DOCUMENT RESUME

ED 024 776 VT 005 241

Technician Career Opportunities in Engineering Technology.

American Society for Engineering Education, Washington, D.C. Engineers' Council for Professional Development, New York, N.Y.; National Council of Technical Schools, Washington, D.C.

Pub Date 64

Note-23p.

Available from-Publications, American Society for Engineering Education, 2100 Pennsylvania Avenue, N.W., Washington, D.C. 20037 ($0.50)

EDRS Price MF-$0.25 HC-$1.25

Descriptors-*Career Opportunities, Educational Background, Employment Qualifications, *Engineering Technicians, Occupational Clusters, *Occupational Information, Technical Education

Career opportunities for engineering technicians are available in the technologies relating to air conditioning, heating, and refrigeration, aviation and aerospace, building construction, chemical engineering, civil engineering, electrical engineering, electronics, industrial engineering, instrumentation, internal combustion engines, mechanical engineering, metallurgical engineering, and nuclear engineering. To succeed as an engineering technician, the person must have mechanical aptitude and a genuine interest in a technical field. He must like science and mathematics and have average or better achievement in these subjects in an engineering technology curriculum. Persons wishing to enter an engineering technology curriculum, must be a high school graduate or have equivalent education and show evidence of sufficient motivation for satisfactory achievement in the curriculum. The course of instruction for engineering technicians emphasizes the application of scientific and mathematical principles in industrial situations and problem solving. The subjects are grouped in categories of mathematics, physical sciences, communications, humanities, technical skills, and technical specialty. Many factors indicate a bright future for both men and women as engineering technicians in business, industry, and government service. (HC)

technician career opportunities in engineering technology

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This pamphlet has been prepared through the cooperation of the guidance committees of the Engineers' Council for Professional Development, the National Council of Technical Schools, and the Technical Institute Council of the American Society for Engineering Education, Washington, D.C.

Its purpose is to aid the prospective student, his family, his guidance counselor, and his employers in analyzing the requirements and duties of occupations associated with engineering technology. This pamphlet is designed:

1. To describe the engineering team and to define the part the *engineering technician* plays on that team
2. To define and list select occupations in which the *engineering technician* is engaged

Although there are other kinds of technicians, such as medical and dental technicians, this pamphlet is concerned only with those technicians who take their place on the engineering team.

WHO IS THE ENGINEERING TECHNICIAN?

Engineering teamwork, rather than brilliance of individual effort alone, is credited with making possible the technological progress and high level of productivity achieved by industry in the past decade. People of widely diverse skills make up the engineering team, which expedites the application of new technological knowledge to the production of goods and services. Members of this team are:

The *engineer* and the *scientist,* who formulate ideas to create new products and services

The *engineering technician,* who helps develop, test, and apply these ideas and creations

The *craftsman,* who makes the product, and the *industrial technician,* who supervises manufacturing and processing

In the past decade, and at present, the engineering technician has been in great demand and short supply; therefore, a definition and clarification of his skills and education are proposed here.

In its 1962 report, *Characteristics of Excellence in Engineering Technology Education,* the American Society for Engineering Education proposed these definitions of the practitioner and his field of study:

> An engineering technician is one whose education and experience qualify him to work in the field of engineering technology. He differs from a craftsman in his knowledge of scientific and engineering theory and methods, and from an engineer in his more specialized background and in his use of technical skills in support of engineering activities.
>
> Engineering technology is that part of the engineering field which requires the application of scientific and engineering knowledge and methods combined with technical skills in support of engineering activities; it lies in the occupational area between the craftsman and the engineer, at the end of the area closest to the engineer.

On September 12, 1963, the Recognition Committee of the Engineers' Council for Professional Development proposed this definition:

> An engineering technician is one whose education and experience qualify him to work in those areas of engineering which require the application of established scientific and engineering knowledge and methods, combined with technical skills, in support of engineering or scientific activities toward the accomplishment of engineering objectives.

The engineering technician, then, is a person with a definite set of skills. He has been developed to use those skills in a specific engineering area, educated and trained beyond the level of high school and vocational school in an engineering technology curriculum leading to an appropriate degree or certificate.

The engineering technician must be able to read, write, speak, and understand the

language of engineering. He must know how to use the tools of engineering. He must know how to work in close association with the engineer or the scientist, sometimes under direct supervision, frequently with little or no direction.

The engineering technician is the first understudy of the engineer and the scientist, helping in a highly skilled way to convert their theories and ideas into workable, useful products and processes. His education, like theirs, must be professional and exacting, for with the increasing complexity of engineering technology, the cost of mistakes comes high.

The engineering technician works most generally in these fields: research, design, development; production, operation, control; and installation, maintenance, sales engineering.

WHAT QUALIFICATIONS DOES HE NEED?

The person who will succeed as an engineering technician must have genuine interest in a technical field and must have mechanical aptitude. Although he does not need the manual and mechanical skills of the craftsman, he must be able to perform a variety of tasks with the instruments and equipment of his technical specialty.

He must like science and mathematics and have average or better-than-average achievement in these subjects in an engineering technology curriculum. Although his education in these subjects will be less theoretical than the engineer's, he must be able to understand and apply basic scientific and engineering principles in his chosen field.

Because he will often supervise the work of others, he must like and be able to work with people. He must be able to express himself clearly both orally and in writing.

WHAT PREPARATION DOES HE NEED?

The high school student who wishes to enter an engineering technology curriculum must satisfy these general admission requirements:

1. Graduation from high school or the equivalent education as recognized in his state.
2. Evidence of sufficient motivation for satisfactory achievement in the curriculum.

In addition, most engineering technology programs require these minimum high school units:

1. Three years of English.
2. At least two years of mathematics, one in algebra and one in plane geometry, or the equivalent in integrated modern mathematics. In addition, intermediate algebra and trigonometry are desirable preparation for engineering technology education.
3. One year of physical science with laboratory (not biology).

These requirements mean that anyone interested in a career as an engineering technician must start planning early. He (or she, for girls become engineering technicians, too) should take all the academic science and mathematics he can in high school. High school English is also important. The engineering technician must develop skill in writing technical reports and the ability to express himself effectively to those with whom he works. These abilities require a sound background in English.

WHERE DOES HE GET HIS EDUCATION?

The engineering technician is a graduate of an engineering technology program conducted by a technical institute, a junior or community college, or a division of a college or university. Programs vary in length from two to three years; the majority are two academic collegiate years in length.

The Engineers' Council for Professional Development, 345 East 47th Street, New York, N.Y. 10017, accredits engineering technology programs. The National Council of Technical Schools, 1507 M Street, N.W., Washington 5, D.C., approves programs which meet its standards. You may obtain lists of accredited programs and schools from both associations, from your high school guidance counselor, or from the public library in your community.

Other agencies which sometimes accredit junior and community colleges offering engineering technology programs are the regional associations of colleges and secondary schools.

WHAT DOES HE STUDY?

The course of instruction for engineering technicians emphasizes the application of scientific and mathematical principles in industrial situations and problem solving. The subjects may be grouped in these categories:

1. Mathematics (college-level mathematics through calculus)
   Physical Sciences (college-level with laboratory work)
2. Communications (written and oral)
   Humanities (psychology, sociology, history, economics)
   (industrial management and organization)
3. Technical Skills (manufacturing processes, construction techniques, etc.)
   Technical Specialty (aeronautics, air conditioning, electronics, etc.)

The engineer concentrates on the formal study of engineering science and the extension of that science to develop new concepts. The engineering technician, who is concerned with the application of established principles, combines classroom work with practical and extensive laboratory work.

DOES HE EARN A DEGREE?

Most institutions which offer engineering technology programs award associate degrees—Associate in Science, Associate in Applied Science, or Associate in Engineering. Others award appropriate diplomas or certificates.

WHAT IS HIS EMPLOYMENT OUTLOOK?

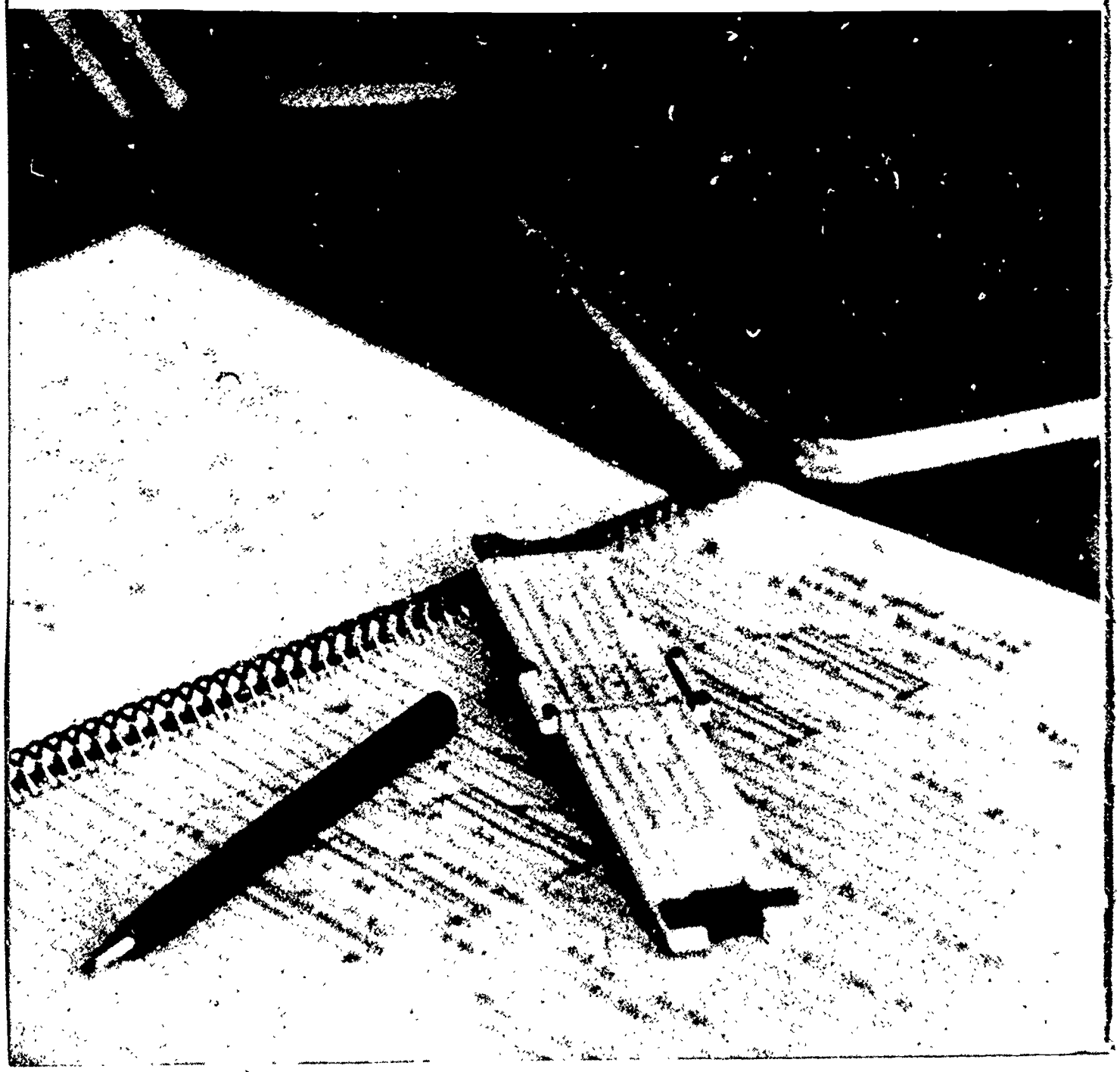
Very promising. Engineering technicians are in great demand and short supply. These are the reasons:

1. Engineering technicians take over many tasks engineers have been doing, releasing engineers for more scientific levels of work.

2. Advances in scientific knowledge have created a need for more people educated in all areas of science, engineering, and technology.
3. Increased research and development require that each engineer or scientist be assisted by at least one, and often several, engineering technicians.
4. Development and industrial use of nuclear power has opened a new area of employment.
5. Automation requires more and better educated people to design, manufacture, install, and maintain complex equipment.

These factors point to a bright future for engineering technicians in business, industry, and government service. Starting salaries are comparatively favorable.

The engineering technician who would rather be on his own has a bright future, too. His technical knowledge and practical laboratory experience, and his education in human relations, supervision, and business organization give him a sound preparation for operating his own business.



CAREER OPPORTUNITIES FOR ENGINEERING TECHNICIANS

AIR CONDITIONING, HEATING, and REFRIGERATION ENGINEERING TECHNOLOGIES

Heating, ventilating, and cooling the homes we live in, the offices and industrial plants we work in, the hospitals, schools, churches, theaters, and other institutions, and the cars, trains, and planes of today and tomorrow—all these offer continuing challenges to an indispensable industry.

Foods and beverages require reliable temperature control in their processing, storage, transportation, and distribution.

The production of drugs and medicines, and the manufacture of precision tools, chemicals, textiles, rubber, petroleum, and photographic supplies are accomplished under atmospheric conditions achieved and regulated by temperature control.

The proper control of temperature, humidity, cleanliness, and circulation of air is essential to scientific research, to industrial development, and to space exploration.

The engineering technician in this vast industry has unlimited opportunities.

ENTRY JOBS FOR RECENT GRADUATES

Control specialist—sells, installs, and services electric, electronic, and pneumatic controls

Development technician—works with design engineer in testing and evaluating new applications and new equipment

Heat-pump specialist—sells, installs, and services reverse-cycle equipment for both heating and cooling applications

Research assistant—works with research engineer as laboratory assistant

Sales representative—sells complete units or components at retail, wholesale, distributor, or manufacturing level

JOBS FOR GRADUATE ENGINEERING TECHNICIANS WITH EXPERIENCE

Application specialist—as manufacturer's representative, aids contractors, installers, and servicemen in proper application of complex equipment

Dealer and contractor—operates own business, selling, installing, and servicing air conditioning, heating, and refrigeration equipment

Installation supervisor—coordinates installation of equipment

System designer—makes surveys, calculates loads, specifies equipment, writes proposals involving the use of heat-transfer systems

AVIATION/AEROSPACE ENGINEERING TECHNOLOGY

The aviation/aerospace industry consists of three major related but distinctly different phases, each of which offers the engineering technician an excellent lifetime career of highly interesting activities.

Space exploration is a vast industry, requiring thousands of engineering technicians. A wide variety of experiments are currently being conducted on manned and unmanned spacecraft. Some practical results already have been achieved in communications and weather forecasting.

Air transportation has developed dramatically and by 1967, up to 55 billion passengers will use air travel. Helicopters, private aircraft, and corporate airplanes play an important role in business operations.

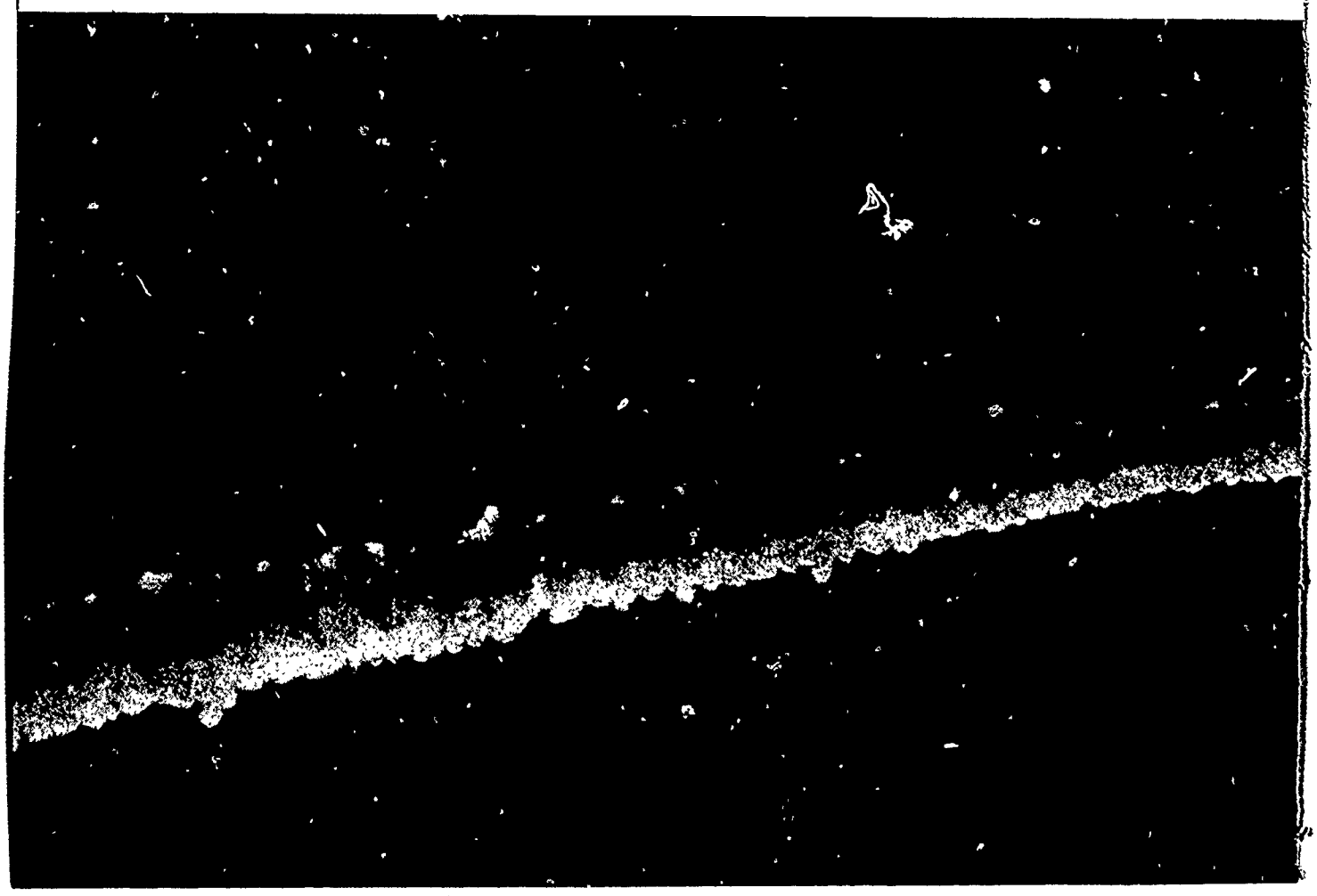
Aircraft manufacturing has become a research-and-development industry. The need for engineering technicians has grown rapidly. The development of all forms of aircraft, missiles, and spacecraft is the responsibility of the manufacturing phase of the industry.

The aviation/aerospace engineering technician may be assigned to one of many interesting positions in this broad and vital industry.

ENTRY JOBS FOR RECENT GRADUATES

Aircraft structures analyst—calculates, analyzes, and evaluates the materials and structures used in the development of new aircraft and space vehicles

Aircraft systems test technician—operationally tests and evaluates hydraulic, pneumatic, and electrical systems in special applications dealing with a wide variety of operational requirements



Aircraft weights technician—determines the weight and balance of the vehicle on the basis of the structural design and the materials used

Electronics research technician—calculates, designs, builds, tests, and reports on the development of new electronic components and systems

Jet powerplant technician—operates, inspects, and evaluates powerplant performance

Technical writer—investigates systems and components and analyzes their operation; establishes operational, maintenance, and servicing procedures; and then develops reference publications for customers

JOBS FOR GRADUATE ENGINEERING TECHNICIANS WITH EXPERIENCE

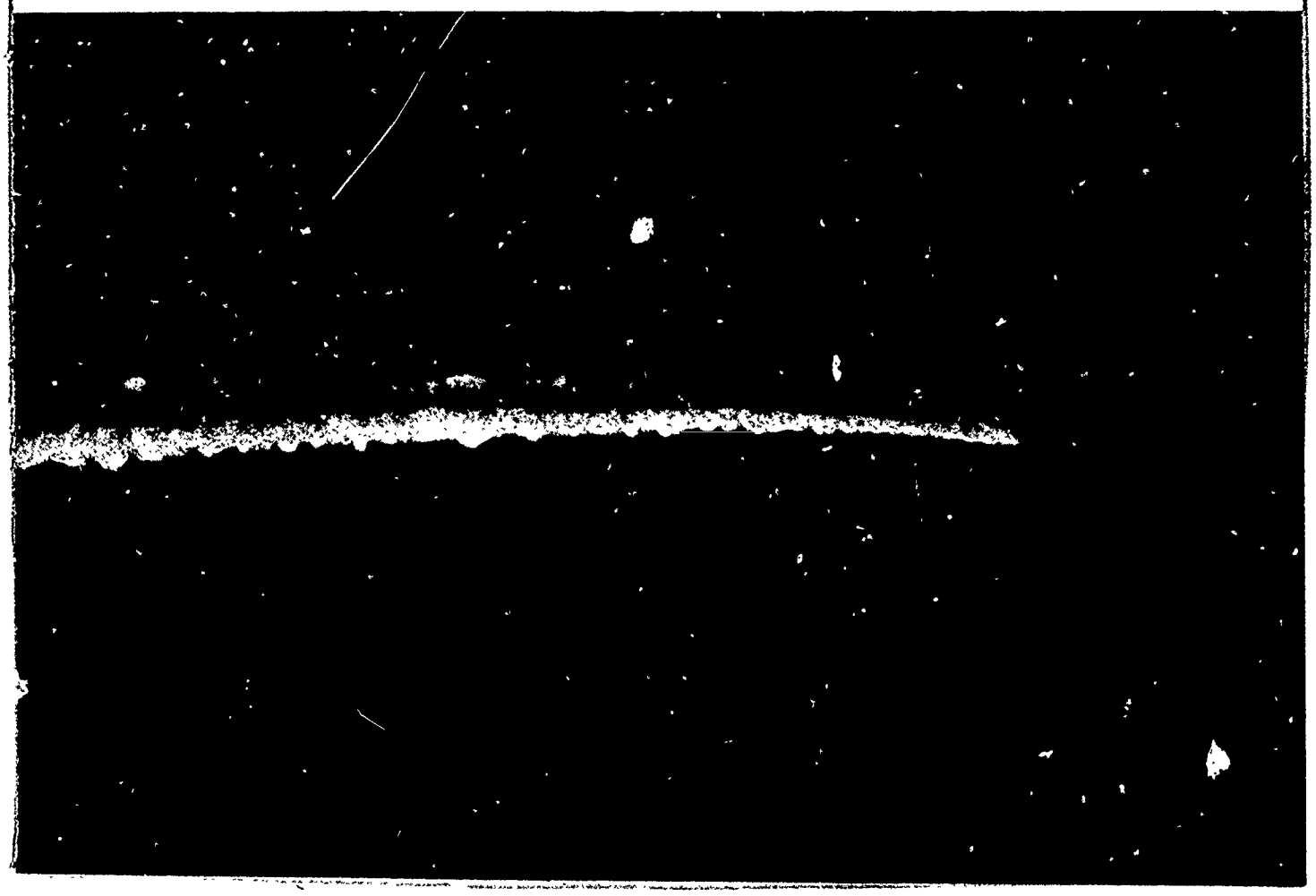
Aerodynamics technician—based on experience as a designer, uses advanced wind tunnels and appropriate instrumentation to establish criteria for safe, reliable vehicles

Aircraft maintenance inspection technician—inspects operations; establishes standards and devises procedures for maintenance; approves repair, overhaul, and modification techniques

Design engineering technician—develops the vehicle on the basis of data furnished by stress analyst, structural analyst, and aerodynamicist; plans production and prepares engineering orders

Stress analyst—through computation and laboratory testing procedures, determines the design requirements so that materials can be selected and specifications established

Structural designer—uses his knowledge of materials and the mechanics of physics to develop a structure to withstand the requirements of its mission



BUILDING CONSTRUCTION ENGINEERING TECHNOLOGY

One of man's basic needs is shelter for himself and his family, and for his goods and services. The exploding population dictates a similar increase in the need for many kinds of shelters--new homes, churches, schools, recreation centers, stores, offices, and a complex of structures in areas of urban renewal.

Existing buildings undergo constant upkeep, repair, and modernization.

The result is a vast, diverse building-construction industry which requires a variety of competent technical personnel.

The engineering technician in this field must have sound training in building specifications and codes, print reading, design, costs and estimates, properties of materials, and construction processes. Since he coordinates the work of many craftsmen involved in the completion of a project—steel workers, steamfitters, plumbers, carpenters, bricklayers, and electricians—he must also be educated in the basic principles of human relations and management.

ENTRY JOBS OR RECENT GRADUATES

Architect's or contractor's assistant—helps plan, design, and supervise construction of buildings; makes progress inspections

Building inspector—inspects buildings under construction to ensure compliance with codes, plans, and specifications

Construction equipment and materials salesman—sells building supplies and equipment

Estimator—computes quantities and costs of materials and labor

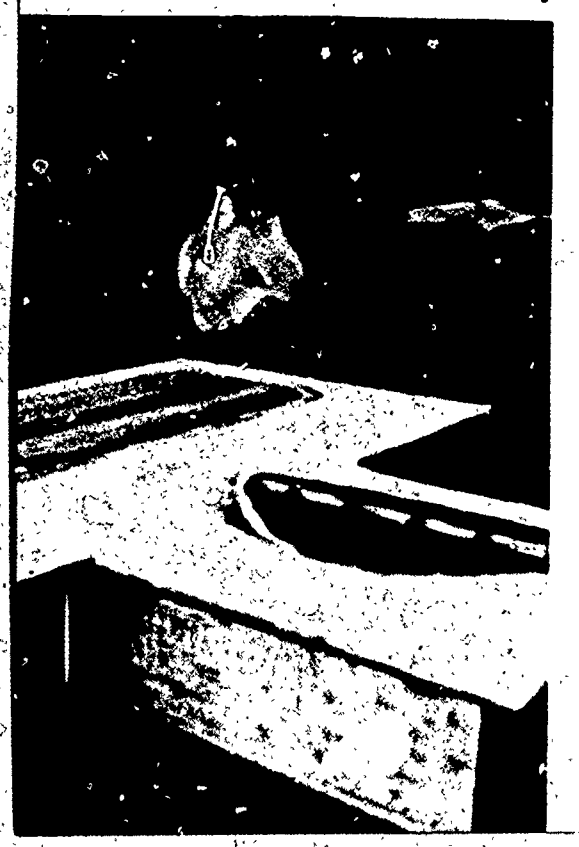
Materials man—buys and distributes materials on construction jobs

Structural draftsman—drafts specifications on steel and concrete requirements

JOBS FOR GRADUATE ENGINEERING TECHNICIANS WITH EXPERIENCE

Building foreman—supervises construction operations

Building superintendent—supervises maintenance and repair of offices, residential buildings, or factories



Construction superintendent—supervises and coordinates operations in building construction

Contractor—self-employed; in home, commercial, or industrial construction business

Salesman—represents manufacturer in the sale of construction equipment, building materials, and supplies

CHEMICAL ENGINEERING TECHNOLOGY

Basically and briefly, the chemical industry investigates raw materials to determine their properties, characteristics, reactions, and possible uses when treated in one way or another. It supplies raw materials to other industries, and through research it develops new uses for the products of other industries.

Basic research in the chemical industry has led to the development of thousands of new products. One particular chemical company carries on research in more than a dozen fields and offers more than 1,200 products or product lines. Another has doubled in size six times in the past 30 years.

The continued emphasis on research and development; the complexity of chemical processes and products; the imposing array of solids, liquids, and gases being analyzed for an imposing array of specific purposes—all these point up the career opportunities in the chemical industry for engineering technicians. This particular technical specialty is as much a field for women as it is for men.

ENTRY JOBS FOR RECENT GRADUATES

Chemical laboratory technician—sets up equipment, prepares chemical samples, gathers and evaluates results of tests

Chemicals salesman—sells chemicals and related equipment to manufacturers, pharmacies, hospitals, and institutions

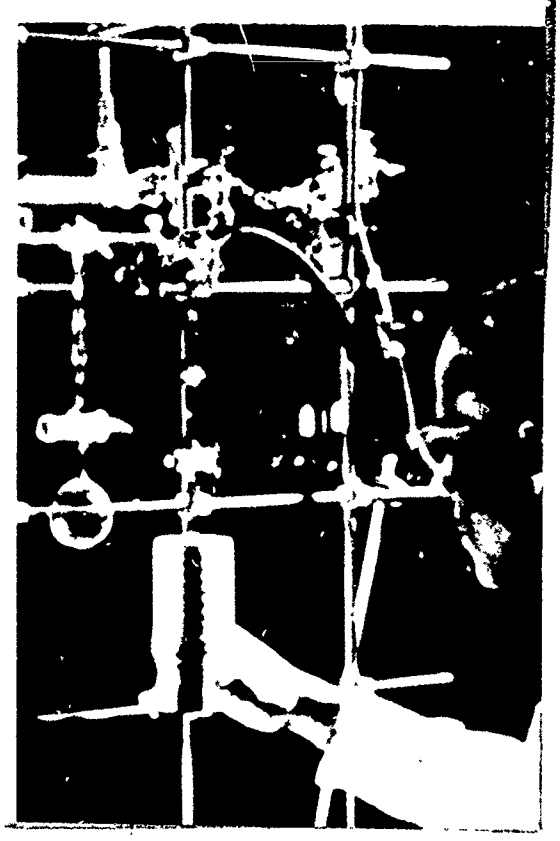
Control analyst—analyzes the processes involved in producing chemical materials; tests samples of raw materials to be used

JOBS FOR GRADUATE ENGINEERING TECHNICIANS WITH EXPERIENCE

Pilot-plant operator—operates pilot-plant equipment in the research and development of new products and processes

Production supervisor—instructs and gives technical direction to others involved in chemical processes of manufacturing

Research assistant—assists research chemist in all phases of investigation, operation of experimental equipment, data reduction, graphic and mathematical calculations, and library research



CIVIL ENGINEERING TECHNOLOGY

Civil engineering technology is one of the broadest fields in the overall practice of engineering because its work is coordinated with so many other branches of the science. Civil engineering is concerned with the planning, design, and construction of fixed structures and ground facilities for land, sea, and air transportation, for control of the flow and uses of water, and for protection in war and peace against the forces of nature and the highly destructive forces recently devised by man.

Civil engineers and civil engineering technicians build airports, bridges, highways, dams, powerhouses, pipelines, and railroads. Thus, civil engineering technology encompasses a variety of special skills and techniques in areas such as hydraulics, flood control and irrigation, structural work (both steel and concrete), field surveying, traffic studies, computations, and the fundamentals of construction.

A civil engineering technician is trained to draw up plans and specifications; estimate costs and materials needed; use the transit, level, and other surveying instruments; prepare maps; inspect jobs; and supervise construction.

ENTRY JOBS FOR RECENT GRADUATES

Computer—determines coordinates for geographic position, land lines, and land monuments; computes quantities

Contractor's aide—assists contractor on construction projects

Detail draftsman—prepares plans and detail drawings for elements in construction projects

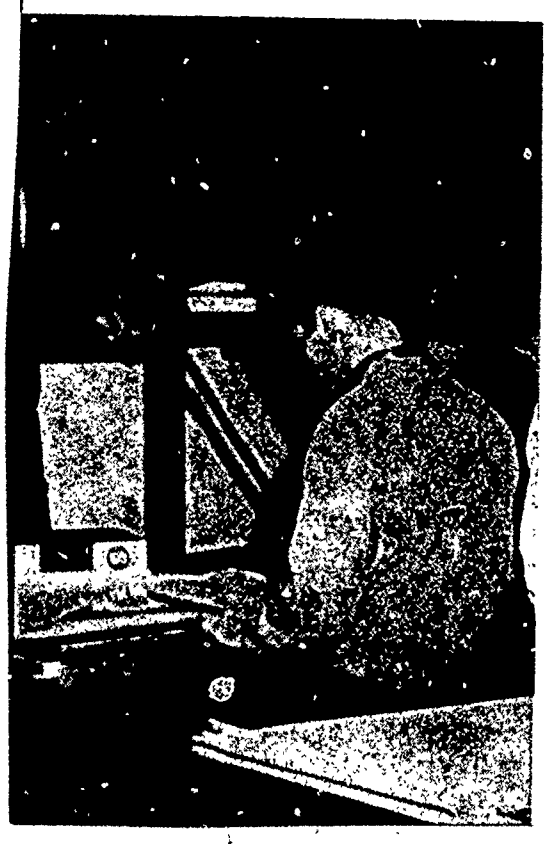
Estimator—estimates amounts and costs of materials, supplies, and labor for construction projects

Inspector—inspects line and grade references, forms, materials, and construction methods

JOBS FOR GRADUATE ENGINEERING TECHNICIANS WITH EXPERIENCE

Construction supervisor—supervises light and heavy construction projects

Highway engineering technician—runs surveys, prepares plans and estimates, supervises construction and maintenance of highways



Photogrammetrist—prepares maps and charts from aerial photographs

Specifications writer—writes specifications for construction jobs

ELECTRICAL ENGINEERING TECHNOLOGY

The electrical industry began in the last century with the efforts of Nikola Tesla and Thomas A. Edison. They and others pioneered the incandescent lamp, the carbon microphone, the telegraph, dynamos, motors, and current transformers, and electrical power distribution systems.

The electrical power industry—the basis for practically all industrial expansion since those pioneer days—continues to broaden in scope and applications. New career areas have been created by developments in electrical controls and automation for industry, and by developments in the illumination field for specialized commercial and industrial installations.

The electrical engineering technician finds job opportunities in the basic concerns with the generation, transmission, distribution, and use of electricity. He finds new opportunities in industrial electronics, where increased use of induction and dielectric heating, X rays, diathermy, and ultrasonics has created a demand for technical personnel.

ENTRY JOBS FOR RECENT GRADUATES

Communications technician—installs, maintains, and operates electrical communications equipment

Electrical draftsman—prepares working plans for wiring diagrams for the erection, installation, and wiring of electrical machinery

Illumination technician—supervises the installation and maintenance of commercial and industrial lighting systems

Test technician—tests equipment, materials, and processes to determine whether they meet specifications and accepted engineering standards

JOBS FOR GRADUATE ENGINEERING TECHNICIANS WITH EXPERIENCE

Electrical contractor—self-employed; residential, commercial, or industrial electrical contracting work

Powerhouse load dispatcher—controls the operation of power stations, substations, and transmission lines within an electric power system

Research technician—seeks to develop new equipment and to evolve new applications in manufacturing processes

Technical writer—assists in compiling manuals, reports, bulletins, specifications, and catalogs pertaining to the electrical industry

ELECTRONICS ENGINEERING TECHNOLOGY

Although electronics is a relatively new science, it has become an industrial giant. In commerce, industry, national defense—Army, Navy, Air Force, and Marine operations—electronic devices embrace a complexity of assignments performed with amazing speed and accuracy.

In radio, television, radar, sonar, motion pictures, computers, and space exploration, the science of electronics progresses at a pace equalled by few others. Electronics is at work in manufacturing operations, many of which are automated and directed by electronic equipment and controls.

More and more engineering technicians are needed to manufacture, operate, and maintain this complex equipment. A new area of employment—field and customer service assignment—provides a direct and continuing link between manufacturer and user.

Technical education in electronics includes considerable work in mathematics and science, the study of tubes and diodes, circuitry, transistors, servomechanisms, chemistry, the physics of heat and wave motion, and other related subjects. It prepares the engineering technician for a wide range of career opportunities.

ENTRY JOBS FOR RECENT GRADUATES

Communications technician—installs various types of communications equipment

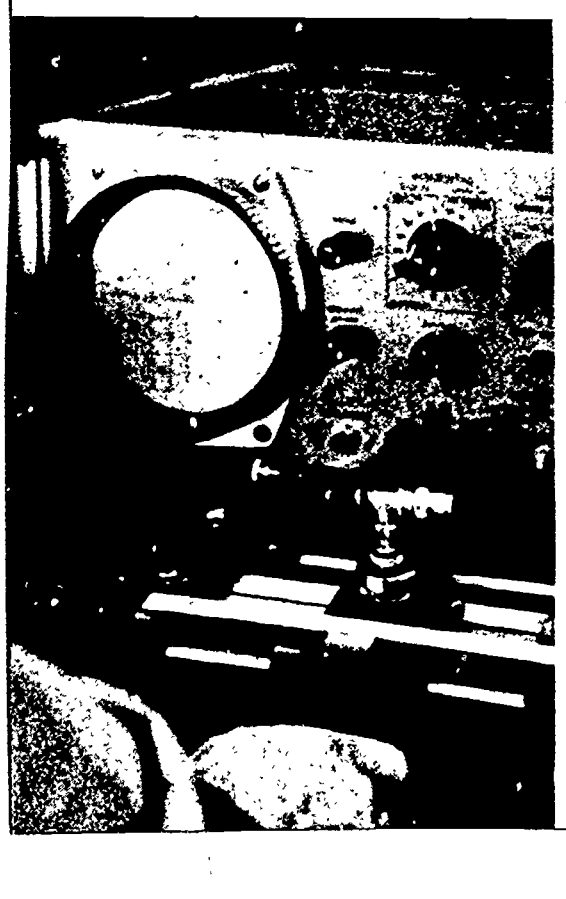
Customer-service technician—installs and maintains electronic computers and related equipment

Electronic engineering aide—assists engineers in the design, development, and testing of new electronic equipment

Medical electronics technician—installs, tests, and maintains electronic equipment used in medical research and diagnosis

JOBS FOR ENGINEERING TECHNICIANS WITH EXPERIENCE

High-frequency technician—Maintains and operates radar, sonar, loran, and other warning and detection devices



Research engineering technician—builds and tests new equipment in fields such as geophysics, precision testing, and guidance systems

Technical sales representative—sells and services electronic equipment and components to industry

Technical writer—compiles reports, bulletins, specifications, and manuals pertaining to electronic equipment; works closely with project engineer

INDUSTRIAL ENGINEERING TECHNOLOGY

Industrial engineering, an encompassing production science, looks for ways and means to get things done promptly, efficiently, at minimum cost, and with a well-designed end product. Industrial engineering technology involves the coordination of industrial equipment and its output with the men and women who operate the equipment. This means that the industrial engineering technician must bring together the work of many other types of technicians.

The industrial engineering technician is trained to manage industrial activities—control cost and quality output, eliminate waste, perform time and motion studies, plan work flow, evaluate jobs and personnel, make statistical studies and analyses of production costs, and generally, do those jobs which must be done to achieve efficient and profitable coordination of men and machinery.

In free enterprise competition, and also in foreign trade competition, industrial engineering technology acts as an insurance regulator against pitfalls which have forced companies out of business. Career opportunities are many and varied.

ENTRY JOBS FOR RECENT GRADUATES

Methods technician—studies effectiveness of different manufacturing processes; seeks out and develops means to achieve economy and efficiency

Plant layout man—assists industrial engineer in planning location of machines, equipment, and materials-handling devices

Production planner—makes up schedules; estimates rate and cost of production; maintains production cost and control record systems

Time study technician—calculates time required for industrial or manufacturing process; studies efficiency of materials handling and arrangement and of use of tools and equipment

JOBS FOR GRADUATE ENGINEERING TECHNICIANS WITH EXPERIENCE

Assistant production manager—coordinates phases of production, supervision, receiving, shipping, scheduling, and control of materials

Manufacturing foreman—supervises machine operators, assemblers, and other employees in manufacturing process

Production foreman—supervises departments, assigns duties, inspects work for quality and quantity; interprets blueprints, sketches, and written orders; determines work procedures

Wage administration technician—assists in drawing up job-evaluation and wage-incentive plans

INSTRUMENTATION TECHNOLOGY

Instrumentation is the technology of measurement and automatic control. Automatic measuring devices and allied control instruments are used in many fields: aviation; metals processing, working, and manufacturing; pulp and paper making; oil refining; sugar refining; food processing; meteorology; flood control; and the development of atomic energy.

In these and other industries, the instrumentation technician is the engineering technician who handles the controls which direct automated processes. He is the technician who installs, tests, and evaluates the proper functioning of electronic, hydraulic, pneumatic, and optical instruments used in the control and measurement of research and manufacturing processes.

In summary, the main responsibility of the instrumentation technician is to work out the "bugs" in control and measuring equipment and make it work according to specifications.

ENTRY JOBS FOR RECENT GRADUATES

Design specialist—assists research engineers who design and evaluate instruments and control devices for automatic equipment

Installation technician—installs, checks out, and assists in the start-up of new measurement and control systems

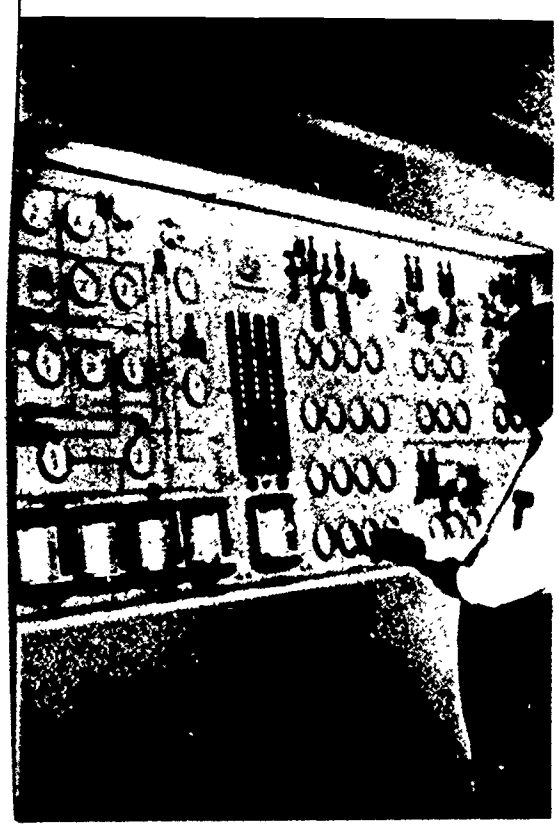
Maintenance technician—repairs control systems in plants or at the bench, or acts as a field troubleshooter and serviceman

Process control technician—operates or supervises the operation of equipment used in the control of industrial processes

JOBS FOR GRADUATE ENGINEERING TECHNICIANS WITH EXPERIENCE

Instrument technician—operates and maintains precision measuring, testing, and control equipment

Research engineering technician—assists in research projects for manufacturers of aviation and meteorological instruments



Test technician—gathers scientific and engineering information in flight and aerospace testing through the use of complex and advanced measurement systems

INTERNAL COMBUSTION ENGINES ENGINEERING TECHNOLOGY

Ever since man began to seek easier ways and means to do jobs, the engine has been his chief helper. Engines are machines which use energy to develop mechanical power, machines which create motion in other machines.

Engines generate power, provide energy, make things go. They pump water, mow lawns, plow fields, and harvest crops. They pull trains, drive cars and buses and trucks along streets and highways, propel airplanes, and push boats and ships over lakes, rivers, and seas.

Many are mobile. Many are stationary, prime sources of power for manufacturing and for heat, light, and motion.

There is no levelling off in the demand for engineering technicians trained in the handling of internal combustion engines—turbine, diesel, and spark-ignition.

ENTRY JOBS FOR RECENT GRADUATES

Design technician—prepares drawings and designs of engine mechanisms to be used for developmental purposes

Development technician—assists engineers in solving problems involved in designing experimental engines

Diesel plant operator—operates, inspects, and services diesel electric generating plants; makes minor repairs and adjustments

Equipment salesman—sells parts and components of turbine, diesel, or spark-ignition engine equipment

Installer—assists in the installation of turbine, diesel, or spark-ignition engine equipment

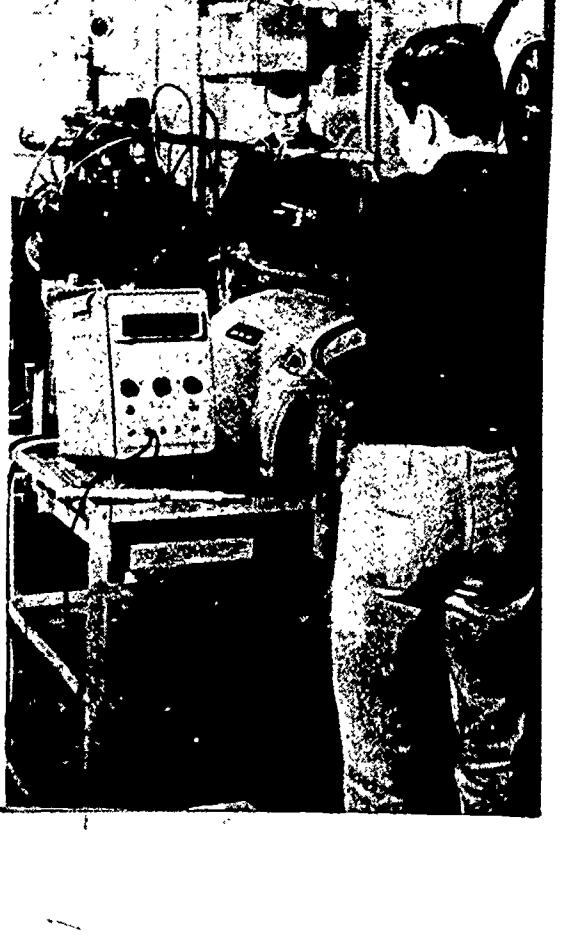
JOBS FOR GRADUATE ENGINEERING TECHNICIANS WITH EXPERIENCE

Boiler and machinery inspector—inspects boilers and machinery for insurance companies

Manufacturer's representative—sells and provides advisory service on equipment requiring technical knowledge for field installations

Research test technician—plans, sets up, and conducts engineering laboratory-performance and evaluation tests

Service specialist—diagnoses and makes necessary corrections on heavy engine equipment



MECHANICAL ENGINEERING TECHNOLOGY

Mechanical engineering technology has to do with the design, production, installation, and operation of machines, tools, metal products, and devices. It involves machines operated by steam, gasoline, or electricity, and machines which use power or produce power from coal, oil, gas, or nuclear fuels.

The mechanical engineering technician aids the mechanical engineer, thereby releasing a considerable part of the engineer's time for other professional work. The mechanical engineering technician has been trained to visualize data from sketches, diagrams, blueprints, and verbal information in two- or three-dimensional forms.

He must have an aptitude for applying mathematics to calculate, interpret, and convert test data into report form. His aptitude and training will be in continuing demand in the future with the growing complexity of technology and the high level of expenditure for research and development.

ENTRY JOBS FOR RECENT GRADUATES

Estimator—computes cost of labor, material, equipment, and installation in preparation for bids in metal fabrication

Laboratory technician—assists in setting up equipment to test materials

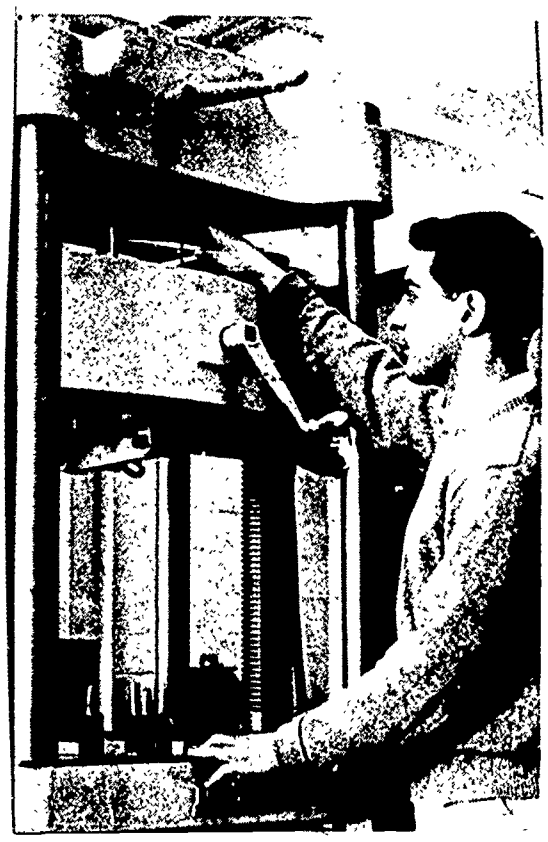
Mechanical draftsman—makes sketches of proposed mechanical devices and accurate scale drawings of machine parts

JOBS FOR GRADUATE ENGINEERING TECHNICIANS WITH EXPERIENCE

Die designer—makes drawings of dies necessary to form a complete stamping, forging, or other part

Machine designer—designs special tools, jigs, and fixtures

Machinery salesman—sells mechanical equipment and supplies to industry, contractors, community users



METALLURGICAL ENGINEERING TECHNOLOGY

The search for metals is an urgent one. Where to find and acquire them in substantial quantity is not the least among the causes of cold and hot wars. The race in research to open new fields for their use is equally urgent. The metallurgical engineering technician is an important member of the team seeking the answers.

Science and technology are constantly testing old metals and new alloys for specific combining properties in today's space-age developments. Iron, steel, copper, brass, and aluminum have been joined by their recently discovered rare-earth cousins—germanium, erbium, cerium, titanium, and gadolinite.

Before a substance can be safely and profitably used, its behavior under a variety of known (or occasionally unknown) circumstances must be ascertained. In plants and foundries, in metallurgical control laboratories, in research and development laboratories, the metallurgical engineering technician will find career opportunities.

ENTRY JOBS FOR RECENT GRADUATES

Assistant metallurgist—assists in testing metals and alloys to determine their physical properties

Metallographer—makes microscopic studies of metals and alloys

Spectrographer—conducts rapid chemical analyses of metals and alloys during refinement

Welding tester—conducts tests of weldments and parent metals

JOBS FOR GRADUATE ENGINEERING TECHNICIANS WITH EXPERIENCE

Heat treatment technician—performs functions involving the changes of composition and structure of metals by heat treatment

Production planning technician—specifies procedures for properly handling metals in industrial production processes

Research technician—develops new materials, processes, and uses for metals and alloys

Testing technician—performs metallurgical laboratory tests for microstructures, strength, hardness, ductility, and other qualities

NUCLEAR ENGINEERING TECHNOLOGY

In recent years, the new and challenging field of nuclear engineering has outgrown the supply of qualified manpower, particularly qualified engineering technicians. A number of technical schools now offer nuclear engineering technology programs.

These programs provide the background for the young man or woman interested in a career as an engineering technician in the field of nuclear science. A solid foundation is given in nuclear physics, chemistry, electronics, and instrumentation. A nuclear engineering technician with this training has a promising future in job opportunities such as these:

Control technician—assists the control and instrumentation engineer
Instrument repair and maintenance technician—repairs and maintains radiation instruments
Radiation safety technician—works with public and private officials on safeguards in projects involving radiation
Reactor operator technician—assists engineers and scientists in the operation of nuclear reactors

General Electric Vallecitos Boiling Water Reactor, Pleasanton, Calif.

OPPORTUNITIES FOR WOMEN IN ENGINEERING TECHNOLOGY

Women now comprise one-third of the national working force, and unemployment of women is only half that of men. However, women engineering aides represent only 4 per cent of the total field, and of the 15,000 annual graduates from engineering technology programs, only about 0.5 per cent are women.

These were some of the facts brought out by Dr. William G. Torpey at a conference on The Role of Women in Engineering Technology, held under the auspices of the Executive Office of the President, Office of Emergency Planning. Dr. Torpey is manpower consultant for the OEP.

Dr. Ken August Brunner, specialist, Associate Degree and Related Programs, U.S. Department of Health, Education, and Welfare, explained the present shortage of women in engineering technology in this way:

1. Women don't know about opportunities in engineering technology.
2. Educational counselors usually don't know about these opportunities either and don't stress such opportunities when counseling women students.
3. Women don't prepare for technician occupations even if they have received enlightened guidance.
4. Although employers who have hired women technicians generally report a high degree of satisfaction, some still hold fast to the concept that engineering is "men's work."
5. Opportunities for women in engineering technology are excellent now and will continue. But it remains for women to recognize and prepare to meet these opportunities, and, in the process, to expand them even more.

Four reasons why women should undertake engineering technology as a career were listed by Mrs. R. G. Preece, membership chairman, Professional Guidance and Education Committee, Society of Women Engineers, Indialantic, Florida:

1. There is a need for women in engineering technology, and the field offers exceptional educational opportunities.
2. Women are capable of being engineering technicians. They make up half of the 17 per cent of the United States population with adequate intelligence to enter engineering fields.
3. Broad career opportunities are open to women—civil, mechanical, electrical, mining, chemical, and aeronautical engineering technologies; rocket propulsion, nuclear and atomic energy, materials of unusual properties, rapid communications and information handling systems, and the missile technologies. No field of engineering technology is closed to qualified women.
4. Perhaps the most important reason for women to become engineering technicians is the personal satisfaction the career can give.

A final point was made by Mrs. Wilma Smith, executive assistant to the dean of engineering, University of Florida:

Women have certain characteristics that can be of benefit in technical work.

Their color perception is quite accurate, much greater than that of men. Almost no women are color blind—less than one per cent. For this reason, in work involving color coding, women can be more efficient than men. Many have good memories for numbers, which makes working with statistics easier for them. In work with computers, women do exceptionally well. They also tend to have much greater manual dexterity, are more patient, and most are more imaginative.

CERTIFICATION OF ENGINEERING TECHNICIANS

The Institute for the Certification of Engineering Technicians, a national examining body sponsored by the National Society of Professional Engineers, was established in 1961 to recognize the status of qualified engineering technicians. Certification is awarded in these classifications:

Junior Engineering Technician—The applicant must have either two years of experience in work requiring elementary technical ability as evidenced by the endorsement of a professional engineer or equivalent, or be a graduate from an engineering technology program accredited by the Engineers' Council for Professional Development.

Engineering Technician—The applicant must meet one of the requirements for the grade of Junior Engineering Technician and must have five additional years of applicable experience as evidenced by the endorsement of two professional engineers or equivalent. He must be at least 25 years old and may be required to pass an examination.

Senior Engineering Technician—The applicant must meet the requirements for the grade of Engineering Technician and must have at least ten additional years of high-level experience of a detailed technical nature as evidenced by the endorsement of three professional engineers or equivalent. He must be at least 35 years old.

All applications for certification are reviewed for appropriate action by the institute's Board of Trustees, which is composed of four registered professional engineers and four senior engineering technicians. The competency of those who voluntarily apply for certification is determined by this board through investigation—including recommendations, endorsements, and examinations as appropriate—of the applicant's education, work experience, knowledge, and character. Certification is limited to residents of the United States and its territories. The institute maintains a registry of holders of certificates in the three categories.

Further information and application forms for certification are available from the Institute for the Certification of Engineering Technicians, 2029 K Street, N.W., Washington, D.C.

SOURCES OF ADDITIONAL INFORMATION

List of Accredited Curricula Leading to First Degrees in Engineering Technology in the United States–1963 (25¢), Engineers' Council for Professional Development, 345 East 47th Street, New York, N.Y. 10017.

Employment Outlook for Technicians: A Report on Technicians Who Work with Engineers and Physical Scientists, VA 2-1 (25¢). Available from Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

"Problems and Potentialities of the Technical Institute" (50¢). Chapter 10 of *The Technical Institute in America,* a report on a survey conducted by the American Society for Engineering Education (now out of print). Available from American Society for Engineering Education, 1346 Connecticut Ave., N.W., Washington, D.C. 20036.

Career Guidance Information for Engineering Technicians (50¢); *Directory of Approved Technical Institute Courses* (free); both available from National Council of Technical Schools, 1507 M Street, N.W., Washington, D.C.

The Long-range Demand for Scientific and Technical Personnel, NSF 61-65 (50¢), Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

Characteristics of Excellence in Engineering Technology Education (individual copies, 50¢ each; in lots of 50 to 99, 40¢ each; in lots of 100 or more, 25¢ each). Available from American Society for Engineering Education, 1346 Connecticut Ave., N.W., Washington, D.C. 20036.

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