TITLE: Engineering Managers

DEFINITION: Plan, direct, and coordinate work in engineering fields, spending a majority of time performing managerial work for which a background consistent with that described for engineers is required.

TASKS:

1. Establishes procedures, and directs testing, operation, maintenance, and repair of transmitter equipment.
2. Evaluates contract proposals, directs negotiation of research contracts, and prepares bids and contracts.
3. Plans and directs installation, maintenance, testing, and repair of facilities and equipment.
4. Directs, reviews, and approves product design and changes, and directs testing.
5. Plans, coordinates, and directs engineering project, organizes and assigns staff, and directs integration of technical activities with products.
6. Plans and directs oil field development, gas and oil production, and geothermal drilling.
7. Analyzes technology, resource needs, and market demand, and confers with management, production, and marketing staff to plan and assess feasibility of project.
8. Plans, directs, and coordinates survey work with activities of other staff, certifies survey work, and writes land legal descriptions.
9. Administers highway planning, construction, and maintenance, and reviews and recommends or approves contracts and cost estimates.
10. Directs engineering of water control, treatment, and distribution projects.
11. Confers with and prepares reports for officials and speaks to public to solicit support.

KNOWLEDGE:

Knowledge elements are ranked by importance.

100 Engineering and Technology
Knowledge of equipment, tools, mechanical devices, and their uses to produce motion, light, power, technology, and other applications

96 Administration and Management
Knowledge of principles and processes involved in business and organizational planning, coordination, and execution. This includes strategic planning, resource allocation, manpower modeling, leadership techniques, and production methods

79 Design
Knowledge of design techniques, principles, tools and instruments involved in the production and use of precision technical plans, blueprints, drawings, and models

75 Physics
Knowledge and prediction of physical principles, laws, and applications including air, water, material dynamics, light, atomic principles, heat, electric theory, earth formations, and meteorological and
related natural phenomena

75 Mathematics
Knowledge of numbers, their operations, and interrelationships including arithmetic, algebra, geometry, calculus, statistics, and their applications

71 English Language
Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar

67 Economics and Accounting
Knowledge of economic and accounting principles and practices, the financial markets, banking, and the analysis and reporting of financial data

58 Mechanical
Knowledge of machines and tools, including their designs, uses, benefits, repair, and maintenance

54 Telecommunications
Knowledge of transmission, broadcasting, switching, control, and operation of telecommunications systems

50 Law, Government and Jurisprudence
Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process

46 Sales and Marketing
Knowledge of principles and methods involved in showing, promoting, and selling products or services. This includes marketing strategies and tactics, product demonstration and sales techniques, and sales control systems

46 Chemistry
Knowledge of the composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods

46 Public Safety and Security
Knowledge of weaponry, public safety, and security operations, rules, regulations, precautions, prevention, and the protection of people, data, and property

46 Building and Construction
Knowledge of materials, methods, and the appropriate tools to construct objects, structures, and buildings

46 Geography
Knowledge of various methods for describing the location and distribution of land, sea, and air masses including their physical locations, relationships, and characteristics

46 Communications and Media
Knowledge of media production, communication, and dissemination techniques and methods including alternative ways to inform and entertain via written, oral, and visual media

42 Personnel and Human Resources
Knowledge of policies and practices involved in personnel/human resource functions. This includes recruitment, selection, training, and promotion regulations and procedures; compensation and benefits packages; labor relations and negotiation strategies; and personnel information systems

38 Psychology
Knowledge of human behavior and performance, mental processes, psychological research methods, and the assessment and treatment of behavioral and affective disorders

33 Education and Training
Knowledge of instructional methods and training techniques including curriculum design principles, learning theory, group and individual teaching techniques, design of individual development plans, and test design principles

29 Computers and Electronics
Knowledge of electric circuit boards, processors, chips, and computer hardware and software, including applications and programming

29 Production and Processing
Knowledge of inputs, outputs, raw materials, waste, quality control, costs, and techniques for maximizing the manufacture and distribution of goods

17 Customer and Personal Service
Knowledge of principles and processes for providing customer and personal services including needs assessment techniques, quality service standards, alternative delivery systems, and customer satisfaction evaluation techniques

13 Transportation
Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including their relative costs, advantages, and limitations
13 History and Archeology
Knowledge of past historical events and their causes, indicators, and impact on particular civilizations and cultures

8 Biology
Knowledge of plant and animal living tissue, cells, organisms, and entities, including their functions, interdependencies, and interactions with each other and the environment

8 Clerical
Knowledge of administrative and clerical procedures and systems such as word processing systems, filing and records management systems, stenography and transcription, forms design principles, and other office procedures and terminology

4 Therapy and Counseling
Knowledge of information and techniques needed to rehabilitate physical and mental ailments and to provide career guidance including alternative treatments, rehabilitation equipment and its proper use, and methods to evaluate treatment effects

4 Medicine and Dentistry
Knowledge of the information and techniques needed to diagnose and treat injuries, diseases, and deformities. This includes symptoms, treatment alternatives, drug properties and interactions, and preventive health-care measures

4 Foreign Language
Knowledge of the structure and content of a foreign (non-English) language including the meaning and spelling of words, rules of composition and grammar, and pronunciation

4 Sociology and Anthropology
Knowledge of group behavior and dynamics, societal trends and influences, cultures, their history, migrations, ethnicity, and origins

**SKILLS:**
Skills elements are ranked by *importance*.

96 Coordination
Adjusting actions in relation to others' actions

96 Implementation Planning
Developing approaches for implementing an idea

83 Reading Comprehension
Understanding written sentences and paragraphs in work related documents

83 Speaking
Talking to others to effectively convey information

83 Operations Analysis
Analyzing needs and product requirements to create a design

79 Problem Identification
Identifying the nature of problems

79 Management of Material Resources
Obtaining and seeing to the appropriate use of equipment, facilities, and materials needed to do certain work

79 Visioning
Developing an image of how a system should work under ideal conditions

79 Science
Using scientific methods to solve problems

79 Critical Thinking
Using logic and analysis to identify the strengths and weaknesses of different approaches

79 Judgment and Decision Making
Weighing the relative costs and benefits of a potential action

79 Idea Generation
Generating a number of different approaches to problems

75 Writing
Communicating effectively with others in writing as indicated by the needs of the audience

75 Information Gathering
Knowing how to find information and identifying essential information

75 Idea Evaluation
Evaluating the likely success of an idea in relation to the demands of the situation
75 Identification of Key Causes
Identifying the things that must be changed to achieve a goal

71 Monitoring
Assessing how well one is doing when learning or doing something

71 Time Management
Managing one's own time and the time of others

71 Management of Personnel Resources
Motivating, developing, and directing people as they work, identifying the best people for the job

71 Identifying Downstream Consequences
Determining the long-term outcomes of a change in operations

71 Systems Perception
Determining when important changes have occurred in a system or are likely to occur

71 Systems Evaluation
Looking at many indicators of system performance, taking into account their accuracy

71 Mathematics
Using mathematics to solve problems

71 Technology Design
Generating or adapting equipment and technology to serve user needs

67 Solution Appraisal
Observing and evaluating the outcomes of a problem solution to identify lessons learned or redirect efforts

67 Active Learning
Working with new material or information to grasp its implications

67 Information Organization
Finding ways to structure or classify multiple pieces of information

63 Testing
Conducting tests to determine whether equipment, software, or procedures are operating as expected

63 Synthesis/Reorganization
Reorganizing information to get a better approach to problems or tasks

58 Troubleshooting
Determining what is causing an operating error and deciding what to do about it

58 Negotiation
Bringing others together and trying to reconcile differences

58 Equipment Selection
Determining the kind of tools and equipment needed to do a job

58 Product Inspection
Inspecting and evaluating the quality of products

58 Social Perceptiveness
Being aware of others' reactions and understanding why they react the way they do

54 Active Listening
Listening to what other people are saying and asking questions as appropriate

54 Management of Financial Resources
Determining how money will be spent to get the work done, and accounting for these expenditures

46 Installation
Installing equipment, machines, wiring, or programs to meet specifications

38 Persuasion
Persuading others to approach things differently

33 Learning Strategies
Using multiple approaches when learning or teaching new things

33 Instructing
Teaching others how to do something

25 Operation and Control
Controlling operations of equipment or systems

21 Service Orientation
Actively looking for ways to help people
17 Operation Monitoring
Watching gauges, dials, or other indicators to make sure a machine is working properly

17 Equipment Maintenance
Performing routine maintenance and determining when and what kind of maintenance is needed

17 Repairing
Repairing machines or systems using the needed tools

13 Programming
Writing computer programs for various purposes.

**ABILITIES:**
Abilities elements are ranked by *importance*.

100 Oral Comprehension
The ability to listen to and understand information and ideas presented through spoken words and sentences

96 Written Expression
The ability to communicate information and ideas in writing so others will understand

96 Written Comprehension
The ability to read and understand information and ideas presented in writing

96 Oral Expression
The ability to communicate information and ideas in speaking so others will understand

88 Deductive Reasoning
The ability to apply general rules to specific problems to come up with logical answers. It involves deciding if an answer makes sense.

83 Speech Clarity
The ability to speak clearly so that it is understandable to a listener

83 Inductive Reasoning
The ability to combine separate pieces of information, or specific answers to problems, to form general rules or conclusions. It includes coming up with a logical explanation for why a series of seemingly unrelated events occur together.

79 Near Vision
The ability to see details of objects at a close range (within a few feet of the observer)

79 Mathematical Reasoning
The ability to understand and organize a problem and then to select a mathematical method or formula to solve the problem

71 Visualization
The ability to imagine how something will look after it is moved around or when its parts are moved or rearranged

71 Originality
The ability to come up with unusual or clever ideas about a given topic or situation, or to develop creative ways to solve a problem

67 Fluency of Ideas
The ability to come up with a number of ideas about a given topic. It concerns the number of ideas produced and not the quality, correctness, or creativity of the ideas.

67 Number Facility
The ability to add, subtract, multiply, or divide quickly and correctly

63 Speech Recognition
The ability to identify and understand the speech of another person

58 Problem Sensitivity
The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

54 Category Flexibility
The ability to produce many rules so that each rule tells how to group (or combine) a set of things in a different way.

54 Information Ordering
The ability to correctly follow a given rule or set of rules in order to arrange things or actions in a certain order. The things or actions can include numbers, letters, words, pictures, procedures, sentences, and mathematical or logical operations.

54 Visual Color Discrimination
The ability to match or detect differences between colors, including shades of color and brightness.
50 Time Sharing
The ability to efficiently shift back and forth between two or more activities or sources of information (such as speech, sounds, touch, or other sources)

50 Speed of Closure
The ability to quickly make sense of information that seems to be without meaning or organization. It involves quickly combining and organizing different pieces of information into a meaningful pattern

50 Memorization
The ability to remember information such as words, numbers, pictures, and procedures

46 Selective Attention
The ability to concentrate and not be distracted while performing a task over a period of time

42 Far Vision
The ability to see details at a distance

33 Trunk Strength
The ability to use one's abdominal and lower back muscles to support part of the body repeatedly or continuously over time without "giving out" or fatiguing

33 Spatial Orientation
The ability to know one's location in relation to the environment, or to know where other objects are in relation to one's self

33 Perceptual Speed
The ability to quickly and accurately compare letters, numbers, objects, pictures, or patterns. The things to be compared may be presented at the same time or one after the other. This ability also includes comparing a presented object with a remembered object

29 Wrist-Finger Speed
The ability to make fast, simple, repeated movements of the fingers, hands, and wrists

25 Auditory Attention
The ability to focus on a single source of auditory (hearing) information in the presence of other distracting sounds

25 Peripheral Vision
The ability to see objects or movement of objects to one's side when the eyes are focused forward

25 Flexibility of Closure
The ability to identify or detect a known pattern (a figure, object, word, or sound) that is hidden in other distracting material

21 Extent Flexibility
The ability to bend, stretch, twist, or reach out with the body, arms, and/or legs

21 Arm-Hand Steadiness
The ability to keep the hand and arm steady while making an arm movement or while holding the arm and hand in one position

21 Depth Perception
The ability to judge which of several objects is closer or farther away from the observer, or to judge the distance between an object and the observer

17 Manual Dexterity
The ability to quickly make coordinated movements of one hand, a hand together with its arm, or two hands to grasp, manipulate, or assemble objects

17 Static Strength
The ability to exert maximum muscle force to lift, push, pull, or carry objects

17 Hearing Sensitivity
The ability to detect or tell the difference between sounds that vary over broad ranges of pitch and loudness

17 Control Precision
The ability to quickly and repeatedly make precise adjustments in moving the controls of a machine or vehicle to exact positions

17 Finger Dexterity
The ability to make precisely coordinated movements of the fingers of one or both hands to grasp, manipulate, or assemble very small objects

8 Response Orientation
The ability to choose quickly and correctly between two or more movements in response to two or more signals (lights, sounds, pictures, etc.). It includes the speed with which the correct response is started with the hand, foot, or other body parts

8 Gross Body Equilibrium
The ability to keep or regain one's body balance or stay upright when in an unstable position

8 Night Vision
The ability to see under low light conditions

8 Sound Localization
The ability to tell the direction from which a sound originated

4 Rate Control
The ability to time the adjustments of a movement or equipment control in anticipation of changes in the speed and/or direction of a continuously moving object or scene

4 Reaction Time
The ability to quickly respond (with the hand, finger, or foot) to one signal (sound, light, picture, etc.) when it appears

4 Speed of Limb Movement
The ability to quickly move the arms or legs

4 Dynamic Strength
The ability to exert muscle force repeatedly or continuously over time. This involves muscular endurance and resistance to muscle fatigue

4 Stamina
The ability to exert one's self physically over long periods of time without getting winded or out of breath

4 Dynamic Flexibility
The ability to quickly and repeatedly bend, stretch, twist, or reach out with the body, arms, and/or legs

4 Gross Body Coordination
The ability to coordinate the movement of the arms, legs, and torso together in activities where the whole body is in motion

4 Multilimb Coordination
The ability to coordinate movements of two or more limbs together (for example, two arms, two legs, or one leg and one arm) while sitting, standing, or lying down. It does not involve performing the activities while the body is in motion

WORK ACTIVITIES:
Work activities elements are ranked by importance.

92 Guiding, Directing and Motivating Subordinates
Providing guidance and direction to subordinates, including setting performance standards and monitoring subordinates.

92 Getting Information Needed to Do the Job
Observing, receiving, and otherwise obtaining information from all relevant sources.

88 Organizing, Planning, and Prioritizing
Developing plans to accomplish work, and prioritizing and organizing one's own work.

88 Providing Consultation and Advice to Others
Providing consultation and expert advice to management or other groups on technical, systems-related, or process related topics.

88 Coordinating Work and Activities of Others
Coordinating members of a work group to accomplish tasks.

83 Analyzing Data or Information
Identifying underlying principles, reasons, or facts by breaking down information or data into separate parts.

83 Communicating With Other Workers
Providing information to supervisors, fellow workers, and subordinates. This information can be exchanged face-to-face, in writing, or via telephone/electronic transfer.

83 Developing and Building Teams
Encouraging and building mutual trust, respect, and cooperation among team members.

83 Establishing and Maintaining Relationships
Developing constructive and cooperative working relationships with others.

79 Monitoring and Controlling Resources
Monitoring and controlling resources and overseeing the spending of money.

79 Communicating With Persons Outside Organization
Communicating with persons outside the organization, representing the organization to customers, the public, government, and other external sources. This information can be exchanged face-to-face, in writing, or via telephone/electronic transfer.
79 Making Decisions and Solving Problems
Combining, evaluating, and reasoning with information and data to make decisions and solve problems. These processes involve making decisions about the relative importance of information and choosing the best solution.

79 Implementing Ideas or Programs
Conducting or carrying out work procedures and activities in accord with one's own ideas or information provided through directions/instructions for purposes of installing, modifying, preparing, delivering, constructing, integrating, finishing, or completing programs, systems, structures, or products.

79 Identifying Objects, Actions, and Events
Identifying information received by making estimates or categorizations, recognizing differences or similarities, or sensing changes in circumstances or events.

75 Processing Information
Compiling, coding, categorizing, calculating, tabulating, auditing, verifying, or processing information or data.

75 Judging Qualities of Things, Services, or People
Making judgments about or assessing the value, importance, or quality of things or people.

75 Estimating Needed Characteristics
Estimating the Characteristics of Materials, Products, Events, or Information: Estimating sizes, distances, and quantities, or determining time, costs, resources, or materials needed to perform a work activity.

75 Interpreting Meaning of Information to Others
Translating or explaining what information means and how it can be understood or used to support responses or feedback to others.

75 Developing Objectives and Strategies
Establishing long range objectives and specifying the strategies and actions to achieve these objectives.

75 Scheduling Work and Activities
Scheduling events, programs, activities, as well as the work of others.

75 Monitor Processes, Material, or Surroundings
Monitoring and reviewing information from materials, events, or the environment, often to detect problems or to find out when things are finished.

75 Updating and Using Job-Relevant Knowledge
Keeping up-to-date technically and knowing one's own jobs' and related jobs' functions.

71 Interacting With Computers
Controlling computer functions by using programs, setting up functions, writing software, or otherwise communicating with computer systems.

71 Performing Administrative Activities
Approving requests, handling paperwork, and performing day-to-day administrative tasks.

71 Drafting and Specifying Technical Devices
Providing documentation, detailed instructions, drawings, or specifications to inform others about how devices, parts, equipment, or structures are to be fabricated, constructed, assembled, modified, maintained, or used.

67 Thinking Creatively
Originating, inventing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions.

67 Coaching and Developing Others
Identifying developmental needs of others and coaching or otherwise helping others to improve their knowledge or skills.

67 Evaluating Information Against Standards
Evaluating information against a set of standards and verifying that it is correct.

67 Resolving Conflict or Negotiating with Others
Handling complaints, arbitrating disputes, and resolving grievances, or otherwise negotiating with others.

67 Documenting or Recording Information
Entering, transcribing, recording, storing, or maintaining information in either written form or by electronic/magnetic recording.

63 Staffing Organizational Units
Recruiting, interviewing, selecting, hiring, and promoting persons for the organization.

58 Selling or Influencing Others
Convincing others to buy merchandise/goods, or otherwise changing their minds or actions.

50 Teaching Others
Identifying educational needs, developing formal training programs or classes, and teaching or instructing others.

46 Handling and Moving Objects
Using one's own hands and arms in handling, installing, forming, positioning, and moving materials, or in manipulating things, including the use of keyboards.

46 Inspecting Equipment, Structures, or Material
Inspecting or diagnosing equipment, structures, or materials to identify the causes of errors or other problems or defects.

38 Performing General Physical Activities
Performing physical activities that require moving one's whole body, such as in climbing, lifting, balancing, walking, stooping, where the activities often also require considerable use of the arms and legs, such as in the physical handling of materials.

33 Repairing and Maintaining Electrical Equipment
Fixing, servicing, adjusting, regulating, calibrating, fine-tuning, or testing machines, devices, and equipment that operate primarily on the basis of electrical or electronic (not mechanical) principles.

25 Repairing and Maintaining Mechanical Equipment
Fixing, servicing, aligning, setting up, adjusting, and testing machines, devices, moving parts, and equipment that operate primarily on the basis of mechanical (not electronic) principles.

25 Performing For or Working With Public
Performing for people or dealing directly with the public, including serving persons in restaurants and stores, and receiving clients or guests.

21 Assisting and Caring for Others
Providing assistance or personal care to others.

21 Controlling Machines and Processes
Using either control mechanisms or direct physical activity to operate machines or processes (not including computers or vehicles).

8 Operating Vehicles or Equipment
Running, maneuvering, navigating, or driving vehicles or mechanized equipment, such as forklifts, passenger vehicles, aircraft, or water craft.

WORK CONTEXT:
Work context elements are ranked by frequency (F), importance (I), responsibility (R), amount of contact (C), how serious (S), objective vs. subjective (O), automation (A), extent of frustration (E), responsible for health and safety (H), likelihood of injury (L), degree of injury (D).

90 (I) Importance of Being Exact or Accurate
How important is being very exact or highly accurate in performing this job?

87 (I) Coordinate or Lead Others
How important are interactions requiring the worker to: Coordinate or lead others in accomplishing work activities (not supervision)?

80 (I) Importance of Being Sure All Is Done
How important is it to be sure that all the details of this job are performed and everything is done completely?

72 (S) Consequence of Error
How serious would the result usually be if the worker made a mistake that was not readily correctable?

71 (F) Indoors
How frequently does this job require the worker to work: Indoors

69 (R) Responsibility for Outcomes and Results
How responsible is the worker for work outcomes and results of other workers?

67 (F) Sitting
How much time in a usual work period does the worker spend: Sitting?

63 (I) Supervise, Coach, Train Others
How important are interactions requiring the worker to: Supervise, coach, train, or develop other employees?

61 (C) Job-Required Social Interaction
How much does this job require the worker to be in contact (face-to-face, by telephone, or otherwise) with others in order to perform it?

56 (O) Objective or Subjective Information
How objective or subjective is the information communicated in this job?

53 (I) Deal With External Customers
How important are interactions requiring the worker to: Deal with external customers (e.g., retail sales) or the public in general (e.g., police work)?

50 (F) Walking or Running
How much time in a usual work period does the worker spend: Walking or running?

50 (F) Outdoors
How frequently does this job require the worker to work: Outdoors

50 (F) Frequency in Conflict Situations
How frequently do the job requirements place the worker in conflict situations?

50 (F) Standing
How much time in a usual work period does the worker spend: Standing?

50 (E) Frustrating Circumstances
To what extent do frustrating circumstances ("road blocks" to work that are beyond the worker's control) hinder the accomplishment of this job?

47 (I) Importance of Being Aware of New Events
How important is being constantly aware of either frequently changing events (e.g. security guard watching for shoplifters) or infrequent events (e.g. radar operator watching for tornadoes) to performing this job?

46 (F) Using Hands on Objects, Tools, Controls
How much time in a usual work period does the worker spend: Using hands to handle, control, or feel objects, tools or controls?

46 (F) Common Protective or Safety Attire
How often does the worker wear: Common protective or safety attire, such as safety shoes, glasses, gloves, hearing protection, hard-hat, or personal flotation device?

42 (A) Degree of Automation
Indicate the level of automation of this job.

40 (I) Take a Position Opposed to Others
How important are interactions requiring the worker to: Take a position opposed to coworkers or others?

40 (H) Responsible for Health and Safety of Others
How responsible is the worker for others' health and safety on this job?

40 (I) Persuade Someone to a Course of Action
How important are interactions requiring the worker to: Persuade someone to a course of action (informally) or influence others to buy something (to sell)?

38 (F) Contaminants
How often during a usual work period is the worker exposed to the following conditions: Contaminants (pollutants, gases, dust, odors, etc.)?

38 (F) Very Hot
How often during a usual work period is the worker exposed to the following conditions: Very hot (above 90 F) or very cold (under 32 F) temperatures?

33 (F) Hazardous Conditions
How often does this job require the worker to be exposed to hazardous conditions? Hazardous Conditions (e.g., high voltage electricity, combustibles, explosives, chemicals; do not include hazardous equipment or situations)

33 (F) Hazardous Equipment
How often does this job require the worker to be exposed to hazardous equipment? Hazardous Equipment (e.g., saws, machinery/mechanical parts include exposure to vehicular traffic, but not driving a vehicle)

33 (F) Sounds or Noise Levels Are Distracting
How often during a usual work period is the worker exposed to the following conditions: Sounds and noise levels that are distracting and uncomfortable?

29 (F) Bending or Twisting the Body
How much time in a usual work period does the worker spend: Bending or twisting the body?

29 (F) Deal With Unpleasant or Angry People
How frequently does the worker have to deal with unpleasant, angry, or discourteous individuals as part of the job requirements?

29 (F) Kneeling, Crouching or Crawling
How much time in a usual work period does the worker spend: Kneeling, stooping, crouching or crawling?
27 (I) Provide a Service to Others
How important are interactions requiring the worker to: Provide a service to others (e.g., customers)?

27 (D) Hazardous Conditions
If injury, due to exposure to hazardous conditions, were to occur while performing this job, how serious would be the likely outcome? Hazardous Conditions (e.g., high voltage electricity, combustibles, explosives, chemicals; do not include hazardous equipment or situations)

27 (I) Pace Determined by Speed of Equipment
How important is it to this job that the pace is determined by the speed of equipment or machinery? (This does not refer to keeping busy at all times on this job.)

27 (D) Hazardous Equipment
If injury, due to exposure to hazardous equipment, were to occur while performing this job, how serious would be the likely outcome? Hazardous Equipment (e.g., saws, machinery/mechanical parts include exposure to vehicular traffic, but not driving a vehicle)

25 (F) Climbing Ladders, Scaffolds, Poles, etc.
How much time in a usual work period does the worker spend: Climbing ladders, scaffolds, poles, etc?

25 (F) Extremely Bright or Inadequate Lighting
How often during a usual work period is the worker exposed to the following conditions: Extremely bright or inadequate lighting conditions?

25 (F) High Places
How often does this job require the worker to be exposed to high places? High Places (e.g., heights above 8 feet on ladders, poles, scaffolding, catwalks, etc.)

25 (F) Hazardous Situations
How often does this job require the worker to be exposed to hazardous situations? Hazardous Situations involving likely cuts, bites, stings, or minor burns

21 (F) Special Uniform
How often does the worker wear: A special uniform, such as that of a commercial pilot, nurse, police officer, or military personnel?

21 (F) Making Repetitive Motions
How much time in a usual work period does the worker spend: Making repetitive motions?

21 (F) Keeping or Regaining Balance
How much time in a usual work period does the worker spend: Keeping or regaining balance?

20 (I) Importance of Repeating Same Tasks
How important is repeating the same physical activities (e.g., key entry) or mental activities (e.g., checking entries in a ledger) over and over, without stopping, to performing this job?

17 (D) Hazardous Situations
If injury, due to exposure to hazardous situations, were to occur while performing this job, how serious would be the likely outcome? Hazardous Situations involving likely cuts, bites, stings, or minor burns

17 (D) High Places
If injury, due to exposure to high places, were to occur while performing this job, how serious would be the likely outcome? High Places (e.g., heights above 8 feet on ladders, poles, scaffolding, catwalks, etc.)

17 (F) Cramped Work Space, Awkward Positions
How often during a usual work period is the worker exposed to the following conditions: Cramped work space that requires getting into awkward positions?

17 (L) Hazardous Situations
What is the likelihood that the worker would be injured as a result of being exposed to hazardous situations while performing this job? Hazardous Situations involving likely cuts, bites, stings, or minor burns

14 (L) Hazardous Conditions
What is the likelihood that the worker would be injured as a result of being exposed to hazardous conditions while performing this job? Hazardous Conditions (e.g., high voltage electricity, combustibles, explosives, chemicals; do not include hazardous equipment or situations)

14 (L) Hazardous Equipment
What is the likelihood that the worker would be injured as a result of being exposed to hazardous equipment while performing this job? Hazardous Equipment (e.g., saws, machinery/mechanical parts include exposure to vehicular traffic, but not driving a vehicle)

13 (F) Whole Body Vibration
How often during a usual work period is the worker exposed to the following conditions: Whole body vibration (e.g., operating a jackhammer or earthmoving equipment)?
13 (F) Radiation
How often does this job require the worker to be exposed to radiation?

13 (F) Specialized Protective or Safety Attire
How often does the worker wear: Specialized protective or safety attire, such as breathing apparatus, safety harness, full protection suit, or radiation protection?

12 (L) High Places
What is the likelihood that the worker would be injured as a result of being exposed to high places while performing this job? High Places (e.g., heights above 8 feet on ladders, poles, scaffolding, catwalks, etc.)

10 (D) Radiation
If injury, due to exposure to radiation, were to occur while performing this job, how serious would be the likely outcome?

7 (L) Radiation
What is the likelihood that the worker would be injured as a result of being exposed to radiation while performing this job?

4 (F) Deal With Physically Aggressive People
How frequently does this job require the worker to deal with physical aggression of violent individuals?

4 (F) Diseases or Infections
How often does this job require the worker to be exposed to diseases/infection? Diseases/Infections (e.g., patient care, some laboratory work, sanitation control, etc.)

3 (D) Diseases or Infections
If injury, due to exposure to diseases/infection, were to occur while performing this job, how serious would be the likely outcome? Diseases/Infections (e.g., patient care, some laboratory work, sanitation control, etc.)

2 (L) Diseases or Infections
What is the likelihood that the worker would be injured as a result of being exposed to diseases/infections while performing this job? Diseases/Infections (e.g., patient care, some laboratory work, sanitation control, etc.)

**INTERESTS:**
Interest elements are ranked by occupational interest.

89 Enterprising
Enterprising occupations frequently involve starting up and carrying out projects. These occupations can involve leading people and making many decisions. Sometimes they require risk taking and often deal with business.

67 Investigative
Investigative occupations frequently involve working with ideas, and require an extensive amount of thinking. These occupations can involve searching for facts and figuring out problems mentally.

67 Realistic
Realistic occupations frequently involve work activities that include practical, hands-on problems and solutions. They often deal with plants, animals, and real-world materials like wood, tools, and machinery. Many of the occupations require working outside, and do not involve a lot of paperwork or working closely with others.

61 Conventional
Conventional occupations frequently involve following set procedures and routines. These occupations can include working with data and details more than with ideas. Usually there is a clear line of authority to follow.

28 Social
Social occupations frequently involve working with, communicating with, and teaching people. These occupations often involve helping or providing service to others.

22 Artistic
Artistic occupations frequently involve working with forms, designs and patterns. They often require self-expression and the work can be done without following a clear set of rules.

**WORK VALUES:**
Work values elements are ranked by extent.

74 Independence-Mean Extent
Occupations that satisfy this work value allow employs to work on their own and make decisions. Corresponding needs are Creativity, Responsibility and Autonomy.

73 Achievement-Mean Extent
Occupations that satisfy this work value are results oriented and allow employees to use their strongest abilities, giving them a feeling of accomplishment. Corresponding needs are Ability Utilization and Achievement.
68 Working Conditions-Mean Extent
Occupations that satisfy this work value offer job security and good working conditions. Corresponding needs are Activity, Compensation, Independence, Security, Variety and Working Conditions.

66 Recognition-Mean Extent
Occupations that satisfy this work value offer advancement, potential for leadership, and are often considered prestigious. Corresponding needs are Advancement, Authority, Recognition and Social Status.

54 Relationships-Mean Extent
Occupations that satisfy this work value allow employees to provide service to others and work with co-workers in a friendly non-competitive environment. Corresponding needs are Co-workers, Moral Values and Social Service.

48 Support-Mean Extent
Occupations that satisfy this work value offer supportive management that stands behind employees. Corresponding needs are Company Policies, Supervision: Human Relations and Supervision: Technical.

81 Autonomy
Workers on this job plan their work with little supervision

81 Compensation
Workers on this job are paid well in comparison with other workers

78 Authority
Workers on this job give directions and instructions to others

75 Working Conditions
Workers on this job have good working conditions

75 Company Policies and Practices
Workers on this job are treated fairly by the company

75 Ability Utilization
Workers on this job make use of their individual abilities

72 Security
Workers on this job have steady employment

72 Achievement
Workers on this job get a feeling of accomplishment

72 Activity
Workers on this job are busy all the time

72 Responsibility
Workers on this job make decisions on their own

69 Creativity
Workers on this job try out their own ideas

66 Co-workers
Workers on this job have co-workers who are easy to get along with

66 Social Status
Workers on this job are looked up to by others in their company and their community

63 Recognition
Workers on this job receive recognition for the work they do

63 Moral Values
Workers on this job are never pressured to do things that go against their sense of right and wrong

63 Variety
Workers on this job have something different to do every day

59 Advancement
Workers on this job have opportunities for advancement

44 Independence
Workers on this job do their work alone

44 Supervision, Human Relations
Workers on this job have supervisors who back up their workers with management

34 Social Service
Workers on this job have work where they do things for other people

25 Supervision, Technical
Workers on this job have supervisors who train their workers well

**CROSSWALKS:**

**DOT91 (Dictionary of Occupational Titles):**
- 018167022 Manager, Land Surveying
- 019167014 Project Engineer
- 010161014 Chief Petroleum Engineer
- 010167018 Superintendent, Oil-Well Services
- 005167022 Highway-Administrative Engineer
- 003167070 Engineering Manager, Electronics
- 162117030 Research-Contracts Supervisor
- 007167014 Plant Engineer
- 003167034 Engineer-in-Charge, Transmitter
- 005167010 Chief Engineer, Waterworks

**CEN90 (1990 Census Occupations):**
- 053 Civil Engineers
- 005 Administrators and Officials, Public Administration
- 047 Petroleum Engineers
- 057 Mechanical Engineers
- 022 Managers and Administrators, N.E.C.
- 055 Electrical and Electronic Engineers
- 059 Engineers, N.E.C.

**CIP90 (Classification of Instructional Programs):**
- 143001 Engineering/Industrial Management
- 140805 Water Resources Engineering
- 151102 Surveying
- 140801 Civil Engineering, General

**GOE93 (Guide for Occupational Exploration):**
- 050201 Managerial Work: Mechanical: Systems
- 050206 Managerial Work: Mechanical: Services
- 110503 Business Administration: Management Services: Government
- 050103 Engineering: Systems Design
- 050108 Engineering: General Engineering
- 111204 Contracts and Claims: Procurement Negotiations

**MOC97 (Military Occupational Codes):**
- 5980 Electronics Research Administrator
- 5961 Aircraft Electronics Director
- 5970 Electronic Equipment Military Characteristics Officer
- 2170 Designated Project Support Officer
- 2170 Designated Project Support Officer
- 4240 Petroleum Production Engineering Officer
- 2166 Designated Project Engineering Coordinator
- 2167 Designated Project Test & Evaluation Coordinator
- 2181 Operational Test and Evaluation Officer
- 2180 Preperational Test and Evaluation Officer
- 8035 Aircraft/Guided Missile Engine Project Officer
- 51A Research and Development
- 23 Research and Development
- 51B Test and Evaluation
- 62E1G Developmental Engineer
- 62E4 Developmental Engineer
- 32E3C Civil Engineer
- 32E3K Civil Engineer
- 32E3H Civil Engineer
- 62E3G Developmental Engineer
- 32E1C Civil Engineer

**OES98 (Occupational Employment Statistics):**
- 13017 Engineering, Mathematical, and Natural Sciences Managers

**OPM97 (Office of Personnel Management Occupations):**
- 0807 Landscape Architecture
- 1301 General Physical Science
- 0880 Mining Engineering
- 0881 Petroleum Engineering
- 0890 Agricultural Engineering
- 0892 Ceramic Engineering
- 0893 Chemical Engineering
- 0803 Safety Engineering
- 0896 Industrial Engineering
- 0861 Aerospace Engineering
- 1306 Health Physics
- 1370 Cartography
- 1372 Geodesy
- 1373 Land Surveying
- 1380 Forest Products Technology
SOC98 (Standard Occupational Classification): 11-9041 Engineering Managers

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- Flags of All Countries (for your web site)
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