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General Schedule
Position Classification Standards

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POSITION CLASSIFICATION STANDARD FOR ENGINEERING DRAFTING SERIES, GS-0818

Workforce Compensation and Performance Service

Theodore Roosevelt Building 1900 E Street, NW Washington, DC 20415-8330 Classification Programs Division

Engineering Drafting Series

GS-0818

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SERIES DEFINITION

This series includes positions which involve primarily portraying engineering and architectural ideas and information through drawings. The positions require a practical knowledge of drafting methods and procedures, and skill in the application of drafting techniques.

This standard supersedes the standard for the Engineering Drafting Series, GS-0818, issued in April 1959.

OCCUPATIONAL INFORMATION

Engineering drafting[1] is a support occupation for both engineering and architecture. Drawings are the traditional method by which engineers and architects communicate their ideas and information. There is a universally recognized system of symbols, legends, shadings, and lines (broken and solid, wide and thin) that have specific meaning in drawings.

Engineering drawings are used to:

-- delineate engineering ideas and information for patents, reports, and publications;

-- document the existence and location of public and military facilities and equipment;

-- supply information needed to fabricate, construct, assemble, maintain, repair, install, and procure equipment and facilities; and

-- study the feasibility of new engineering or architectural proposals.

Engineering draftsmen must possess:

-- ability to prepare drawings that are neat, accurate, appropriately dimensioned, and logically arranged, utilizing the methods and techniques of drafting;

-- ability to print neatly and legibly, both freehand and with mechanical lettering devices in accordance with good engineering and architectural lettering practice;

-- ability to make mathematical computations using standardized tables and formulas;

-- knowledge of the symbols, terminology, and accepted standards used in engineering drawings; and

[1] For editorial convenience this standard uses the term engineering to describe draftsmen, drafting, and drawings that are in support of engineering or architecture.

-- practical knowledge of the equipment, facilities, and systems of the particular field of engineering or architecture in which they work.

EXCLUSIONS

The Engineering Drafting Series does not include positions that involve primarily:

1. Application of artistic ability, using common art media including tempera and oils, in laying out and executing illustrations in black-and-white and in color. Such positions are classified in the Illustrating Series, GS-1020.

2. Drafting charts, diagrams, room arrangements, and office forms to depict statistical and administrative data, rather than engineering or architectural data. Such positions are classified in the Office Drafting Series, GS-1021.

3. Compiling, drafting, and editing maps and charts, requiring primarily a technical knowledge of cartography. Such positions are classified in the Cartographic Technician Series, GS-1371.

4. Nonprofessional engineering design work in addition to drafting work. Such positions are classified in the Engineering Technician Series, GS-0802. In many organizations there is a clear career ladder from draftsman to engineering technician positions involving design work.

Engineering design may be defined as the exercise of judgment and technical knowledge in the evaluation and selection of alternatives in conceiving, planning, or proportioning engineering systems, structures, machinery, or devices to satisfy performance, cost, safety, size, strength, durability, constructability, and other requirements.

Positions concerned with the review of drawings are classified in the Engineering Drafting Series when the emphasis in the appraisal of the drawings is on the completeness, correctness, and adequacy of the drafting work, i.e., whether the drawings are neat and logically arranged; contain appropriate dimensioning and notes; and provide clarifying details, views, and section. Non-professional positions in which the emphasis is on the review of drawings for production feasibility, performance, safety, durability, and other elements of design judgment are to be classified in the Engineering Technician Series. In the latter case it is the design intent contained in the drawings which is appraised rather than the drawings per se.

CAREER PATTERNS

There are two types of career patterns in the engineering drafting occupation:

Some positions largely involve drafting with no significant design responsibility. They involve work progressing from routine copying to the most difficult projection and shading techniques responsibilities of draftsmen in these positions are (1) selecting the best projections, views, scale, labels, dimensions, and shading or crosshatching for portraying the design and (2) applying skill in the use of drafting techniques and methods in actually preparing the drawings.

Other positions primarily involve drafting, but also involve substantial design contributions. They may include training for nonprofessional engineering design positions. These draftsmen work closely with designers and are given opportunities, both through actual work experience and formal technical courses, to increase their knowledge of the technical design aspects of the field of engineering or architecture in which they work.

In addition to drafting skill, they use the knowledge gained through experience and training, supplemented by technical reference books, precedent designs, and standards and regulations, in making progressively more difficult design determinations when preparing drawings. They have a knowledge of and consider such design factors as: appropriate fits and tolerances, physical properties of materials, load capacities, requirements and methods of reinforcement, drainage patterns, positioning of pipelines, fabrication techniques, and weight limitations.

These draftsmen are encouraged to relieve designers of routine considerations. Their assignments provide them the opportunity to comprehend the detailed characteristics of the item being designed and to become familiar with accepted design practices. Through extensive experience draftsmen may develop sufficient comprehension of the items being designed, of construction and fabrication techniques, and of design factors and practices to be able to determine what design treatment is acceptable. The emphasis in the assignments may accordingly shift from documenting and communicating information to selecting the design information best adapted to particular requirements.

It is frequently difficult to determine at what point the design contribution, rather than the drafting skill, becomes primary. Normally, positions in which the design contribution is less than that described at GS-7 in the Engineering Technician classification standard are appropriately classified in the Engineering Drafting Series.

TITLES

Engineering Draftsman is the authorized title for nonsupervisory positions.

Supervisory Engineering Draftsman is the authorized title for positions requiring supervisory qualifications.

Specialized titles are not authorized for positions in this series. Nevertheless, the specialized knowledge and skills required for the work of a position may be the basis for selective placement in filling the position.

CLASSIFICATION CRITERIA

Two broad criteria provide the basis for classifying engineering drafting positions:

Nature of Assignment and

Level of Responsibility.

Qualification requirements are not described separately, but have been reflected as appropriate under *Nature of Assignment* and *Level of Responsibility*.

None of these elements should be considered alone as grade determining, but in combination they give a picture of the overall complexity of drafting assignments.

Nature of assignment

Nature of assignment, as defined under the following elements, reflects the skill and knowledge required to complete drafting assignments.

1. *The complexity of the design*. -- Simple designs involve mostly straight lines, some arcs and circles, few parts, parts with clean, easily visualized interrelationships, and few hidden (i.e., interior) design features. Complex designs involve irregular and reverse curves; small, crowded, and hidden details; and many parts with unusual interrelationships and contours.

2. *The techniques utilized*. -- Drawing irregular curved lines with a compass and plotting curves on a coordinate system requires an understanding of certain mathematical principles and more skill than drawing curves with templates (i.e., patterns that come in many shapes and sizes).

   Orthographic, isometric, perspective, and other projection techniques may vary in their relative difficulty. The projection technique used is less significant than the complexity of the drawing or design involved. A perspective drawing of a simple design may be less difficult to make than an orthographic drawing of a complex design.

   Whether a drawing is done on paper, plastic, or linen and whether it is in pencil or ink have no effect on the grade level. Ink drawings are usually done in pencil first and then traced in ink.

3. *Visual information from which draftsmen prepare drawings*. -- At the lower grade levels, draftsmen copy or trace finished drawings and accurate sketches drawn to scale. This requires the minimum knowledge of drafting procedures and practices, but develops basic drafting skills, such as drawing neat and accurate lines and curves of appropriate weights

(i.e., thickness). As draftsmen progress, the sketches they receive are less accurate and they must determine such things as appropriate arrangements, scales, views, and spacing and location of dimensions and notes. At the higher levels, draftsmen receive layouts, models, photographs, and very rough sketches from which to prepare several views of an object. They also combine design features from several sources into a single drawing. Drawing upon experience in the particular area of engineering or architecture concerned, draftsmen visualize and draw views that are not shown on the information that they receive. They may also prepare drawings from written specifications with no visual materials to use as a base.

Level of responsibility

Level of responsibility is measured in terms of:

-- supervision received;

-- guidelines and precedents utilized;

-- person-to-person contacts.

The nature of supervisory instructions is a primary consideration in determining the level of responsibility. Knowing the kinds of instructions draftsmen are given, one can determine the kinds of judgments they make in preparing their drawings. It is important, however, to recognize that on recurring assignments, draftsmen at all levels normally receive very general instructions.

Drawings prepared by draftsmen at all levels are normally reviewed. At the lower levels, a skilled draftsman reviews the drawings for neatness, clarity, and adequacy. At the higher levels, however, the draftsman's skill is assumed and, normally, the drawings are reviewed for accurate portrayal of the design and adequate information for the purpose.

As draftsmen advance, their guidelines and reference books become more numerous and technical. Higher level draftsmen normally use technical handbooks, catalogs, and specifications to obtain information of design characteristics, such as dimensions, tolerances, physical properties, fabrication techniques, and standard mathematical tables and formulas.

Because of the direct relationship with design originators, person-to-person contacts are a significant measure of the level of responsibility for higher grade draftsmen. Design originators frequently rely upon draftsmen with a practical knowledge of the technical aspects and terminology of the engineering specialty to determine, from very limited technical information, what kinds of drawings are needed and what information should be included in the drawings.

Draftsmen at the higher levels normally need to exercise independent judgment. They frequently relieve the designer of many standard and noncritical design considerations and are completely responsible for the preparation of appropriate and adequate drawings.

NOTES TO USERS OF THIS STANDARD

This is a one-grade interval series.

This standard includes grade-level criteria for nonsupervisory positions in grades GS-1 through GS-7. Nonsupervisory positions above GS-7, where the primary skill is engineering drafting, are rare and would be impractical to describe. When the drafting responsibilities obviously exceed those described at grade GS-7 of this standard, positions should be classified by extension of the criteria of this standard and application of sound classification principles.

This standard does not describe the relatively atypical nonsupervisory positions in which the review of drafting work is a primary responsibility. The review work performed in these positions varies greatly in scope, intensity, and responsibility. For this reason the review responsibility must be carefully appraised in terms of the required knowledge and abilities. Review work that entails merely a checking for completeness, accuracy, and compliance with instructions -- as in the case of two draftsmen who check each other's work -- would not warrant an additional grade.

Positions that require substantial and continuing responsibility for supervising the work of engineering draftsmen and require supervisory qualifications should be evaluated according to the General Schedule Supervisory Evaluation Guide.

ENGINEERING DRAFTSMAN, GS-0818-01

Nature of assignment

GS-1 draftsmen are basically learners and receive instructions in the elementary methods and techniques of drafting. They learn how to use and care for equipment. Assignments are selective and repetitive in nature to develop skill in following instructions. Draftsmen at this level trace and copy simple drawings characterized by straight lines involving few details of dimensions or notes; prepare standard border lines and title boxes for drawing sheets; and prepare basic title headings by tracing or using lettering kits.

Level of responsibility

GS-1 draftsmen receive very close supervision and detailed instructions for each assignment. Procedures, methods, and techniques are demonstrated. Their work is closely reviewed while in progress and

ENGINEERING DRAFTSMAN, GS-0818-02

Nature of assignment

GS-2 is a typical entrance level for engineering draftsmen. Depending upon their experience or training in drafting, assignments may be similar to those of the GS-1 draftsman. A major difference in most GS-2 positions is that assignments are designed to further develop skill in basic drafting techniques, while GS-1 draftsmen are being introduced to the drafting field. GS-2 draftsmen trace or copy finished drawings that include curved lines that can be drawn with templates. They are given planned opportunities to develop skill in lettering when they copy drawings and when they make clearly indicated revisions in notes and dimensions on finished drawings.

GS-2 draftsmen apply their knowledge of standard drafting practice and the requirements of engineering drawings in their organizations. These requirements include such things as the filing and numbering systems for drawings, the size and type of paper used, the format for notes and titles, the arrangement of views, and the kinds of drawings made in their organization.

The following assignments are illustrative:

1. From a marked up print indicating each revision, corrects misspelled words or incorrect numbers and dimensions on completed drawings, specifications lists, parts lists, etc.

2. Draws screws, nuts, and other simple parts and related dimensions and notes.

Level of responsibility

GS-2 draftsmen receive close supervision. The supervisor or a higher grade draftsman gives specific instructions on the methods to be used. Methods and techniques may be demonstrated, as at GS-1, but, as assignments recur, GS-2 draftsmen select and apply appropriate methods and techniques from among those that they have used. Assignments are checked while in progress and reviewed upon completion for neatness, accuracy, and clarity.

ENGINEERING DRAFTSMAN, GS-0818-03

Nature of assignment

GS-3 draftsmen make drawings of simple equipment and facilities from sketches, marked up prints, and models, when the details are easily visualized and fit a familiar pattern. They select appropriate templates or use a compass for making arcs, curves, circles, and ellipses; draw angles with the drafting machine or the T-square and triangles; and determine the size, spacing, and arrangement of dimensions and notes. By comparison, GS-2 draftsmen receive finished drawings to copy or trace.

From tabular data and instructions as to the appearance of the finished product, GS-3 draftsmen plot and draw graphs, charts, and diagrams. Given the final scale of the reduced drawing, they make standard arithmetic transmutations in determining scales and line weights of drawings to be reduced for publications and reports and in converting drawings from one scale to another.

When making routine revisions to finished drawings in accordance with sketches furnished, GS-3 draftsmen make needed changes in related information on parts and material lists and on other drawings as indicated.

The following assignments are illustrative:

1. From a map draws location plan of a civil engineering project for the cover sheet and arranges, centers, spaces and, with a mechanical device, letters titles on cover sheet of the completed set of drawings.

2. From sketches, draws floor plans of a building, determining the size, spacing, and arrangement of freehand lettering according to a given scale.

3. From a marked up print showing the changes, revises the original drawings of a plumbing system, increasing the diameter of the pipes. Locates and changes all references to the number of the original pipe on parts lists and related drawings.

4. Draws simple land profiles from previously reduced survey notes and structural dimensions furnished.

Level of responsibility

Instructions are detailed for each new or unfamiliar assignment. The supervisor or higher grade draftsman making the assignment periodically checks the work. On recurring assignments, the supervisor may refer the GS-3 draftsman to similar drawings done in the past or to a manual that will give him needed information on scale, dimensions, arrangements, views, and any other information needed to complete the assignment. By comparison, GS-2 draftsmen normally work from finished drawings that include the appropriate scale, dimensions, etc. The supervisor or a higher grade draftsman is available for consultation and reviews completed assignments for neatness, accuracy, and clarity.

Contacts of GS-3 draftsmen are normally limited to other draftsmen.

ENGINEERING DRAFTSMAN, GS-0818-04

Nature of assignment

GS-4 draftsmen prepare drawings that include various views, sectional profiles, detail drawings, and assembly and subassembly drawings from sketches, marked up prints, layouts, and models. Drawings include irregular and reverse curves that must be drawn with a compass or plotted on a coordinate system; small and intricate details; and hidden and intersecting lines. By comparison, GS-3 draftsmen prepare drawings where the design is simple and easy to visualize.

GS-4 draftsmen may gather some of the information necessary to complete their drawings by visiting the site, viewing the actual process or hardware, or measuring the equipment or facility. In such cases, the drawings are more for pictorial effect than for accuracy of the dimensions.

At the GS-4 level, draftsmen make simple revisions from written and verbal descriptions. They receive sketches of each view when complex design features are involved. In contrast, GS-3 draftsmen receive sketches of routine changes.

GS-4 draftsmen make arithmetic computations by using standard formulas for such things as dimensions, scale, and area. They prepare notes, such as descriptions for revisions, using standard abbreviations and engineering terms. At this level, draftsmen select and use symbols and legends common to their field of engineering or architecture. By contrast, GS-3 draftsmen are not yet familiar enough with technical terminology and information requirements to prepare notes on a regular basis.

The following assignments are illustrative:

1. From written specifications of the new width of a proposed roadway, makes all necessary revisions to a complete set of drawings, including dimensions and notes, for a highway construction project.

2. From rough sketches, a model of the actual item, and viewing the process, prepares a step-by-step diagram for manufacturing an emergency arresting gear.

3. From a layout and manual reference, prepares several views of a simple gear system. Obtains data on dimensions, tolerances, etc., from the manual and by measuring the layout.

Level of responsibility

When making new or unfamiliar assignments to GS-4 draftsmen, supervisors specify the method of approach, sources of information, and applicable precedents. They assign familiar or recurring work in terms of the objectives and the time frame. GS-4 draftsmen use their own judgment and draw upon prior experiences to determine what precedents and sources of information are of value. By comparison, supervisors identify applicable precedents and sources of information for GS-3 draftsmen. Supervisors review the finished routine drawings of GS-4

draftsmen for accuracy and completeness. New or unfamiliar assignments are reviewed in process.

Supervisors refer GS-4 draftsmen to technical manuals and handbooks to obtain information pertaining to the kinds of systems, equipment, and facilities with which they work. GS-4 draftsmen are expected to be familiar with the technical terminology; the kinds of design and construction or fabrication information that they need to include in their drawings; and the various uses made of their drawings and how these affect the information and drawing requirements.

Like GS-3 draftsmen, GS-4 draftsmen have the normal day-to-day contacts with other draftsmen in their immediate organization. In contrast to GS-3, however, GS-4 draftsmen have contacts with workers in the shop or at the site of a project to obtain information or make measurements.

ENGINEERING DRAFTSMAN, GS-0818-05

Nature of assignment

GS-5 draftsmen prepare complete sets of orthographic drawings, normally including several views, details and assembly drawings. The designs frequently involve irregular and reverse curves, small and intricate details, and hidden design features in combinations that require experienced drafting skill to visualize and portray accurately. By comparison, GS-4 draftsmen encounter isolated complex design features that are easier to visualize and portray.

GS-5 draftsmen prepare complete sets of drawings of equipment or facilities from incomplete sketches, layouts, or models, and supplementary verbal information. Given the purpose of the drawings, they determine what views, sections, stages of assembly, detail drawings, and supplementary design information are needed. In contrast, GS-4 draftsmen receive a complete sketch of each view when complex design features are involved.

Given a surveyor's field notes or tables of vertical/horizontal ratios, GS-5 draftsmen prepare vertical and horizontal views of land contours. They use standard mathematical formulas to draw contours, and to compute such things as center of gravity, load capacities, quantities of materials, and dimensions. By comparison, GS-4 draftsmen seldom use such mathematics.

When the design is easily visualized and without unusual, crowded, and irregular features, GS-5 draftsmen prepare layouts and, in some cases, three-dimensional drawings from sketches, models, and finished orthographic drawings.

The following assignments are illustrative:

1. Prepares isometric diagrams from sketches of a plumbing or electrical wiring system of a small building, such as a single family residence.

2. Prepares complete sets of shop drawings from layouts or sketches of test equipment to be manufactured locally. To properly describe the design several cross-sectional and

subassembly drawings are necessary. The drawings include the information necessary to make the equipment, such as dimensions, tolerances, fits, fabrication techniques, and standard parts to be used. Obtains such information verbally from the design originator and from technical handbooks, manuals, and manufacturer's catalogs.

3. Updates compilation sheets of underground utilities in a geographic area. Reviews drawings of new underground line proposals by utility companies. Plots new lines on compilation sheet to check for interference with any existing lines. Where interference exists, and needed changes are minor, recommends alternative position.

4. Determines the arrangement and prepares drawings of printed circuit boards from electronic schematics, information as to the maximum size, and manuals giving dimensions of standard parts.

5. From precedents, drafting standards, and established practices, prepares final construction drawings for floodgates, navigation locks, dams, bridges, culverts, levees, channel excavation, dikes and berms; prepares boring profiles, typical cross-section, and profiles; delineates related topographic details as required.

Level of responsibility

Assignments involving complex designs that are familiar to GS-5 draftsmen are made in terms of objectives to be achieved and without explicit instructions as to work methods. GS-5 draftsmen independently resolve problems that they have previously encountered. Where assignments differ significantly from those they have previously encountered or where problems occur, supervisors suggest a method of approach and furnish additional advice as needed. Supervisors review finished drawings for overall completeness and adequacy.

On their own initiative, GS-5 draftsmen select directly applicable information from standard references, guides, and precedents that they have encountered previously. By comparison, GS-4 draftsmen use primarily that information which their supervisors have identified as applicable.

In addition to those contacts mentioned at the GS-4 level, GS-5 draftsmen typically have direct contact with the project engineer or designer. For example, GS-5 draftsmen may be assigned to projects where the design is not yet finalized and the designers are making frequent changes. The designers relate such changes directly to the draftsmen who must analyze them in terms of their effects on drawing requirements and recognize and refer problems to the supervisor. Here the important factors are the draftsmen's ability to communicate with the engineers, to understand the terminology of the particular specialty, and to recognize problems that should be referred to a higher level.

ENGINEERING DRAFTSMAN, GS-0818-06

Nature of assignment

Some GS-6 draftsmen are located in organizations that provide support services for a number of engineering and architectural organizations with different specializations and different requirements for data presentation. They prepare drawings that are similar in difficulty and complexity to GS-5, but involve more breadth and variety. The drawings serve a variety of purposes: fabrication and construction; repair, maintenance, and installation; reports and publications; feasibility studies; and displays. GS-6 draftsmen use the full range of drafting techniques, including three-dimensional projections. They exercise considerable versatility in preparing drawings of such breadth and variety.

Other GS-6 draftsmen are assigned to projects where directly applicable precedents are not available. The complexity of the design and techniques utilized are similar to those described at GS-5. In contrast to the GS-5 level, however, GS-6 draftsmen are dependent upon a wide variety of precedents and technical guidelines, which are not always directly applicable, to complete their drawings. In this situation the GS-6 draftsman's experience and practical knowledge of the engineering or architectural specialization, especially the kinds of equipment and the functional interrelationships of parts, enable him to visualize and combine complex design features from information encompassed in a variety of sources, including verbal descriptions. He may prepare layouts that require a high degree of accuracy and are used by designers to check tolerances, clearances, and dimensions.

The following assignments are illustrative:

1. In the graphics unit of a research and development organization, prepares drawings of equipment describing new developments in various areas of physical science and engineering. Graphic portrayals are used in technical publications, displays, research reports, and feasibility studies. Occasionally prepares shop drawings for locally fabricated models.

2. In a design and construction organization, prepares sets of drawings of new or changed facilities, equipment, and systems from engineers' sketches, marked up prints, and verbal instructions. Drawings contain information concerning location, design, materials, dimensions, standard parts, etc., that is necessary to carry out the construction project. Drawings involve a variety of branches of engineering and include such things as building designs, floor plans, and structures, roadways and parking areas, land contours and drainage patterns, plumbing, heating, air conditioning, and electrical systems, etc.

3. Prepares a complete set of drawings for feasibility study of the communications portions of a tunnel to be added to an existing freeway. Tunnel will contain cameras and will be hooked up to a computer several miles away. From old feasibility studies determines the kinds of information needed. Obtains rough sketches and written and verbal information from the engineer. Searches manufacturer's catalogs and standards manuals for detail descriptions of standard cameras, computers, traffic signs, etc. Prepares location plans and drawings of the electrical system using information obtained from road maps, utility maps, and visits to the

site. Engineer reviews completed drawings to insure that adequate information is contained to evaluate communications phases of the overall plan.

4. Given written descriptions and sketches of desired facilities, draws preliminary layout for renovation of a school building. Searches drawings of existing schools with similar facilities and obtains specifications on per pupil room sizes, mandatory and optional facilities, etc., from manuals. Adapts information to existing building making use of existing walls, stairways, and facilities wherever possible. Refers conflicts between desired facilities and existing space to architect for resolution.

Level of responsibility

Technical drafting supervision is usually available. When the immediate supervisor is not an experienced draftsman, drawings are reviewed by the individual making the request. In either case, instructions are given in terms of objectives and the draftsmen exercise independent judgment in completing their assignments. Completed assignments are normally reviewed for achievement of objectives. Unusual assignments, or those where precedents are not available, receive a more detailed review to insure that the methods utilized are logical and the design is portrayed accurately.

GS-6 draftsmen use the same guidelines and technical reference materials as GS-5 draftsmen. In contrast to GS-5, however, GS-6 draftsmen rely heavily on technical reference materials where precedent drawings are not available.

Contacts at the GS-6 level are similar to those at GS-5. Where unprecedented designs are involved, however, GS-6 draftsmen utilize greater knowledge to obtain design information and drawing requirements directly from the designer or project engineer.

ENGINEERING DRAFTSMAN, GS-0818-07

Nature of assignment

GS-7 draftsmen are senior draftsmen who normally have substantial experience in the drafting field and receive unusually difficult drafting assignments. Their assignments are distinguished from the GS-6 level by originality, scope, and/or complexity, as described below.

Some GS-7 draftsmen apply initiative and resourcefulness in independently planning the methods by which to portray original designs of complexity and variety. They draw upon their substantial experience in the field and use appropriate technical guidelines to resolve problems. Because of the originality of the design, however, GS-7 draftsmen may be dependent upon discussions with the designer to understand the design concept and to obtain the information needed to make the drawings.

At this level, draftsmen select and utilize the full range of projection techniques to portray unusual and complex designs. They may prepare layouts that require a high degree of precision and are used by designers to check tolerances, clearances, and dimensions on newly designed equipment where problems are anticipated or have been discovered in the manufacturing, assembly, installation, or operation of the equipment. By comparison, GS-6 draftsmen prepare layouts where no problems are anticipated.

Other GS-7 draftsmen serve as coordinators and planners for large and complex projects requiring the assistance of several lower grade draftsmen. Such projects can be divided into complete segments comparable in complexity to those sets of drawings described at GS-6. GS-7 draftsmen act as liaison with the designer or project engineer. They independently plan the method of approach and assign portions of the project to lower grade draftsmen. They direct and review the work of the other draftsmen on the project who come to them for assistance. They are responsible for the adequacy and accuracy of all drawings in the completed projects.

The following assignments are illustrative:

1. Plans and prepares drawings of new avionics and fire control systems. These systems are novel in concept and differ significantly from established agency precedents. Obtains design information verbally and in rough sketches from the designer and from technical manuals. Designs involve crowded features, irregular shapes, multiple functional relationships, and requirements for achieving extremely precise positional relationships between components.

2. Independently plans the method by which to effectively portray information contained in patent specifications or descriptions. Receives assignments involving inventions in any field of technology. Makes drawings from written specifications and, in some cases, photographs, sketches, or models. Uses three-dimensional projections to portray the design in a single drawing of limited size, with crosshatching and shading to show colors, materials, and contours.

3. Receives assignments that consist of a set or group of drawings for an entire project or a portion of a project with independent responsibility for completion. Depending upon the assignment, may have several lower graded draftsmen assigned to assist in completion of the assignment. Assignments involve complex items embodying design features differing from established agency precedents. These complexities require the draftsman to work in close support of the design originator in order to receive all necessary information to produce the detail required in the drawing and to obtain familiarity with the knowledge of the subject matter with which the drawings are concerned.

Level of responsibility

GS-7 draftsmen receive their assignments in terms of objectives. They plan, develop, and execute their work with little or no supervisory assistance. When designs are original, GS-7 draftsmen work very closely with the design originators who, in turn, verify completed drawings for consistency with the overall design intent. When a supervisory draftsman is available, he normally reviews finished projects for overall completeness and adequacy.

Guides and precedents, although not directly applicable, are numerous. GS-7 draftsmen spend considerable time searching for information. They exercise judgment in selecting, rejecting, and interpreting data based upon their knowledge of the design intent, experience in the particular area of specialization, and the various uses that will be made of completed drawings. GS-7 draftsmen are relied upon to select, interpret, and apply technical guidelines in situations where precedent drawings are not applicable.

GS-7 draftsmen are normally recognized as experts in their field. Other draftsmen come to them for advice on how to portray unusual or complex designs. They may play an active role in the training of lower grade draftsmen.