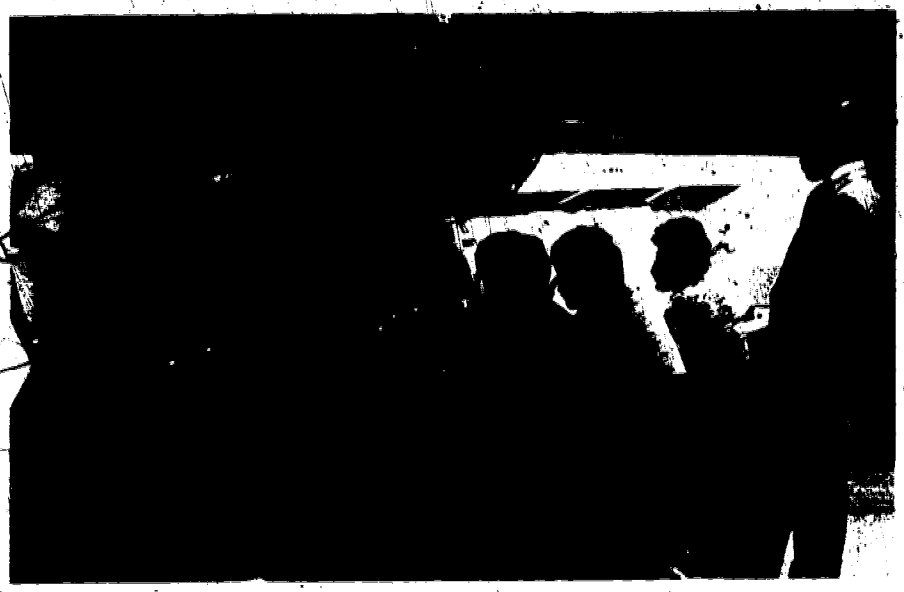
After each plane departs, airport traffic controllers notify the enroute controllers who will be next to take charge. There are 25 enroute control centers located around the country. Enroute controllers work in teams of two or three. Because airplanes generally fly along specially designated routes, each team is assigned a certain amount of airspace along one of these routes. A team, for example, might be responsible for all planes that are between 30 to 100 miles north of the airport and flying at an altitude between 6,000 and 18,000 feet.

When a plane enters a team's airspace, one controller communicates with the pilots by radio and follows the plane's flight path on radar. The remaining team members prepare for other planes about to enter their area by communicating with neighboring control towers and adjacent centers, and organizing flight plans coming over teletype machines and computer displays. These plans were filed by pilots and provide controllers with information such as when a plane will enter the team's airspace and at what altitude.

Enroute controllers also warn pilots about nearby planes, bad weather conditions, and other possible hazards. If two planes are on a collision course they will be directed around each other. Or if a pilot wants to change altitude in search of better flying conditions, the controller will check to determine that no other planes will be along the proposed path during the altitude change.

As the flight progresses, the team responsible for the aircraft notifies the next team that will be in charge. Through this coordination, one team after another watches over the plane until it safely arrives at its destination.

Controllers usually have several planes under their control at one



Controllers coordinate flight activities to prevent accidents and expedite takeoffs and landings.

time, and often have to make quick decisions about completely different activities. For example, an airport controller might be directing a plane on its landing approach, and at the same time be providing pilots just entering the airport's airspace with information about conditions at the airport. While instructing these pilots, the controller also would be observing other planes in the vicinity, such as those in a holding pattern waiting for permission to land, to determine that they remain well separated.

Places of Employment

The sole employer of civilian air traffic controllers is the Federal Aviation Administration (FAA). About 21,000 persons worked as air traffic controllers in 1976, mostly at major airports and air route traffic control centers located near large cities.

Training, Other Qualifications, and Advancement

Air traffic controller trainees are selected through the competitive Federal Civil Service System. Applicants must be less than 31 years old and must pass a written test that measures their ability to learn and perform the controller's duties. In addition, applicants must have 3 years of general work experience or 4 years of college, or a combination of both. Applicants with sufficient experience as military controllers, pilots, or navigators may be hired without taking the written test. Applicants must be in excellent health and have vision correctable to 20/20.

Potential controllers should be articulate, since directions to pilots must be given quickly and clearly. A quick and retentive memory also is important because controllers constantly receive information about the planes under their direction which they must immediately grasp, interpret, and remember for a short period. A decisive personality is an asset, since controllers often have to make rapid decisions.

Successful applicants receive a combination of on-the-job and formal training to learn the fundamentals of the airway system, Federal aviation regulations, controller equipment, and aircraft performance characteristics. They receive approximately 16 weeks of intensive training, including practice on simulators, at the FAA Academy in Oklahoma City. It usually takes 2 to 3 years of progressively more responsible work experience to become a fully qualified controller. Each year, controllers must pass a physical examination; they must pass a job performance examination twice each year.

Controllers can transfer to jobs at different locations and advance to supervisory positions. Some advance to more responsible management jobs in air traffic control and a few to top administrative jobs in the FAA.

Employment Outlook

Employment of air traffic controllers is expected to increase faster than the average for all occupations through the mid-1980's. In addition to openings resulting from growth, many others will arise as experienced controllers retire, die, or leave the occupation for other reasons. Competition for jobs should be keen, however, because the number of qualified applicants is expected to be much greater than the number of openings.

As the number of aircraft increases, the skyways will become more congested and more controllers will be needed. Also, to prevent collisions, the FAA has created spaces near certain airports and above certain altitudes which require all pilots to receive directions from air traffic controllers. If, as expected, the number and size of these spaces are expanded, additional controllers will be needed despite the greater use of new, automated control equipment.

College graduates who have civilian or military experience as controllers, pilots, or navigators, will have the best employment opportunities.

Earnings and Working Conditions

In 1976 controller trainees earned $11,500 a year; the average earnings for all controllers was $22,300 a year, or over twice the average for all nonsupervisory workers in private industry, except farming. Depending on length of service, they receive 13 to 26 days of paid vacation and 13 days of paid sick leave each year, life insurance, health benefits, and, due to the stress involved in the work, a more liberal retirement program than other Federal employees.

Controllers work a basic 40-hour week; however, they may work additional hours for which they receive overtime pay or equal time off. Because control towers and centers must be operated 24 hours a day, 7

days a week, controllers are assigned to night and weekend shifts on a rotating basis.

Air traffic controllers sometimes work under great stress. They must keep track of several planes at the same time and make certain all pilots receive correct instructions.

Many controllers belong to the Professional Air Traffic Controllers Organization.

Sources of Additional Information

A pamphlet providing general information about controllers and instructions for submitting applications is available from any U.S. Civil Service Commission Job Information Center. Look under U.S. Government, Civil Service Commission, in your telephone book to obtain a local Job Information Center telephone number and call for a copy of Announcement 418. If there is no listing in your telephone book, dial the toll-free number 800-555-1212 and request the toll-free number of the U.S. Civil Service Commission Job Information Center for your location.

AIRPLANE MECHANICS

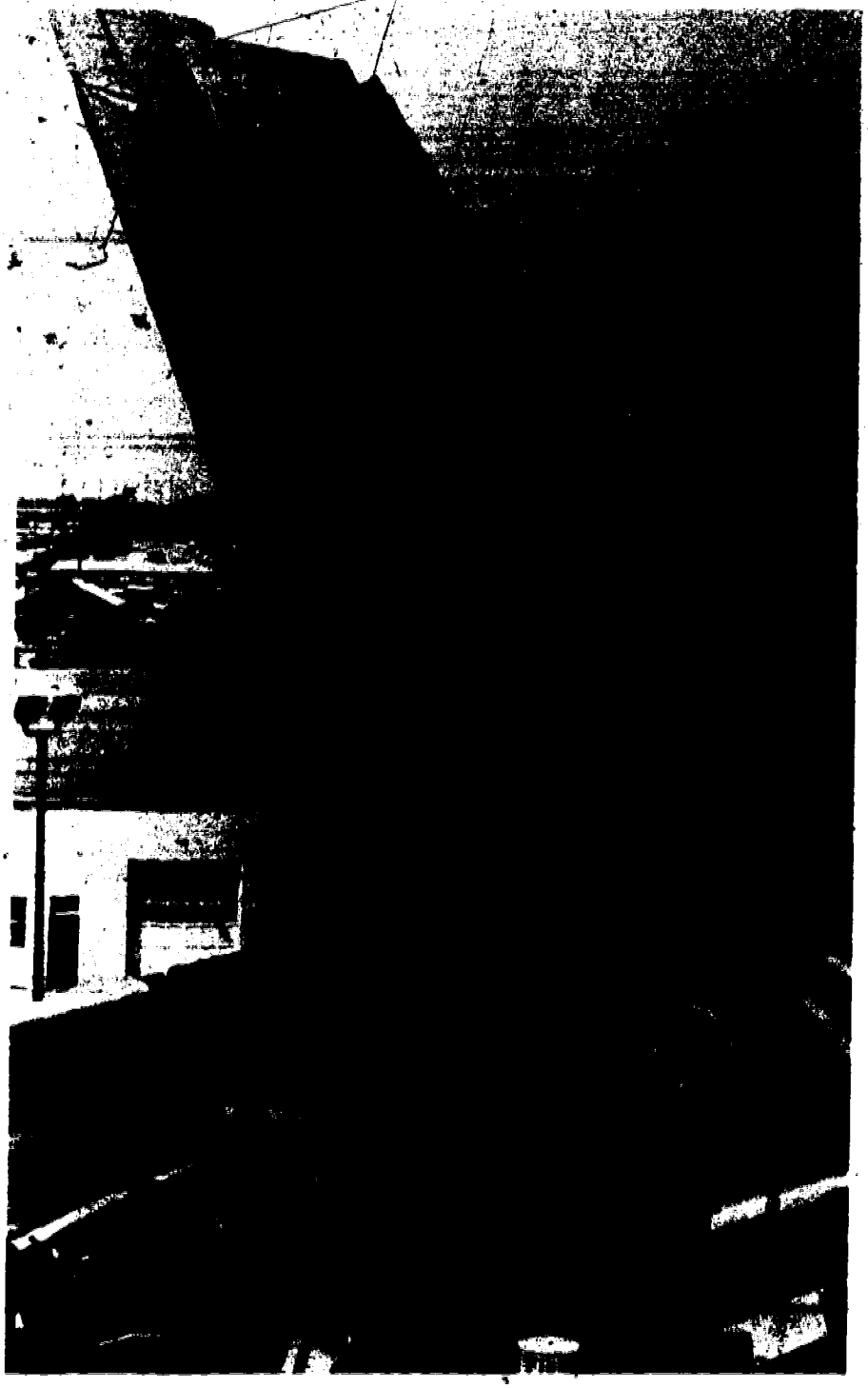
(D.O.T. 621.281)

Nature of the Work

Today most travelers hardly think twice about flying thousands of feet above the ground. The confidence travelers have in airplanes is a tribute to the mechanics who maintain them. Airplane mechanics perform scheduled maintenance, make repairs, and complete inspections required by the Federal Aviation Administration (FAA).

In order to keep planes in top operating condition, many mechanics specialize in scheduled maintenance. Using a schedule that is based on the number of flight hours, calendar days, or a combination of these factors, the planes are inspected and necessary maintenance is performed. Mechanics may examine engines through specially designed openings, working from ladders or scaffolds, or use hoists or lifts to remove the entire engine from the planes. Mechanics may take engines apart, measure the parts for wear with delicate instruments, check for invisible cracks with X-ray and magnetic inspection equipment, and replace worn parts. They also may repair sheet-metal surfaces, measure the tension of control cables, or check for rust, distortion, and cracks in parts of fuselages and wings. After making repairs, mechanics test the equipment to make sure the repairs were made properly.

Some mechanics specialize in repair work and use the pilot's descrip-



The confidence travelers have in airplanes is a tribute to the mechanics who maintain them.

tion of a problem to find and fix faulty equipment. For example, during the pre-flight check of the airplane, a pilot may discover that the gas 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. They work as fast as safety permits so that the plane can be put back into service quickly.

Mechanics may work on many types of airplanes, on one type of plane, or they may specialize in working on one section of the plane, such as engines or electrical systems. At small airports, mechanics usually make all kinds of inspections and repairs on many different types of aircraft.

Places of Employment

About 110,000 airplane mechanics were employed in 1976, not including about 30,000 who worked in aircraft manufacturing firms assembling airplanes. Over one-half worked for airlines and about one-third worked for the Federal Government. The rest were general aviation mechanics, most of whom worked for small repair shops or companies that operate their own planes to transport executives and cargo.

Most airline mechanics work near large cities at the airlines' main stops. Many employees of the Federal Government are civilians employed by the military and work at large military bases. Others work for the FAA, many in the headquarters at Oklahoma City. Mechanics for small repair shops work at airports in every part of the country.

Training, Other Qualifications, and Advancement

The majority of mechanics who work on civilian aircraft are licensed by the FAA as "airframe mechanics," "powerplant mechanics," or "aircraft inspectors." Airframe mechanics are qualified to work on the fuselage, wings, landing gear, and other structural parts of the plane, while powerplant mechanics are qualified only for work on the engine. Combination airframe-and-powerplant mechanics can work on any part of the plane, and those with an inspector's license can certify inspection work completed by other mechanics. Unlicensed mechanics are supervised by those with licenses.

At least 18 months of work experience are required for an FAA airframe or powerplant license; for a combined license, at least 30 months of experience working with both engines and airframes are required. To obtain an inspector's license, a mechanic must have held an airframe-and-powerplant license for at least 3 years. Applicants for all licenses also must pass written and oral tests and give practical demonstrations of their ability to do the work authorized by the license.

Most mechanics learn their job in the Armed Forces or in trade schools certified by the FAA. Courses in these trade schools last about 2 years and provide training with the tools and equipment mechanics will use on the job. Attendance at such schools may be used as a substitute for work experience when applying for an FAA license. However, these schools do not guarantee students jobs or FAA licenses. People who were aircraft mechanics in the Armed Forces usually have earned credit towards the work experience and other requirements of the license. They usually attend a shorter program at one of the trade schools to learn the material specific to civilian aircraft, before taking the licensing test.

A few people become mechanics through on-the-job training. For these trainee jobs, employers prefer high school graduates who are in good physical condition. Experience in automotive repair or other mechanical work is helpful.

Courses in mathematics, physics, chemistry, and mechanical drawing are helpful for all prospective mechanics because knowledge of the principles involved in the operation of an aircraft often is necessary in order to learn how to make repairs.

Aircraft mechanics must be able to do detailed work and have the strength to lift heavy parts and tools. Agility is important for the reaching and climbing that are necessary to the job. Aircraft mechanics must be willing to work in high places, such as on the top of wings and fuselages on large jet planes.

As aircraft mechanics gain experience, they can advance to more responsible jobs. Opportunities are best for those who have an airframe-and-powerplant license, as well as an aircraft inspector's license. The avenue of advancement usually is mechanic to head mechanic (or crew chief), to inspector, to head inspector, to shop supervisor. In airline companies, a few supervisors may advance to executive positions. With additional business training, some may open their own repair shops.

Employment Outlook

The number of aircraft mechanics is expected to increase faster than the average for all occupations through the mid-1980's. In addition to jobs resulting from growth, many job openings will result from the need to replace mechanics who transfer to other fields of work, retire, or die. However, job opportunities in general aviation, airline companies, and the Federal Government will differ.

Job opportunities in general aviation are expected to be good. The number of aircraft used by companies for executive transportation is expected to grow rapidly, thus increasing the demand for mechanics. Since wages in small companies frequently are low, there is less competition for jobs than in the airlines. Also, some additional jobs will become available as experienced mechanics leave for better paying jobs with airlines or large private companies. Although employers in general aviation prefer applicants with an airframe-and-powerplant license from the FAA, some trainee jobs are available.

In contrast with general aviation, competition for airline jobs will be keen because the high wages attract more qualified applicants than there are jobs available. A growing population and rising incomes are expected to increase the demand for airline transportation and, as airlines add more planes to meet this demand, more mechanics will be needed. However, the introduction of larger planes, combined with the recent

slowdown in air traffic, has led to a temporary decrease in the need for airline mechanics. Therefore, in the near future, many of the new jobs will be taken by experienced airline mechanics now on furlough.

Little change in the number of mechanics employed by the Federal Government is expected. Opportunities will fluctuate with changes in defense spending.

Earnings and Workings Conditions

In 1976, annual earnings of airline mechanics averaged $23,061, about 2 1/2 times the average for all nonsupervisory workers in private industry, except farming. As an additional benefit, airline mechanics and their immediate families receive reduced fare transportation with their own and most other airlines.

Mechanics usually work in hangars or in other indoor areas. However, when repairs must be made quickly, they may work outdoors. Mechanics sometimes must stand or lie in awkward positions when making repairs. Work areas are noisy when engines are being tested.

Mechanics employed by most major airlines are covered by union agreements. The principal unions in this field are the International Association of Machinists and Aerospace Workers and the Transport Workers Union of America. Some mechanics are represented by the International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers of America.

Sources of Additional Information

For general information about airplane mechanics, write to:

Aviation Maintenance Foundation, P.O. Box 739, Basin, Wyo. 82410.

Information about jobs in a particular airline may be obtained by writing to the personnel manager of the company. For addresses of airline companies, write to:

Air Transport Association of America, 1709 New York Ave. NW., Washington, D.C. 20006.

For information on jobs in a particular area, contact employers at local airports or local offices of the State employment service.

AIRPLANE PILOTS

(D.O.T. 196.168, .228, .268, and .283)

Nature of the Work

Pilots are skilled, highly trained professionals who fly planes to carry out a wide variety of tasks. Although most pilots transport passengers and cargo, many others perform tasks such as crop dusting, inspecting power lines, and taking photographs.

Except on small aircraft, two pilots usually are needed to fly the plane. Generally, the most experienced pilot (called captain by the airlines) is in command and supervises any other crew members on board. The copilot assists in communicating with air traffic controllers, monitoring the instruments, and flying the plane. Most large airliners have a third pilot in the cockpit who serves as flight engineer. The flight engineer assists the other pilots by monitoring and operating many of the instruments, making minor inflight repairs, and looking out for other aircraft.

Before departure, pilots plan their flights carefully. They confer with dispatchers and weather forecasters to find out about weather conditions on route and at their destination. Based on this information, they choose a route, altitude, and speed that will give a fast, safe, and smooth flight. It is the responsibility of the pilot in command to inform air traffic control of the flight plan so that the flight can be coordinated with other air traffic.

Before taking off, pilots thoroughly check their planes to determine that the engines, controls, instruments, and other components are

Before takeoffs, pilots make sure all equipment is working properly.

working properly. They also make sure that baggage or cargo has been loaded correctly.

Takeoff and landing are the most difficult parts of the flight and require close coordination between the pilot and copilot. For example, as the plane accelerates for takeoff, the pilot concentrates on the runway while the copilot scans the instrument panel. The pilots already have calculated the speed they must attain to become airborne, taking into account the altitude of the airport, the weight of the plane, and the speed and direction of the wind. The moment the plane reaches this speed, the copilot informs the pilot who then pulls back on the controls to raise the nose of the plane.

Unless the weather is bad, the actual flight is relatively easy. Pilots steer the plane along their planned route, and radio their position, air speed, and other flight details to the air traffic control stations they pass along the way. They continuously scan the instrument panel to check their fuel and the condition of their engines. Pilots may request a change in altitude or route if circumstances dictate. For example, if the weather briefing led the pilots to expect a smoother ride than is being experienced, they may ask air traffic control if pilots flying at other altitudes have reported better conditions. If so, they may request a change. This procedure also may be used to find a stronger tailwind or a weaker headwind to save fuel and increase speed.

If visibility is poor, pilots must rely completely on their instruments. Using the readings on the altimeter, they know how high above ground they are and can fly safely over mountains and other obstacles. A special navigation radio gives pilots information which, with the help of special maps, tells them their exact position. Other, very sophisticated equipment provides directions to a point just above the end of a runway and enables pilots to land completely "blind."

Once on the ground, pilots must complete records on their flight for their company and the Federal Aviation Administration (FAA).

Airline pilots have the services of large support staffs and consequently perform few nonflying duties. Pilots employed by businesses that use their own aircraft, however, usually are the businesses' only experts on flying and consequently have many other duties. For example, since pilots understand the requirements for a balanced plane, the business pilot loads the plane and handles all passenger luggage. While the plane is being refueled, the business pilot stays with it to assure that the job is done properly. Other nonflying responsibilities include keeping records, scheduling flights and major maintenance, and performing minor maintenance and repair work on their planes. Some pilots are instructors and spend much of their time giving flying lessons. They teach their students the principles of flight in ground school classes and demonstrate how to operate the aircraft in "dual-controlled" planes. A few specially trained pilots are "evaluators" or "check pilots." They fly with each airline pilot and copilot at least twice a year to make sure that they are proficient.

Places of Employment

About 83,000 civilian pilots worked full time in 1976. About one-half worked for the airlines. Much of the remainder worked as flight instructors at local airports or for large businesses that use their own airplanes to fly company cargo and executives. Some pilots flew small planes for air taxi companies, usually flying passengers to or from lightly traveled airports not serviced by the airlines. Others worked for a variety of businesses performing tasks such as crop dusting, inspecting pipelines, or conducting sightseeing trips. Federal, State, and local governments also employed pilots.

Most pilots work at the major airports located close to cities. In fact, over one-third of all pilots work near seven metropolitan areas—Los Angeles, San Francisco, New York, Dallas-Fort Worth, Chicago, Miami, and Atlanta.

Training, Other Qualifications, and Advancement

All pilots who are paid to transport passengers or cargo must have at least a commercial pilot's license from the FAA. To qualify for this license, applicants must be at least 18 years old and have at least 250 hours of flight experience. They also must pass a strict physical examination to make sure that they are in good health, have 20/20 vision with or without glasses, good hearing, and no physical handicaps that prevent quick reactions. Applicants must pass a written test that includes questions on the principles of safe flight, navigation techniques, and FAA regulations; and demonstrate their flying ability to FAA examiners.

In addition to a commercial license, pilots who want to fly in bad weather must be licensed by the FAA to fly by instruments. Pilots may qualify for this license by having 40 hours of experience flying by instruments, passing a written examination on procedures and FAA regulations covering instrument flying; and demonstrating their ability to fly by instruments.

Airline pilots must fulfill additional requirements. They must pass FAA written and flight examinations to earn a flight engineer's license. Captains must have an airline transport pilot's license. Applicants for this license must be at least 23 years old and have a minimum of 1,500 hours of flying experience during the previous 8 years, including night and instrument flying.

All licenses are valid as long as a pilot can pass the required physical examinations and the periodic tests of flying skills demanded by government regulations.

Flying can be learned in military or civilian flying schools. Either kind of training satisfies the flight experience requirements for licensing, but persons serving in the Armed Forces have the opportunity to gain the substantial experience on jet aircraft that is preferred by airlines and many businesses.

Pilots hired by airlines must be high school graduates; however, most airlines require 2 years of college and prefer to hire college graduates. Because pilots must be able to make quick decisions and accurate judgments under pressure, airline companies give all applicants psychological tests and reject those who do not pass.

New airline pilots usually start as flight engineers. Although airlines favor applicants who already have a flight engineer's license, they may train those who have only the commercial license. All new pilots receive several weeks of intensive training in simulators and classrooms before being assigned to a flight.

Companies other than airlines generally do not require as much flying experience. However, a commercial pilot's license is required and companies prefer applicants who have experience in the type of plane they will be flying. New employees generally start as copilots.

Advancement for all pilots generally is limited to other flying jobs. Many pilots start as flight instructors, building up their flying hours while they teach. As they become more experienced, these pilots occasionally may have the opportunity to fly charter planes and perhaps get jobs with small air transportation firms such as air taxi companies. Some advance to business flying jobs. Only a small number get flight engineer jobs with the airlines because the airlines prefer pilots who have been trained in the military.

In the airlines, advancement usually depends on seniority provisions established by union contracts. After 5 to 10 years, flight engineers advance according to seniority to co-pilot and, after 10 to 20 years, to captain. Seniority also determines which pilots get the more desirable routes. In non-airline jobs, copilots may advance to pilot and, in large companies, to chief pilot in charge of aircraft scheduling, maintenance, and flight procedures.

Employment Outlook

Employment of pilots is expected to increase faster than the average for all occupations through the mid-1980's. In addition to the jobs from employment growth, openings will result as experienced pilots die or retire. Competition for job openings should be keen, however, because the number of qualified pilots seeking jobs is expected to exceed the number of openings.

More than half the openings for pilots will occur outside the airlines. Businesses are expected to operate an increasing number of planes and employ more pilots to fly executives and cargo to locations that the scheduled airlines do not service. More flight instructors also will be needed to train new pilots.

The expected growth in airline passenger and cargo traffic will create a need for more airliners and more pilots to fly them. The short term outlook, however, is poor. The recent slowdown in air travel combined with the introduction of bigger planes has caused a temporary decrease in the need for airline pilots. Therefore, many of the new jobs that do develop will be taken by experienced airline pilots now on furlough.

Recent college graduates who have experience flying large, multi-engine aircraft and who have a commercial pilot's license and a flight engineer's license can expect first consideration for jobs with the major airlines. Businesses generally have fewer formal education and experience requirements than airlines. However, these companies prefer applicants with flying experience in the type of plane they will be flying on the job.

Earnings and Working Conditions

Earnings of airline pilots are among the highest in the Nation. In 1976, the average salary for airline pilots was $46,253 a year. Starting salaries for flight engineers averaged $9,000 a year, while some senior captains on the largest aircraft earned more than $80,000. Earnings depend on factors such as the type, size, and speed of the planes, and the number of hours and miles flown. Extra pay is given for night and international flights. As an additional benefit, pilots and their immediate families usually are entitled to a limited amount of reduced fare transportation on their own and other airlines.

Earnings of business pilots ranged from $10,000 for copilots on small planes to $45,000 for chief pilots of companies with large jets. Most business pilots flying single-engine planes made from $14,200 to $19,000 a year while salaries of those flying jets ranged from $16,500 to $29,500. Most flight instructors made between $7,000 and $16,000 a year while annual salaries for air taxi pilots ranged from $12,000 to $17,000.

By law, airline pilots cannot fly more than 85 hours a month. Most airline pilots actually fly less than 70 hours a month and, although they have additional nonflying duty hours, usually only work 16 days a month. However, the majority of flights involve layovers away from home. When pilots are away from home, the airlines provide hotel accommodations and an allowance for expenses. Airlines operate flights at all hours of the day and night, so work schedules often are irregular. Pilots with little seniority may be assigned night or early morning flights.

Pilots employed outside the airlines often have irregular schedules; they may fly 30 hours one month and 90 hours the next. Since these pilots frequently have many nonflying responsibilities, they have much less free time than airline pilots. With the exception of business pilots, most pilots employed outside the airlines do not remain away from home overnight. They may work odd hours, however. Instructors, for example, often give lessons at night or on weekends.

Although flying does not involve much physical effort, the mental stress of being responsible for a safe flight, no matter what the weather, can be very tiring. Particularly during takeoff and landing, pilots must be alert and ready to act if something goes wrong.

Most airline pilots are members of the Air Line Pilots Association, International. Those employed by one major airline are members of the Allied Pilots Association.

Sources of Additional Information

Information about job opportunities in a particular airline, and the qualifications required, may be obtained by writing to the personnel manager of the airline. Addresses of airline companies are available in the booklet *The People of the Airlines*. For a copy, write to:

Public Relations Department, Air Transport Association of America, 1709 New York Ave. NW., Washington, D.C. 20006.

For information about the duties, as well as the physical and educational requirements for airline pilots, contact:

Air Line Pilots Association, International, 1625 Massachusetts Ave. NW., Washington, D.C. 20036.

For information about job opportunities in companies other than airlines, consult the classified section of aviation trade magazines and apply to companies that operate aircraft at local airports.

FLIGHT ATTENDANTS

(D.O.T. 352.878)

Nature of the Work

Flight attendants (also called stewardesses and stewards) are aboard almost all commercial passenger planes to help make the passengers' flight safe, comfortable, and enjoyable.

Before each flight, attendants see that the passenger cabin is in order. They check that supplies such as food, beverages, blankets, and reading material are adequate, and that first aid kits and other emergency equipment are aboard. As passengers come aboard, attendants greet them, check their tickets, and assist them by hanging up coats and stowing small pieces of luggage under the seats.

Before the plane takes off, attendants use the public address system to instruct passengers in the use of emergency equipment and check to see that all passengers have their seat belts fastened. In the air, they answer questions about the flight, distribute magazines and pillows, and help care for small children, elderly persons, and handicapped persons. On many flights, they serve cocktails and precooked meals.

One of the most important functions of attendants is to assist passengers in the rare event of an emergency. These range from a disabled engine, where passengers must be reassured, to emergency landings, where attendants evacuate the plane, opening doors and inflating emergency slides. Attendants also must be prepared to administer first aid to passengers who become ill during the flight.

Places of Employment

About 42,000 flight attendants worked for the airlines in 1976. Most attendants are stationed in major cities at the airlines' main bases; nearly three-fifths work near Chicago, Dallas, Los Angeles, Miami, New York, and San Francisco. Airliners generally carry 1 to 10 flight attendants, depending on the number of seats on the plane and the proportion of economy to first-class passengers. Large aircraft like the Boeing 747 may have as many as 16 flight attendants.

Training, Other Qualifications, and Advancement

The airlines place great stress on the hiring of poised, tactful, and resourceful people. In particular, applicants should be able to talk comfortably with strangers. As a rule, applicants must be at least 19 years old. They must be in excellent health and have good vision. Vision may be corrected with contact lenses or, on most airlines, with glasses. Applicants also must speak clearly.

Applicants must be high school graduates. Those having 2 years of college, nurses' training, or experience in dealing with the public are preferred. Flight attendants for international airlines generally must be able to speak an appropriate foreign language fluently.

Most large airlines give newly hired flight attendants about 5 weeks of training in their own schools. Transportation to the training centers and an allowance while in training may be provided. Trainees are taught how to react to emergencies, including instruction on evacuating an airplane, operating an oxygen system, and giving first aid. Attendants also are taught flight regulations and duties, and company operations and policies. Additional courses in passport and customs regulations are given to trainees for the international routes. Towards the end of their training, students go on practice flights. The few airlines that do not operate schools generally send new employees to the school of another airline.

Most airlines provide a 5-week training course for newly hired attendants.

After completing their training, flight attendants are assigned to one of their airline's main bases. New attendants usually fill in on extra flights or replace attendants who are sick or on vacation. Because assignments are based on seniority, experienced attendants usually get their choice of base and flights.

Opportunities for advancement are limited. However, some attendants may advance to flight service instructor, customer service director, instructor, or recruiting representative.

Employment Outlook

Employment of flight attendants is expected to grow much faster than the average for all occupations through the mid-1980's. In addition to growth, openings will occur because of the need to replace experienced attendants who retire, die, or transfer to other occupations.

Increases in population and income are expected to increase the number of airline passengers. To deal with this growth, airlines usually enlarge their capacity by increasing the number and size of planes in operation. Since the Federal Aviation Administration safety rules require one attendant for every 50 seats, more flight attendants will be needed. Job opportunities may vary from year to year, however, because air travel is sensitive to ups and downs in the economy.

Because the job is attractive and offers a chance to travel, many people are interested in becoming flight attendants. Applicants can expect keen competition for any available jobs because the number of applicants is expected to exceed the number of openings. Applicants with 2 years of college and experience in dealing with the public have the best chance of being hired.

Earnings and Working Conditions

The average monthly earnings of all flight attendants were $1,042 in 1976. According to a number of union contracts, salaries of most beginning flight attendants on domestic flights ranged from $690 to $780 a month, while those on international flights earned from $830 to $980. As an additional benefit, flight attendants and their immediate families are entitled to reduced fare transportation on their own and most other airlines.

Since airlines operate around the clock 365 days a year, attendants may work at night, on holidays, and on weekends. They usually fly no more than 80 hours a month, but they may devote up to 35 hours a month on the ground duties involved in preparing their planes for flights. As a result of variations in scheduling and limitations on flying time, many attendants have 15 days or more off each month. Attendants may be away from their home bases about one-third of the time or more. When they are away from home, the airlines provide hotel accommodations and an allowance for meal expenses.

Flight attendants have the opportunity to meet interesting people and see new places. The combination of free time and discount air fares provides substantial opportunity for travel. However, the work can be strenuous and trying. Many short flights require speedy service if all passengers are to be served. Poor weather can make it difficult to serve drinks and meals. Attendants stand during much of the flight and must remain pleasant and efficient regardless of how tired they may be.

Most flight attendants are members of either the Transport Workers Union of America or the Association of Flight Attendants.

Sources of Additional Information

Information about job opportunities in a particular airline and the qualifications required may be obtained by writing to the personnel manager of the company. Addresses of companies are available from:

Air Transport Association of America, 1709 New York Ave. N.W., Washington, D.C. 20006

RESERVATION, TICKET, AND PASSENGER AGENTS

(D.O.T. 912.368 and 919.368)

Nature of the Work

In any company, the attitude with which employees deal with the public and the quality of the service they provide often make the difference between a satisfied or dissatisfied customer. In airline companies, this important personal contact with the public is provided by reservation, ticket, and passenger agents. These employees reserve seats, sell tickets, and help passengers board planes.

Reservation agents work at large central offices and give customers information on flight schedules and fares over the telephone. After finding out where a customer wants to go, when, and from which airport he or she wants to leave, agents check to find out if a seat is available. Computers are used to keep track of flight space information so that agents at all reservation offices can quickly find this out.

If the plane is full, the agent may suggest an alternate flight or check with other airlines flying to the same destination. If the customer makes a reservation, the agent types his or her name and other information into the computer to prepare a ticket and reserve the space.

Ticket agents work in the airlines' downtown ticket offices or at airports. In addition to answering questions about schedules and making reservations, these agents fill out the ticket forms with the flight number, passenger's name and destination, and other necessary information. At airports and a few downtown offices they also tag passengers' luggage for shipment on the plane.

Passenger agents work only at airports and may spend much of their time helping ticket agents give information, prepare tickets, and check baggage. However, they also help passengers board planes. These agents may use the public address system to tell passengers when and where to board. At the gates, agents collect tickets and, on some flights, assign seats as well. Passenger agents also keep records of passengers on

Computers are used to keep track of flight reservation information.

[illegible] and market situations with problems such as lost or damaged baggage.

During holiday and vacation time periods ticket and passenger agents especially may find the work hectic due to the large number of passengers who must be rapidly accommodated.

Places of Employment

[illegible] In 1976 most worked in [illegible] reservation offices and at large metropolitan airports where most airline passengers consume flight miles. Some are employed in smaller communities served by airlines.

Training, Other Qualifications, and Advancement

[illegible] passenger agents must deal courteously with the public, airlines have their hiring standards concerning appearance, personality, and education. A good speaking voice is essential because these employees frequently use the telephone or public address systems. High school graduation generally is required, and some college training is preferred.

New employees begin as [illegible] ticket agents. They usually receive about a week of classroom instruction to learn how to use the flight schedule book and the computer to get information on flights and make ticket reservations. They also learn how to handle customers courteously. After completing the classroom instruction, new employees receive on-the-job training from experienced workers. About 3 weeks of experience are needed before an employee is able to handle the job without close supervision.

Advancement opportunities are limited. Reservation and ticket agents may become passenger agents. Passenger agents may advance to supervisor positions. A few eventually may become city and district managers for airline ticket offices.

Employment Outlook

Employment of reservation [illegible] passenger agents is expected to increase faster than the average for all occupations through the mid-1980's. In addition to jobs that result from growth, many openings will arise as experienced workers retire, die, or transfer to other jobs. Opportunities for employment may fluctuate from year to year, however, since the number of airline passengers varies with ups and downs in the economy. Applicants may find considerable competition for openings because a large number of people are attracted to airline jobs.

More agents will be needed because of the anticipated increase in airline passengers. Although airlines are installing machines to process reservations, keep records, and perform other routine tasks, machines cannot replace the personal contact that is an important part of a reservation, ticket, or passenger agent's job.

Earnings and Working Conditions

Passenger agents had estimated weekly earnings of $322 in 1976, according to a survey of 21 airlines. Ticket agents averaged $311 a week while reservation agents averaged $294. These earnings ranged from about one-third to one-half more than the average for all nonsupervisory workers in private industry, except farming. As an added benefit, agents and their immediate families are entitled to reduced fare air transportation with their own and many other airlines.

Agents generally work 40 hours a week. Airlines operate flights at all hours of the day and night, however, and work schedules are irregular. Agents with little seniority may work nights and weekends.

Many agents belong to labor unions. Four unions cover most of the organized agents: the International Air Line Employees Association, the Transport Workers Union of America, the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees, and the International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers of America.

Sources of Additional Information

[illegible] reservation, ticket, and cargo agents, write to:

Air Line Employees Association, 5600 S. Central Ave., Chicago, Ill. 60638

Information about jobs in a particular airline may be obtained by

writing to the personnel manager of the company. Addresses of companies are available from:

Air Transport Association of America, 1709 New York Ave. NW., Washington, D.C. 20006.

OCCUPATIONS IN THE MERCHANT MARINE INDUSTRY

In 1976, the merchant marine industry employed about 100,000 people in a variety of occupations that require different levels of skill and education. Many of these jobs are found only in the merchant marine industry.

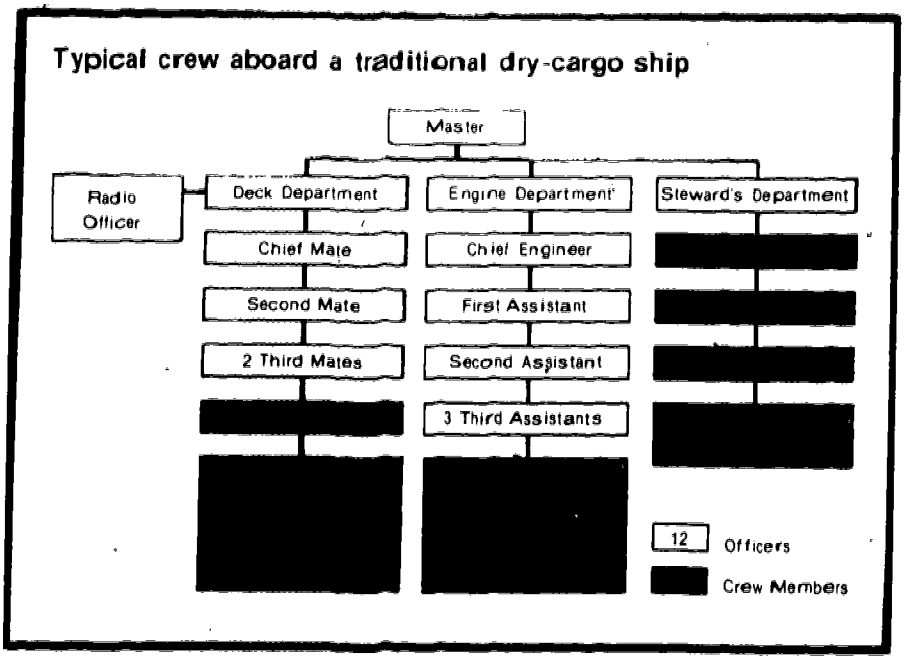
Nature and Location of the Industry

The merchant marine consists mainly of private firms that carry foreign and domestic commerce aboard oceangoing vessels. In late 1976, nearly all of the 521 ships in the active fleet were privately owned. The small number of government-owned ships in the merchant marine are operated by the Navy's Military Sealift Command (MSC) and have civilian crews.

Nearly three-fifths of the ships in our merchant fleet are freighters. These include general cargo ships and special vessels, such as roll-on-roll-off container ships. About two-fifths of the ships are tankers that carry liquid products, such as oil, mostly between the Nation's Gulf and Atlantic Coast ports. Several ships are combination passenger-cargo carriers.

Many ships operate on a regular schedule to specific ports. Others sail for any port promising cargo. The size of a crew depends on the type of vessel. Cargo ships and tankers have crews varying from 13 to 65 persons; passenger ships may have crews of 300 or more.

Most shoreside employees in the industry work in the country's major port cities, and most officers and sailors have home bases in these cities. The Nation's largest port is New York. Other major Atlantic ports are Boston, Philadelphia, Baltimore, Norfolk, Charleston, Savannah, and Jacksonville. Gulf ports that handle large volumes of cargo include New Orleans, Houston, Galveston, and Tampa. Shipping on the West Coast is concentrated in the areas of San Francisco, Los Angeles, Seattle, and Portland.



Occupations in the Industry

Almost half of the merchant marine industry's employees are officers and sailors who make up ship crews. Most of the industry's shoreside employees are dockworkers who load and unload ships. A small number of workers have administrative and clerical jobs.

Ship Crews. The *captain* (D.O.T. 197.168) or master, has complete authority and responsibility for the ship's operation, and the safety of the crew, passengers, and cargo. Under the supervision of the captain, the work aboard ship is divided among the deck, engine, and steward departments.

Deck officers (D.O.T. 197.133), under orders from the captain, direct movement of the ship and the maintenance of the deck and hull. *Boatswains* (D.O.T. 911.131) supervise deck crews and see that deck officers' orders are carried out. *Able seamen* (D.O.T. 911.884) steer the ship and report sightings to the deck officer. *Ordinary seamen* (D.O.T. 911.887), the entry rating in the deck department, do general maintenance work such as chipping rust, painting, and splicing and coiling ropes. *Deck utility hands* (D.O.T. 911.884) and *ship's carpenters* (D.O.T. 860.281) also are employed on some vessels to maintain the ship's deck and hull.

Marine engineers (D.O.T. 197.136) are responsible for starting, stopping, and controlling the speed of the main engines and the operation of all other machinery aboard ship. They also direct sailors, such as oilers and wipers, in the lubrication and maintenance of engines, pumps, and other equipment. *Oilers* (D.O.T. 911.884) lubricate moving parts of mechanical equipment. *Wipers* (D.O.T. 699.887) keep the engineroom and machinery clean. *Firers-watertenders* (D.O.T. 951.885) regulate fuel gauges and the amount of water in the boilers. The *ship's electrician* (D.O.T. 825.281) repairs and maintains electrical equipment, such as generators and motors.

The *chief steward* (D.O.T. 350.138) supervises the preparation of meals and the upkeep of living quarters aboard ship. The *chief cook* (D.O.T. 315.131) and assistant cooks prepare meals. *Utility hands* (D.O.T. 318.887) carry food supplies from the storeroom, prepare vegetables, and wash cooking utensils. *Mess attendants* (D.O.T. 350.878) set tables, serve meals, wash dishes, and care for living quarters.

Most ships employ *radio officers* (D.O.T. 193.282), who keep contact with the shore and other ships and maintain the radio equipment. Some cargo ships and all passenger vessels carry *pursers* (D.O.T. 197.168), who prepare the necessary papers to allow ships to enter or leave port.

Occupations aboard ship are discussed in detail elsewhere in the *Handbook* in the statements on merchant marine officers and merchant marine sailors.

Dock Workers. [illegible] needed to load and unload ships. Terminal managers are responsible for hiring dockworkers called *stevedores* (D.O.T. 911.883). Gang bosses supervise crews of stevedores who load and unload ships and move cargo in and out of warehouses. Some operate materials handling equipment, such as lift trucks and cranes. Stevedores also position and fasten hose lines to the ship's tank when loading or unloading liquid cargo such as chemicals and oil.

Clerical Occupations. [illegible] marine industry employs workers in general clerical jobs, such as payroll clerk, secretary, and typist. Other clerical workers have specialized jobs. *Billing clerk* (D.O.T. 219.388) type invoices that list items shipped and dates of shipment. *Clerks and dispatchers, pilot station* (D.O.T. 911.368) keep records of ships entering ports. *Manifest clerks* (D.O.T. 219.388) compile and type the ship's manifest (a list of passengers and cargo) for use at customhouses or terminals. *Receipt and report clerks* (D.O.T. 911.388) prepare reports on labor and equipment costs for loading and unloading cargoes.

Administrative and Professional Occupations. The merchant marine industry employs a small number of administrative and other office personnel. Executives plan and administer company policy. The industry also employs accountants, lawyers, and labor relations and personnel workers. Some *marine architects* (D.O.T. 001.081) are employed to oversee the construction and repair of ships.

Training, Other Qualifications, and Advancement

Inexperienced workers may be hired as stevedores to load and unload cargo. Applicants must be in good physical condition. A high school education is preferred but not required. Under the guidance of experienced workers, stevedores can learn their jobs in a few weeks. As vacancies occur, they can advance to jobs such as lift truck operator and crane operator. Workers who have supervisory ability may become gang bosses.

No educational requirements are established for jobs aboard ship, but a good education is an advantage. Formal training for officers is conducted at the U.S. Merchant Marine Academy, at five State merchant marine academies, and through programs operated by trade unions. Unions also conduct training programs to upgrade the ratings of sailors.

[illegible] officers must be a U.S. citizen, be physically fit, and pass a written examination administered by the U.S. Coast Guard. Sailors also must obtain licenses (merchant mariner's documents) from the Coast Guard. Applicants are required to pass a physical examination and present proof that they have a job offer aboard a U.S. merchant vessel.

Persons who are considering a career at sea must be able to live and work with others as a team. Although peacetime service is relaxed, they must adjust to some military like discipline that is essential because of the nature of shipboard life.

Most general clerical occupations, such as secretary or bookkeeper, usually require the completion of basic commercial courses in high school or business school. Additional on-the-job training is necessary for specialized clerical occupations, such as manifest clerk and receipt and report clerk.

Administrative positions usually are filled by college graduates who have degrees in business administration, marketing, accounting, industrial relations, or other specialized fields. A knowledge of the merchant marine industry is helpful. Marine architects must be licensed professionals. Requirements for licensing are set by the individual States and generally include graduation from an accredited professional school followed by 3 years of practical experience in an architect's office.

Employment Outlook

Little or no change in employment in the merchant marine industry is expected through the mid-1980's. Nevertheless, some openings will arise each year from the need to replace experienced workers who retire, die, or transfer to other fields.

Because of substantially higher shipbuilding and labor costs, our merchant fleet finds it difficult to compete in the world shipping market. To insure that our country has a merchant fleet operating in regular or essential trade routes, the Government subsidizes many ships. In 1970, the Government also passed a law which would subsidize the construction of 30 new ships annually over a 10-year period and to improve tax incentives for firms to buy new ships. Despite this support, the size of our merchant fleet probably will not grow significantly, since the number of ships to be built is expected to only slightly exceed the number of older vessels taken out of service.

Little or no change in the employment of ship's officers is expected over the long run. Employment of sailors, on the other hand, is expected to decline because new ships are equipped with laborsaving innovations, such as automated engine-rooms, which reduce the need for these workers.

Employment trends also will vary among shoreside occupations. The greater use of containerized cargo

ships and improvements in materials handling equipment will reduce the need for stevedores. Employment in administrative and clerical occupations, on the other hand, is not expected to change significantly.

Earnings and Working Conditions

Stevedores working along the Atlantic and Gulf Coasts earned $8 an hour in 1976, and those on the Pacific Coast earned $7.52 an hour. Stevedores also earn extra pay for handling hazardous cargo.

Earnings aboard ships are relatively high; all officers earned a base pay of over $1,000 a month in 1976. Sailors who have advanced a rung or two in rating could receive a base pay of over $700 a month. In addition, both officers' and sailors' earnings are supplemented by premium pay for overtime or for assuming extra responsibilities. On the average, additional payments for assuming extra work or responsibility add about 50 percent to base pay. Shipboard workers also receive free meals and lodging while at sea.

Since ship's crewmembers and stevedores are subject to occasional layoff, however, their annual earnings usually are not as high as the hourly rates and monthly salaries would imply.

Most shoreside workers in the industry work a 5 day, 40 hour week. The workweek for people aboard ships is considerably different. Most officers and sailors are required to stand watch, working split shifts around the clock. Generally they work two 4 hour shifts during every 24-hour period and have 8 hours off between each shift. Other officers and sailors are on duty 8 hours a day, Monday through Friday.

The merchant marine industry provides excellent fringe benefits. Most employers provide paid vacations and holidays. Vacations for sailors and officers range from 90 to 180 days a year. Many firms also provide other benefits such as life, health, and accident insurance. Officers and sailors may retire on full pension after 20 years of service, regardless of age. Stevedores are eligible for pension at age 65.

Working and living conditions aboard ship have improved over the years. Mechanization has reduced the physical demands, and newer vessels have private rooms, air-conditioning, television, and better recreational facilities. However, life aboard ship is confining, and since voyages last several weeks or months, officers and sailors are away from their homes and families much of the time. Some tire of the lengthy separations and choose shoreside employment. However, for many people, the spirit and adventure of the sea, good wages, and fringe benefits more than compensate for the disadvantages.

The duties aboard ship are hazardous compared with other industries. At sea, there is always the possibility of injury from falls or the danger of fire, collision, or sinking. Most shoreside jobs are not hazardous, but stevedores may do heavy lifting and risk injury from falling boxes and other freight when loading and unloading ships.

Most employees are union members. All stevedores are represented by either the International Longshoremen's Association or the International Longshoremen's and Warehousemen's Union. Most officers aboard ships are represented by the International Organization of Masters, Mates and Pilots; and the National Marine Engineers Beneficial Association. Sailors are members of the National Maritime Union of America and the Seafarers' Union.

Sources of Additional Information

[illegible] information about jobs in merchant marine write to:

Director of Maritime Manpower, Maritime Administration, U.S. Department of Commerce, Washington, D.C. 20235

Information about job openings and wages aboard ships can be obtained from local maritime unions. If such a union is not listed in the local telephone directory, contact:

National Maritime Union of America, 346 Seventh Ave., New York, N.Y. 10011

Seafarers International Union of North America, 675 Fourth Ave., Brooklyn, N.Y. 11232

National Marine Engineers, Beneficial Association, 17 Battery Pl., New York, N.Y. 10004.

Further information about stevedore jobs is available from:

International Longshoremen's Association (AFL-CIO), 17 Battery Pl., New York, N.Y. 10004.

International Longshoremen's and Warehousemen's Union (AFL-CIO), 150 Golden Gate Ave., San Francisco, Calif. 94102.

MERCHANT MARINE OFFICERS

Nature of the Work

Every ship has jobs of such importance to its safe operation that the persons doing them are identified as having special responsibilities. These persons are the ships officers.

In command of every oceangoing vessel is the *captain* or *master* (D.O.T. 197.168) who is the shipowner's sole representative. The captain has complete authority and responsibility for the ship's operation and the safety of the crew, passengers, cargo, and vessel.

In addition, while in port, the captain may serve as the shipowner's agent in conferring with custom officials, and in some case may act as paymaster for the ship. Although not technically members of a specific department, captains generally are associated with the deck department, from whose ranks they have been promoted.

Deck Department. Deck officers or "mates," as they are traditionally called, direct movement of the ship and maintenance of the deck and hull. They maintain the authorized speed and course; plot the vessel's position; post lookouts for other ships; record information in the "log" of the voyage; and immediately notify the captain of any unusual occurrences. To comply with coast guard regulations for ensuring the safe and efficient operation of ships, deck officers must be familiar with modern navigational equipment, such as sonar, radar, and radio directional finders.

The captain has complete authority and responsibility for the ship's operation

The *chief mate* (D.O.T. [illegible]), also known as the first mate or chief officer, is the captain's key assistant in assigning duties to the deck crew and maintaining order and discipline. The chief mate also plans and supervises the loading and unloading of cargo and assists the captain in taking the ship in and out of port. On some ships the chief mate also may be in charge of first aid treatment.

By tradition the *second mate* (D.O.T. 197.1[illegible]) is the navigation officer. The second mate sees that the ship is provided with the necessary navigation charts and that navigation equipment is maintained properly.

Third mates (D.O.T. [illegible]) are the most junior rated deck officers. They [illegible] signal officers and are in charge of all signaling equipment. They also assist in the [illegible] of cargo during loading and unloading. The third mate frequently inspects lifesaving equipment to be sure it is ready for use in the event of shipwreck or other emergencies.

[illegible] engineers operate and maintain engines and machinery aboard ship. The *chief engineer* (D.O.T. 197.130) supervises the engine department and is responsible for the efficient operation of engines and other mechanical equipment. The chief engineer oversees the operation of the main powerplant and auxiliary equipment while the vessel is underway and keeps records of equipment performance and fuel consumption.

The *first assistant engineer* (D.O.T. 197.130) supervises engineroom personnel and directs operations such as starting, stopping, and controlling the speed of the main engines. The first assistant engineer also oversees and inspects the lubrication of engines, pumps, generators, and other machinery and, with the chief engineer, directs all types of repairs.

The *second assistant engineer* (D.O.T. 197.130) has charge of the boiler and associated equipment such as the water feed system and pumps. The second assistant engineer also makes sure proper steam pressure and oil and water temperatures are maintained and supervises the cleaning of boilers.

The *third assistant engineer* (D.O.T. 197.130) supervises the operation and maintenance of the lubrication system and a variety of other engineroom equipment. Some third assistant engineers are responsible for the electrical and refrigeration systems aboard ships.

Other officers. A ship keeps contact with the shore and other vessels through its *radio officer* (D.O.T. 193.282), who also maintains radio equipment. These officers send and receive messages by voice or Morse code. They periodically receive and record time signals, weather reports, position reports, and other information. Radio officers also may maintain depth recording equipment and electronic navigation equipment.

Some freighters and all passenger vessels carry *pursers* (D.O.T. 197.168). The purser or staff officer does the extensive paperwork that is required before a ship enters or leaves a port. They prepare payrolls and assist passengers as required. In recent years, the Staff Officers Association has established a program to train pursers to act also as physician's assistants. This instruction is designed to improve the medical care aboard freighters and tankers and facilitate U.S. Public Health Service clearance when a ship arrives in port. All passenger ships must carry licensed doctors and nurses.

Places of Employment

About 13,500 officers were employed aboard U.S. oceangoing vessels during 1976. Deck officers and engineering officers accounted for more than four fifths of the total, and

radio officers made up most of the remainder. Due to long vacations and other breaks in service such as those resulting from illness there are about two officers employed for every job on a ship.

About two-thirds of the officers were aboard freighters and most of the remainder were aboard tankers. Only a small percentage were on passenger vessels.

Training, Other Qualifications, and Advancement

Applicants for an officer's license in the deck or engineering departments of oceangoing vessels must meet certain legal requirements. Captains, chief and second mates, and chief and first assistant engineers must be at least 21 years old. The minimum age for third mates, third assistant engineers, and radio operators is 19. In addition, applicants must present proof of U.S. citizenship and obtain a U.S. Public Health Service certificate attesting to their vision, color perception, and general physical condition.

Besides legal and medical requirements, candidates must also have at least 3 years of appropriate sea experience or be a graduate of an approved training program. Deck officer candidates must pass Coast Guard examinations that require extensive knowledge of navigation, cargo handling, and deck department operations. Marine engineering officer candidates must demonstrate in-depth knowledge of propulsion systems, electricity, plumbing and steam fitting, metal shaping and assembly, and ship structure. To advance to higher ratings, officers must pass progressively more difficult examinations.

For a Coast Guard license as a radio officer, applicants must have a first or second-class radiotelegraph operator's license issued by the Federal Communications Commission. For a license to serve as the sole radio operator aboard a cargo vessel, the Coast Guard also requires 6 months of radio experience at sea.

Unlike most professions, no education requirements have been established for officers. A sailor with 3 years' experience in the deck or engine department may apply for either a third mate's license or for a third assistant engineer's license. However, because of the complex machinery, and navigational and electronic equipment on modern ships, formal training usually is needed to pass the Coast Guard's examination for these licenses.

The fastest and surest way to become a well-trained officer is through an established training program. Such programs are available at the U.S. Merchant Marine Academy at Kings Point, N.Y., and at six State merchant marine academies: California Maritime Academy, Vallejo, Calif.; Great Lakes Maritina Academy Traverse City, Michigan; Maine Maritime Academy, Castine, Maine; Massachusetts Maritime Academy, Hyannis, Mass.; Texas Maritime Academy, Galveston, Tex.; and State University of New York Maritime College, Fort Schuyler, New York, N.Y. About 500 students graduate each year from these schools; about one-half are trained as deck officers and one-half as marine engineers. Admission to the U.S. Merchant Marine Academy is through nomination by a member of Congress, whereas entrance to the other academies is made through written application directly to the school.

Most of the academies offer 4-year programs in nautical science or marine engineering, which include courses such as navigation, mathematics, electronics, propulsion systems, electrical engineering, naval architecture, languages, history, and shipping management, as well as practical experience at sea. After Coast Guard examinations are passed, licenses are issued for either third mate or third assistant engineer. In addition, graduates may receive commissions as ensigns in the U.S. Naval Reserve.

Because of their thorough grounding in theory and its practical application, academy graduates are in the best position to move up to master and chief engineer ratings. Their well rounded education also helps qualify them for shoreside jobs such as marine superintendent, operating manager, design engineers, naval architects, or shipping executive.

The U.S. Merchant Marine Academy now selects about 15 percent of the approximately 250 persons who enter the academy each year to be trained as "omnicompetent" officers. They are taught both navigational and technical skills so they can work in either the deck or engine department. Graduates of the U.S. Merchant Marine Academy have an obligation to serve a minimum of 3 years as officers in the merchant marine or in the military service of the United States.

A number of trade unions in the maritime industry provide officer training. These unions include the International Organization of Masters, Mates and Pilots; the Seafarers' International Union of North America; the Brotherhood of Marine Officers; and the National Marine Engineers' Beneficial Association (MEBA). However due to a crowded job market in recent years, all but the MEBA-operated Calhoon Engineering School in Baltimore, Md., have restricted training programs to upgrading of officers already licensed. The Calhoon School, which produces about 90 graduates every year, offers a third assistant engineer's license. The program consists of both classroom instruction and sea experience and provides free room, board, medical care, and text books in addition to a monthly grant. Trainees must agree to serve at least 3 years in the merchant marine after the 3-year training period.

Advancement for deck and engine officers is along well-defined lines and depends primarily upon specified sea experience, passing a Coast Guard examination, and leadership ability. Deck officers start as third mates. After 1 year's sea service they are eligible to take a second mate examination. A second mate may apply for a chief mate's license after 1 year of sea service. Officers in the engine department start as third assistant engineers. After 1 year of service, they may apply for a second assistant's license and finally a chief engineer's license.

Employment Outlook

Employment of ship's officers is expected to increase more slowly than the average for all occupations through the mid-1980's.

Since World War II, the number of vessels in our merchant marine has declined steadily as the owners of American ships have registered them outside the country. The transfers occurred because ships registered in the United States must employ American crews and, because of their higher wages, cost about twice as much to operate as ships registered abroad and manned with foreign crews. The incentive of obtaining greater profits by lowering operating costs prompted many owners to register their ships outside the U.S.

Little further decline in the number of ships is expected, however, because the Federal Government has taken steps to insure that ships registered in the U.S. and operated by American crews are available to transport essential cargo. To maintain this capability, the Government pays the difference in wages if U.S. crews are used, and helps pay for the construction or purchase of new ships. Some job openings will occur as a result of the need to replace experienced workers who retire die or take shoreside employment. Replacement needs are relatively high because ships' officers are somewhat older, on the average, than workers in other occupations and the liberal pension plans offered by the merchant marine industry encourage early retirement. Also, some officers find they prefer the stability of shoreside employment.

Job opportunities [illegible] become more favorable in the 1980's than in the near future as the balance between the supply and demand for officers becomes more favorable.

Since maritime unions control a majority of jobs, graduates from union training programs have the best opportunities to obtain jobs aboard ocean going vessels. However, graduates of merchant marine academies who cannot find jobs on merchant ships generally have little trouble finding jobs in related fields. For example, trained officers are needed on oceanographic research vessels, on vessels that carry supplies to offshore oil drilling rigs, and on dredges operated by the Army Corps of Engineers. Others find jobs with the maritime industry.

Earnings and Working Conditions

Earnings of officers depend upon their rank and the type of ship. Wages are highest on large ships. The accompanying tabulation shows monthly base wages for officers aboard an average freighter in 1976. Additional payments for overtime or for assuming extra responsibilities generally average about 50 percent of base pay. For example, a second mate with a monthly base pay of $1,278 may regularly earn about $1,917 each month.

	Base pay[1]
[illegible]	$3,717
Chief engineer	3,158
First assistant engineer	1,888
First mate	1,802
Radio officer	1,604
Second assistant engineer	1,338
Second mate	1,278
Third assistant engineer	1,202
Third mate	1,147
Purser	1,055

[1] East coast wages in June 1976 aboard a 12,000- to 17,000-deadweight-ton single-screw ship.

Officers and their dependents enjoy substantial pension and welfare benefits. Vacations range from 90 to 180 days a year. Officers with 20 years of service have the option of a monthly pension of $325 or 37 1/2 percent of their monthly rate of pay. Those who have 25 years of service are eligible for $420 a month or 50 percent of their monthly rate. Officers forced to retire prematurely due to a permanent disability receive partial pensions. Comprehensive medical care and hospitalization are provided for officers and their families through employer or union programs.

The [illegible] considerably different from the workweek on shore. At sea, most officers are required to work 7 days a week. Generally, they work two 4-hour watches (shifts) during every 24-hour period and have 8 hours off between each watch. Some officers work 8 hours a day, Monday through Friday. All officers are paid overtime for work over 40 hours a week. When the ship is in port, the basic workweek is 40 hours for all crewmembers.

The duties aboard ship are hazardous compared to other industries. At sea, there is always the possibility of injuries from falls or the danger of fire, collision, or sinking.

Almost 90 percent of all officers belong to maritime unions. The two largest are the International Organization of Masters, Mates and Pilots, representing deck officers, and the National Marine Engineers' Beneficial Association, representing engineering officers. The Brotherhood of Marine Officers represents deck and engine officers on some ships. The Staff Officers Association and the Marine Staff Officers Association represents pursers aboard certain freighters. Radio officers are represented by the American Radio Association and the Radio Officers Union. In addition, a number of independent unions organize officers on tankers. Officers' unions may require initiation fees as high as $4,000.

Sources of Additional Information

For general information about merchant marine officer's jobs, write to:

Office of Maritime Manpower, Maritime Administration, U.S. Department of Commerce, Washington, D.C. 20235

Information about job openings, qualifications for employment, wage scales, and other particulars is available from local maritime officers' unions. If no maritime union is listed in the local telephone directory, contact:

International Organization of Masters, Mates and Pilots, 39 Broadway, New York, N.Y. 10006

National Marine Engineers' Beneficial Association, 17 Battery Pl., New York, N.Y. 10004

MERCHANT MARINE SAILORS

Nature of the Work

[illegible] from Saudi Arabia, aluminum [illegible] from Surinam, and cars from Japan, as well as countless other imported commodities, provide much of the energy and raw materials that

our economy requires and the finished products that individuals enjoy. Yet these cargoes are so routinely transported across thousands of miles of ocean that our dependence on merchant ships—and sailors—for their delivery in frequently taken for granted.

Sailors make up most of a merchant ship's crew and do most of the manual labor. Employment is along craft lines with varying skill levels. Each worker is assigned to one of the following departments: deck, engine, or steward's.

Deck Department. *Ordinary seamen* (D.O.T. 911.887), the entry rating in the deck department, scrub decks, coil and splice ropes, paint, clean personnel quarters, and do other general maintenance work. They also may relieve able seamen who steer the ship and act as lookouts.

Able seamen (D.O.T. 911.884) make up about one-fifth of all sailors. They must have a thorough knowledge of all parts of the ship and be able to handle all gear and deck equipment. They act as quartermasters to steer the ship. Usually, they each take 2-hour turns at the wheel, and also serve as lookouts to watch for other ships.

Able seamen also are responsible for rigging, repairing, and stowing cargo handling and other gear. They must be able to tie common knots and handle mooring lines when the ship is docking or departing. In addition to their more skilled tasks, they do general deck maintenance work similar to that done by ordinary seamen.

The *boatswain* (D.O.T. 911.131), or bosun, is the highest ranking able seaman. As boss of the deck crew, the boatswain relays the deck officers' orders and sees that these orders are carried out. The boatswain assists the chief mate in assigning work to crewmembers and directs general maintenance operations such as cleaning decks and polishing metalwork. When the ship docks or anchors, the boatswain supervises the deck crew in handling the lines used for mooring.

Some cargo vessels carry one to three *deck utility hands* (D.O.T. 911.884), who maintain the ship's decks under the supervision of the boatswain. They determine the condition of bilges (compartments in the bottom of the hull) and do general maintenance work.

Some vessels carry a *ship's carpenter* (D.O.T. 860.281) who secures cargo hatches and ports, and braces (shores) cargo. The carpenter also may operate winches that hoist and drop the anchor and do other general repair work on the ship's wooden parts.

Engine Department. The engineering staff consists of workers who have a variety of occupational specialties requiring varying degrees of skill from the rating of wiper to specialized skilled jobs such as refrigerator engineer. *Wipers* (D.O.T. 699.887) keep the engineroom and machinery clean. Most cargo vessels carry two or three wipers. *Oilers* (D.O.T. 911.884) lubricate mechanical equipment. They make regular rounds of ship machinery to check oil flow and pressures. Oilers also may help overhaul and repair machinery. *Firers-watertenders* (D.O.T. 951.885) check and regulate the amount of water in the boilers, inspect gauges, and regulate fuel flow to keep steam pressure constant. They also check the operation of evaporators and condensers, which are used to convert salt water to fresh water.

The *ship's electrician* (D.O.T. 825.281) repairs and maintains electrical equipment, such as generators

Experience in the Coast Guard or Navy provides a good background for most merchant marine jobs.

and motors. Electricians also test wiring for short circuits and remove and replace fuses and defective lights.

Certain types of ships require workers who have special skills, such as *refrigeration engineers* (D.O.T. 950.782) who maintain proper temperatures in refrigerator compartments for perishable cargoes such as meat and vegetables.

Steward's Department The *chief steward* (D.O.T. 350.138) supervises the preparation and serving of meals and the upkeep of living quarters aboard ship. The *chief cook* (D.O.T. 315.131) and assistant cooks prepare meals. The chief cook also supervises the other galley (ship's kitchen) workers and is responsible for keeping the galley clean and orderly. *Utility hands* (D.O.T. 318.887) and *mess attendants* (D.O.T. 350.878) complete the crew in the steward's department. These beginning jobs require little skill. Utility hands carry food supplies from the storeroom and iceboxes, prepare vegetables, wash cooking utensils, and scour galley equipment. Mess attendants set tables, serve meals, clean tables, wash dishes, and care for living quarters.

Due to the greater use of prepackaged foods and smaller crew sizes, many new ships have reduced the number of workers in the steward's department. For example, the chief cook and chief steward are replaced by a combination chief steward/cook.

Because of the ever present danger of fire at sea, able seamen must be familiar with fire prevention and control methods. They participate in periodic boat drills and are trained in all operations connected with launching lifeboats and liferafts.

Places of Employment

About 33,200 sailors were employed aboard U.S. ocean-going vessels during 1976. Due to long vacations and other breaks in duty, such as illness, the number of employed sailors is about one and a half times the number of jobs on ships. Nearly two-thirds of the jobs were aboard freighters, and most of the remainder were aboard tankers. Only a small percentage were on passenger ships.

Training, Other Qualifications, and Advancement

Although not required, previous sea experience in the Coast Guard or Navy is a useful background for entering the merchant marine. Applicants must obtain a doctor's certificate specifying they are in excellent health and then must obtain a letter from a shipping company stating that, if qualified, they will be hired if a job becomes available. In addition, applicants must register with the U.S. Coast Guard and acquire from it universal identification papers called a merchant mariner's document. The document, however, does not guarantee a job. It merely qualifies a person to be considered for a job when the supply of regular workers has been exhausted. To get a job, a person must be present at the hiring hall when the opening becomes available.

Hiring halls are located in the chief ports of the country. They are operated by unions for commercial vessels and by the Navy's Military Sealift Command (MSC) for government-operated ships. In most ports along the Atlantic and Gulf Coasts and Great Lakes, the National Maritime Union and the Seafarers' International Union operate hiring halls. The Sailors' Union of the Pacific operates hiring halls in many ports of the West Coast. MSC employment offices are located at Brooklyn, N.Y., New Orleans, La., and Oakland, Calif.

Jobseekers are given shipping cards when they register at the hiring hall. The shipping companies send job orders to the hiring hall, and sailors who have been unemployed the longest get first preference on any jobs for which they are qualified. Inexperienced applicants are expected to have difficulty getting jobs because the number of experienced workers already greatly exceeds the number of job openings. Applicants must be present at the hall when jobs are announced and may lose their places if they are not present or have turned down three job offers.

A sailor advances in the deck and engine departments by serving a designated period in a rating, and by successfully completing a Coast Guard examination that tests the ability to use and maintain equipment. For example, after serving a minimum of 1 year, aboard an ocean going vessel an ordinary seaman may apply to the Coast Guard for limited endorsement as an able seaman. For full endorsement, applicants must be at least 19 years of age and pass an examination to test their knowledge of seamanship and ability to carry out all the duties required of able seamen. Able seamen who have supervisory ability may advance to boatswain after years of service.

Most training programs in the industry are designed to help experienced workers upgrade their ratings. However, the Seafarers' International Union of North America operates the Harry Lundeberg School for seamanship at Piney Point, Md. that accepts a limited number of young people who have no sea experience and trains them in general seamanship skills. Upgrading courses for sailors are offered by the Seafarers' Union, the National Maritime Union of America, and a number of other organizations.

Advancement to higher positions in the steward's department is by recommendation of the chief steward to the captain. A mess attendant or utility hand can advance to third cook, to cook-baker, to chief cook, and finally to chief steward.

A small number of persons who show exceptional ability are selected for self-study, union sponsored programs, which enable unlicensed sailors to advance to the licensed ranks as either third mate or third assistant engineer.

Employment Outlook

Employment of merchant sailors is expected to decline through the mid-1980's. Some job openings, however, will arise each year due to the need to replace experienced sailors who retire, die, or quit the sea for other reasons. Competition for these positions is expected to be keen because the number of people seeking jobs as sailors probably will exceed the number of openings. Most openings will be filled by experienced sailors who are unemployed; very few inexperi-

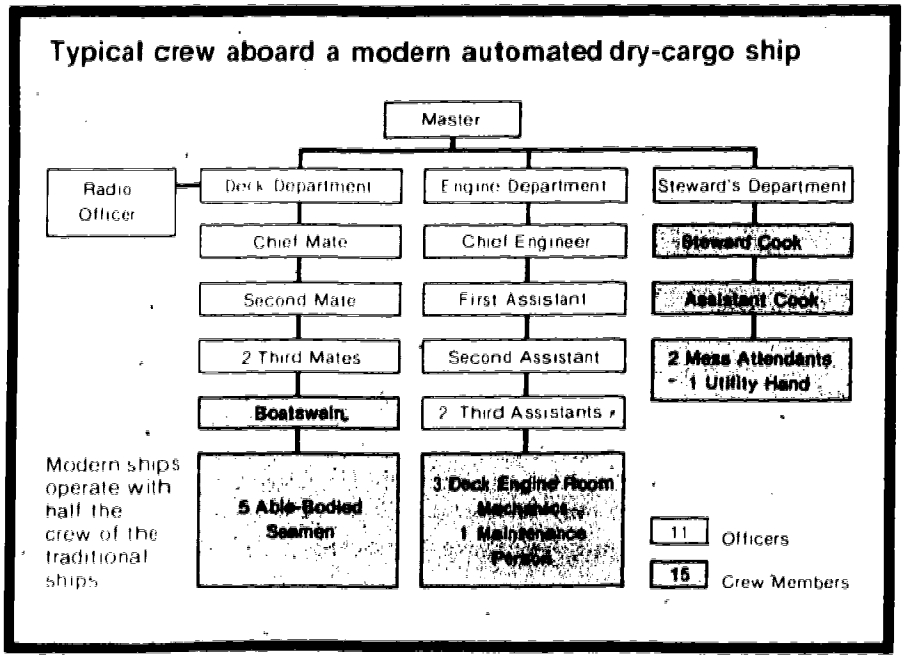
enced applicants are expected to get jobs.

Employment opportunities in the U.S. Merchant Marine are directly related to the number of ships—and to the number of sailors required to operate each ship. After World War II this country possessed the largest merchant marine fleet ever assembled. Since then, however, the number has declined steadily as some owners transferred their ship's registration outside the country. These transfer occurred because ships registered in the United States must employ American crews and, because of higher wages, cost about twice as much to operate as ships registered abroad and manned with foreign crews. The incentive of obtaining greater profits by lowering operating costs prompted many owners to register their ships outside the U.S.

Little further decline in the number of ships is expected, however, because the Federal Government has taken steps to insure that ships registered in the United States and operated by American crews are available to transport essential cargo. To maintain this capability, the Government pays the difference in wages to a company if they use American crews, and helps pay for the construction or purchase of new ships.

The number of ships is expected to remain about the same because the number of new ships entering service should about equal those being retired. However, employment of sailors is expected to decline because new ships are operated with smaller crews. For example, vessels generally carry a crew of twelve sailors in the engineering department, whereas new ships only carry four: three deck engine mechanics and one wiper. Deck engine mechanics replace oilers, firer-watertenders, and electricians. Older freighters and tankers customarily employ three ordinary seamen, whereas their job has been eliminated on new ships. In addition mechanization of tasks has eliminated jobs for some carpenters and the use of prepackaged food and smaller crew sizes have reduced the number of cooks and stewards.

Employment opportunities may improve if the Government mandates that a fixed proportion of imported oil or exported grains is to be carried in American ships—a move that would require more American ships.



Earnings and Working Conditions

Crewmembers of American merchant ships enjoy excellent pay and fringe benefits. Earnings depend on job assignments and type of vessel. Basic monthly pay for a cross section of ratings on a typical freighter in 1976 is shown in the accompanying tabulation.

	Base pay [1]
[illegible]	$1,117
Chief steward	950
Carpenter	874
Cook/Baker	822
Deck utility hand	807
Able seaman	723
Firer watertender	723
Oiler	723
Ordinary seaman	564
Mess attendant/utility hand	560

[1] East Coast wages in June, 1976 aboard a 12,000–17,000 power ton single screw ship.

Monthly wages are supplemented by premium pay for overtime and other factors. On the average, premium earnings are equal to about 50 percent of base wages. For example, an oiler with a monthly base pay of $723 regularly earns about $1,084 each month.

Liberal employer-financed fringe benefits are provided. Vacations range from 90 to 180 days a year. Sailors may retire on pensions after 20 years of service. Sailors and their dependents are covered by comprehensive medical care and hospitalization programs.

The workweek aboard ship is considerably different from the workweek on shore. At sea, most sailors are required to work 7 days a week. Generally, they work two 4-hour watches (shifts) during every 24-hour period and have 8 hours off between each watch. Some sailors are day workers. They work 8 hours a day, Monday through Friday. All sailors are paid overtime for work over 40 hours a week. When the ship is in port, the basic workweek is 40 hours for all crewmembers.

A person working in the engineroom must be able to withstand high temperatures while a deck worker must adapt to both bitter cold and the hot sun. At sea, there is always the possibility of injuries from falls or the danger of fire, collision, or sinking.

Accommodations for sailors aboard U.S. vessels are generally good, but not luxurious. Meals are served in a messroom, which often doubles as a recreation room where

the crew can read, write letters, play cards, and socialize. Crewmembers generally share quarters aboard older ships and have little privacy, but most new ships have single-berth rooms. Many sailors find the work aboard ship routine and boring.

Sailors are represented by a number of labor organizations; the two largest are the National Maritime Union of America and the Seafarers' International Union of North America.

Sources of Additional Information

For general information about merchant marine sailors' jobs, write to:

Office of Maritime Manpower, Maritime Administration, U.S. Department of Commerce, Washington, D.C. 20235

Information about job openings, qualifications for employment, wage scales, and other particulars is available from local maritime unions. If no maritime union is listed in the local telephone directory, contact:

National Maritime Union of America, 36 Seventh Ave., New York, N.Y. 10011.

Seafarers' International Union of North America, 675 Fourth Ave., Brooklyn, N.Y. 11232.

7

What to Look For in this Reprint

To make the *Occupational Outlook Handbook* easier to use, each occupation or industry follows the same outline. Separate sections describe basic elements, such as work on the job, education and training needed, and salaries or wages. Some sections will be more useful if you know how to interpret the information as explained below.

The TRAINING, OTHER QUALIFICATIONS, AND ADVANCEMENT section indicates the preferred way to enter each occupation and alternative ways to obtain training. Read this section carefully because early planning makes many fields easier to enter. Also, the level at which you enter and the speed with which you advance often depend on your training. If you are a student, you may want to consider taking those courses thought useful for the occupations which interest you.

Besides training, you may need a State license or certificate. The training section indicates which occupations generally require these. Check requirements in the State where you plan to work because State regulations vary.

Whether an occupation suits your personality is another important area to explore. For some, you may have to make responsible decisions in a highly competitive atmosphere. For others, you may do only routine tasks under close supervision. To work successfully in a particular job, you may have to do one or more of the following:

- motivate others
- direct and supervise others
- work with all types of people
- work with things you need [illegible] and manual dexterity
- work independently, you [illegible] and self discipline
- work as part of a team
- work with details [illegible] or laboratory reports
- help people
- use creative talents and
- work in a confined area
- do physically hard work
- work outside in all types [illegible]

[illegible] abilities [illegible] judge [illegible] their [illegible] suit you.

The EMPLOYMENT [illegible] the job market is likely to be [illegible]. Each [illegible] expected growth is compared to this [illegible] rate for all occupations (20 percent between 1976 and 1985). The following phrases are used:

Much faster	[illegible]
Faster	[illegible]
About as fast	15.0 to 24.9%
Slower	4.0 to 14.9%
Little change	3.9 to 3.9%
Decline	4.0% or more

Generally, job [illegible] growing at least as fast as for the economy as a whole.

But, you would have to know the number of people competing with you to be sure of your prospects. Unfortunately, this supply information is lacking for most occupations.

There are exceptions, however, especially among professional occupations. Nearly everyone who earns a medical degree, for example, becomes a practicing physician. When the number of people pursuing relevant types of education and training and then entering the field can be compared with the demand, the outlook section indicates the supply/demand relationship as follows:

Excellent	Demand much greater than supply
Very good	Demand greater than supply
Good or favorable	Rough balance between demand and supply
May face competition	Likelihood of more supply than demand
Keen competition	Supply greater than demand

Competition or few job openings should not stop your pursuing a career that matches your aptitudes and interests. Even small or overcrowded occupations provide some jobs. So do those in which employment is growing very slowly or declining.

Growth in an occupation is not the only source of job openings because the number of openings from turnover can be substantial in large occupations. In fact, replacement needs are expected to create 70 percent of all openings between 1976 and 1985.

Finally, job prospects in your area may differ from those in the Nation as a whole. Your State employment service can furnish local information.

The EARNINGS section tells what workers were earning in [illegible].

[illegible] jobs pay the most is a hard question to answer because good information is available for only one type of earnings: wages and salaries, and not even this for all occupations. Although 9 out of 10 workers receive this form of income, many earn extra money by working overtime, night shifts, or irregular schedules. In some occupations, workers also receive tips or commissions based on sales or service. Some factory workers are paid a piece rate, an extra payment for each item they make.

The remaining 10 percent of all workers, the self employed, includes people in many occupations—physicians, barbers, writers, and farmers, for example. Earnings for self employed workers, even in the same occupation, differ widely because much depends on whether one is just starting out or has an established business.

Most wage and salary workers receive fringe benefits, such as paid vacations, holidays, and sick leave.

Workers also receive income in goods and services (payments in kind). Sales workers in department stores, for example, often receive discounts on merchandise.

Despite difficulties in determining exactly what people earn on the job, the Earnings section does compare occupational earnings by indicating whether a certain job pays more or less than the average for all nonsupervisors in private industry, excluding farming.

Each occupation has many pay levels. Beginners almost always earn less than workers who have been on the job for some time. Earnings also vary by geographic location, but cities that offer the highest earnings often are those where living costs are most expensive.