

TIER II STANDARD FOR CIVIL ENGINEERS

INTRODUCTION

1. This grade level standard illustrates the application of the ICSC Master Standard (Tier I) to a specific field of work of the United Nations common system: **Civil engineers**. It is divided into three sections:

- Definition of coverage;
- Summary factor rating chart;
- Grade level descriptions of typical duties and factor-by-factor evaluation rationales.

2. The Tier II standard for Civil engineers was developed in consultation with the representatives of the organizations and the staff taking into account existing organizational structures and job descriptions submitted by the organizations. Two consultation groups were convened by the ICSC secretariat in August 1982 to review the preliminary draft it had prepared: one in North America - Montreal (16 to 20 August) and one in Europe - Geneva (23 to 27 August). The European group included one job classification adviser from ILO representing the Geneva-based organizations, a civil engineer from WHO and a representative of FICSA. A further meeting was held in Rome with job classification and civil engineering experts from FAO. The North-American group was composed of a job classification adviser and two substantive specialists from ICAO, as well as a representative of FICSA. The CCAQ Sub-Committee on Job Classification considered the draft standard at its eighth session (Vienna, November 1982) and circulated it to all organizations of the common system and to CCAQ for its final review.

3. The standard was established and promulgated, with immediate effect, by the International Civil Service Commission at its seventeenth session in March 1983.

I - DEFINITION OF COVERAGE

4. This section serves to confirm the appropriateness of the job to the occupational category and field of work. The coverage of the standard is defined by reference to (a) the Common Classification of Occupational Groups (CCOG) narrative description of the field of work; and (b) a listing or description of occupations specifically excluded from the standard.

A. Inclusions - CCOG definitions

5. The field of work described in these standards is defined as follows:

1.B.06. Civil engineers

Apply the theories and techniques of civil engineering as follows: study and advise on the design of structures, such as bridges, dams, docks, roads, airports, railways, systems for disposal of non-nuclear waste and flood control and industrial and other buildings, and plan, organize and supervise their construction, maintenance and repair; assess broad requirements of construction project and determine most suitable location for structures; assess conformity with building codes; calculate stresses and strain implicit in or affecting proposed structures, taking account of such factors as estimated load, water pressure, wind resistance, soil characteristics, temperature fluctuations and the nature of building materials to be used; consult with other specialists, such as mechanical, electrical and chemical engineers and construction and landscape architects, regarding technical and aesthetic requirements; advise on the design of structures and the preparation of cost estimates, working plans and specifications, indicating types of materials and earth-moving, hoisting and other equipment required; and plan, organize and supervise maintenance and repair work on existing structures.

6. Professional posts within this field of work are further classified under a specific occupation. The CCOG identifies eight occupations within the civil engineer category. United Nations organizations have reported positions within five of these occupations. The CCOG definitions for these five subgroups are given below:

1.B.06.a. Airport engineers

Apply the theories and techniques of airport engineering as follows: study and advise on airport planning and design, including estimates of traffic, site evaluation and selection, the preparation of master plans, pavement designs and detailed engineering documents and cost estimates; study and advise on airport construction, including the evaluation of contract bids, the evaluation of materials and general work supervision to ensure conformity with plans and specifications; and study and advise on airport operations, including the establishment of preventive maintenance programmes for drainage systems, pavements, visual aids and buildings, the inspection of facilities and the implementation of corrective measures as necessary.

1.B.06.b. Forest engineers

Apply the theories and techniques of forest engineering as follows: study and advise on construction, installation and the use of structures, equipment and harvest transportation system, and perform other engineering duties concerned with the removal of logs from timber area; survey timber land and draw topographical maps; determine the locations of loading points and storage

areas and the methods of equipment for handling logs; advise on the layout and construction of roads or rail network used to transport logs from cutting areas to loading sites and storage areas; and plan and direct the construction of campsites, loading docks, bridges and culverts, equipment shelters and water and sanitary facilities to maintain the efficient and safe removal of logs from constantly shifting cutting areas.

1.B.06.c. Hydraulic engineers

Apply the theories and techniques of hydraulic engineering as follows: study and advise on the design of hydropower, water supply, irrigation, inland waterways and related projects, and plan, organize and supervise their construction, maintenance and repair; determine, through tests and measurements, the characteristics of soil, such as salinity, water-table level, areas of subnormal plant growth, the type of soil and surface profile, and compute and estimate rates of water flow; advise on the design, construction, maintenance and repair of dams and other structures and equipment for hydroelectric power, and of canals, locks, channels, ditches, conduits, mains, reservoirs, pumping stations and other structures and equipment for the control and use of water; and design laboratory models to study construction and flow problems.

1.B.06.e. Sanitary engineers

Apply the theories and techniques of sanitary engineering as follows: study and advise on the technical and economic planning, design, construction, operation, maintenance, surveillance and evaluation of specialized facilities, e.g. those necessary for the control of the quality of air, land and water resources and of the environment, in particular facilities for water supply, waste water and solid waste disposal, vector control, healthful housing, food safety, noise control, radiation protection, the disposal of obnoxious gases, chemicals and industrial water, and the evaluation of the performance of such works; the assessment of environmental conditions, the organization and management of programmes for the monitoring and surveillance of the quality of the environment, the elaboration of statements on the expected environmental impact of physical development programmes; and research and investigations, the setting of standards in physical and urban planning and in evaluating the adequacy and effectiveness of control programmes for the protection of human health and well-being.

1.B.06.g. Structural engineers

Apply the theories and techniques of structural engineering as follows: study and advise on the design of load-bearing frameworks for buildings, towers, bridges, tunnels and other structures and plan, organize and direct their erection; advise on the design of the framework of buildings, towers, bridges, tunnels and other structures to ensure strength and rigidity, taking into account such factors as tolerable stresses within given safety margins, vibration allowances, size, shape, appearance and economy; assess conformity with building codes; write materials and construction specifications and estimate materials and labour costs; review the progress of construction to ensure that workmanship

is in conformity with specifications; and study the developments of new materials and methods and their impact on design and construction.

1.B.06.i. Land and water development engineers

Apply the theories and techniques of land and water development engineering to plan, design, construct, operate, maintain and manage land and water development activities in respect of: irrigation, drainage, flood protection, land reclamation and surface and ground-water resources; the assessment of irrigation and drainage requirements in relation to crop production, soil characteristics and climate; land preparation for irrigation; the control of salinity and waterlogging, and reclamation of problem soils; the use of low-quality water; the protection of agricultural land from flooding, using polders, river training, bank protection and salt-water intrusion; and the design and operation of engineering structures for water storage, diversion conveyance and field distribution.

Functions of a technical or substantive nature

7. The following functions are performed within a particular subject-matter area, in whole or in part, in all occupations normally characterized within the organizations of the United Nations common system as being Professional: at the international level, performs and coordinates research and development activities gathers, evaluates and disseminates data on the latest developments; prepares the technical documentation for and drafts conclusions, recommendations and resolutions resulting from meetings and conferences; prepares articles, technical aids, manuals and other technical publications; plans, coordinates, executes, monitors and evaluates technical assistance projects and activities, and provides guidance and advice.

B. Exclusions

8. These standards do not cover posts in which the following types of activities are predominant: (a) Reviewing building layout in terms of office design (e.g., floor plans, accommodation requirements); (b) Reviewing proposed modifications or additions to physical premises; (c) Supervising the maintenance and repair of physical premises. These activities are primarily found in buildings maintenance positions (1.A.03.b).

9. Job descriptions received from organizations and through subsequent consultations have indicated that the following occupations, although included in CCOG for this field of work, are not represented and hence, are not included within this standard:

- Railway engineer (1.B.06.d.)
- Soil mechanics engineer (1.B.06.f.)

- Transportation engineer (1.B.06.h.)

II - GRADE LEVEL DESCRIPTIONS AND EVALUATION RATIONALES

P-2 GRADE LEVEL

A. Description of typical duties

Work at this level involves:

- Examining material requirements of engineering projects and prepare appropriate specifications.
- Preparing requisitions for procurement of construction supplies.
- Planning and designing basic construction specifications for small engineering projects.
- Reviewing calculations produced by contractors for accuracy.
- Maintaining liaison with local contractors and suppliers concerning the provision of negotiated services.

B. Factor rating rationales

I. PROFESSIONAL KNOWLEDGE

H. Theoretical knowledge

Knowledge at the first university degree level in civil engineering.

V. Practical experience

Two to five years' experience in civil engineering positions at the national level.

D. Language knowledge

Proficiency in only one language is required (the working language of the Organization in that duty station).

II. DIFFICULTY OF WORK

H. Individual contribution

Analyses basic construction specifications contained in contractor proposals or project documents. Makes recommendations concerning viability of specification and material requirements needed to execute project.

V. Complexity of assigned work

Problems analysed are broad in scope and complex but present to unusual applications of engineering concepts.

III. INDEPENDENCE OF WORK

H. Guidelines

Standard procedures for analysis apply; guidelines contained in project plan indicate problems to be analysed.

V. Supervisory Controls

Instructions are discussed beforehand concerning each assignment. Guidance is normally provided on work in progress, and completed work is reviewed in detail.

IV. WORK RELATIONSHIPS

Internal

H. Skill

To obtain information necessary for specification analysis or determination of construction materials needed.

V. Importance

Contacts limited to other engineering officers and procurement officers within the duty station.

External

H. Skill

To obtain information concerning project specifications and material requirements.

V. Importance

Contacts with local contractors and suppliers.

V. SUPERVISORY RESPONSIBILITY

H. Responsibility for support staff

Work does not typically involve full-time supervision of staff, although tasks may be assigned to secretarial and clerical staff.

V. Responsibility for Professional staff

Does not supervise the work of Professional staff.

VI. IMPACT OF WORK

H. Effect on work

Decisions taken at this level relate to the analysis of engineering specifications. Proposals, if accepted, could affect the reliability of the overall project analysis and the procurement of appropriate construction supplies.

V. Consequences of errors

Errors at this level would result in remedial work being performed by a more senior engineer and might cause higher costs and delay in completing work.

P-3 GRADE LEVEL

A. Description of typical duties

Work at this level involves:

- Conducting research in the field on developments of new technical systems, equipment and procedures).
- Developing proposed guidelines for the execution of civil engineering projects or to be used by States as regulatory guidance for such activities;
- Analysing project proposals to ensure technical feasibility and to ensure that project objectives are attainable within prescribed resources, evaluating proposed engineering specifications for accuracy and soundness; recommending planning and design improvements;
- Providing advice to States concerning the planning, design, execution and operation of projects or in interpreting regulatory guidelines in civil engineering (e.g., airports, irrigation systems, forestry programmes, road and water systems);
- Following developments in the relevant literature on civil engineering to identify improved methods and equipment.

B. Factor rating rationales

I. PROFESSIONAL KNOWLEDGE

H. Theoretical knowledge

Theoretical knowledge at the first university degree level in civil engineering, with emphasis on appropriate subspecialty (sanitary, hydraulics, airports, forestry).

V. Practical experience required

A minimum of five years' professional experience in the civil engineering subspecialty at the national level.

D. Language knowledge

Proficiency in only one language is required (the working language of the Organization in the duty station).

II. DIFFICULTY OF WORK

H. Individual contribution

Analyses engineering problems posed in project documents submitted by States. While complex, problems submitted require only occasional unusual application of engineering principles.

V. Complexity of work assigned

Problems analysed are typically complex and broad in scope within the civil engineering subspecialty, requiring broad and occasionally unusual application of engineering principles.

III. INDEPENDENCE OF WORK

H. Application of guidelines

Technical guidelines generally available in the form of project documents or established engineering guidelines, standard procedures in the form of accepted methods of engineering analysis.

V. Supervisory control

Supervisor assigns projects, indicating desired objectives and the appropriate time-frame for completion. Anticipated problems and methods of analyses are discussed at the outset. Work in progress may be reviewed. Problems which arise are brought to the attention of the supervisor. End product is reviewed for soundness of conclusions and technical appropriateness of methodology.

IV. WORK RELATIONSHIPS

Internal

H. Skill

Exchange of technical information concerning assigned projects, obtaining assistance of other technical officers as needed to complete overall analyses.

V. Importance

Generally, contacts are with other engineering staff outside of the duty station and staff of other technical specialties within the duty station.

External

H. Skill

In response to technical problems raised by States, provide advise within the framework of a project or programme concerning the interpretation/implementation of a technical guideline.

V. Importance

The primary work contacts of staff at this level are with counterpart staff in national administrations or other United Nations organizations.

V. SUPERVISORY RESPONSIBILITY

H. Responsibility for support staff

Work does not typically require the full-time supervision of staff, although secretarial and

clerical staff may be assigned specific tasks by the incumbent at this level.

V. Responsibility for Professional staff

Does not supervise the work of Professional staff.

VI. IMPACT OF WORK

H. Effect on work

Decisions at this level are related mainly to individual projects, e.g., determining appropriate technical input required for engineering observations. Proposals in the form of recommendations concerning project documents or proposed amendments to guidelines, if accepted, could affect the execution of major engineering projects or the implementation of accepted standards by Member States.

V. Consequence of error

Errors in the form of poor and inaccurate observations concerning engineering specifications would cause damage to the immediate unit in terms of time owing to the need for a more senior level engineer to reassess and provide further guidance. Failure to meet assigned deadlines might adversely affect unit's credibility within the Organization and with Member States.

P-4 GRADE LEVEL

A. Description of typical duties

Alternative A

Work at this level involves:

- Providing advice concerning manpower and related training requirements for civil engineering personnel.
- Evaluating field candidates for civil engineer project positions.
- Providing technical analysis of contractor pre-qualification documentation, evaluating tenders for construction work.
- Analysing and advising in the planning, design, construction and maintenance of major projects (e.g., airports, irrigation systems, forest harvesting, road systems, water and sanitation systems).
- Evaluating, reviewing and revising project documents, analysing design specifications included in project proposals for accuracy, soundness, feasibility and cost implications. Recommending solutions to unusual engineering problems.
- Providing specialized advice to other departments and regional offices.
- Conducting technical studies on engineering topics, developing guidelines for the general planning and maintenance of programmes and facilities.
- Keeping abreast, through the relevant literature on civil engineering, of significant trends and the development of improved methods and equipment.
- Participating in planning missions, serving as secretary or technical adviser to committees or international meetings.
- Conducting seminars on civil engineering topics related to major programmes for officials of Member States.

OR

Alternative B

Incumbents at this level serve without the direct supervision of a senior civil engineer and are normally located at large field or regional offices. In addition to those duties listed under alternative A, typical duties include:

- Inspecting sites of major facilities (e.g., airports, irrigation systems, water and sanitation systems, road construction sites) in Member States and providing advice and recommendations on the improvement of existing facilities and the development of new facilities.
- Reviewing status of application by Member States of standards and recommended practices for the operation of facilities, systems and programmes, and providing guidance to improve levels of application.

B. Factor rating rationales

I. PROFESSIONAL KNOWLEDGE

H. Theoretical knowledge

Theoretical knowledge equivalent to that obtained at the advanced university degree level, with university degree in civil engineering and post-graduate training in a specific subspecialty (e.g., sanitation, hydraulics, airports, forestry).

V. Practical experience required

Incumbents at this level require a minimum of eight years' professional experience within a subspecialty. Experience at the operational level in carrying out engineering studies for projects with a national administration or large civil engineering/construction firm. Experience in the application of guidelines or in evaluating engineering projects executed in an international setting.

D. Language knowledge

Two languages are normally required (the working language of the Organization in that duty station and one additional working language).

II. DIFFICULTY OF WORK

H. Individual contribution

Incumbents at this level review work produced by junior engineering staff or adapt existing technology or equipment to solve engineering problems encountered in project execution or in the implementation of engineering operational standards.

V. Complexity of work assigned

Projects normally involve complex or unusual engineering problems (e.g., optimization of irrigation networks, airport design in land-restricted settings). Assignments require broad application of engineering principles within the subspecialty.

III. INDEPENDENCE OF WORK

H. Guidelines

Guidelines available in the form of project document specifications, established engineering guidelines and standard procedures in the form of accepted methods of engineering analysis. Assignments require the interpretation and adaptation of these guidelines or specifications in the assessment of unusual and non-recurring project proposals or implementation problems.

V. Supervisory controls

Purpose and desired results within a specified time-frame are indicated. Anticipated problems are normally discussed jointly at the outset (technical supervision is usually available). Work (e.g., completed engineering designs and specification analyses of project proposals and regulatory amendments) is reviewed for soundness of conclusions. Work in progress is submitted for review at the discretion of the incumbent.

IV. WORK RELATIONSHIPS

Internal

H. Skill

Written and oral contacts are with technical specialists in other functional specializations in related fields to obtain technical input required for engineering studies and projects. Provides assistance to other technical sections requiring civil engineering expertise in support of projects, missions and studies

V. Importance

Contacts are with technical specialists located within the duty station and in established field offices.

External

H. Skill

Contacts are primarily related to mission activities and participation in international meetings. Provides technical advice concerning the development of field projects or regulatory guidelines.

V. Importance

Contacts are with counterpart officials in other United Nations organizations or technical officers in national administrations.

V. **SUPERVISORY RESPONSIBILITY**

H. Responsibility for support staff

Work at this level does not normally involve full-time supervision of staff, although secretarial and clerical support may be provided.

V. Responsibility for Professional staff

Does not supervise the work of Professional staff.

VI. **IMPACT OF WORK**

H. Effect on work

Decisions at this level concern the engineering feasibility of major projects or technical input required for the development of engineering guidelines. Proposals, if accepted, would affect the execution of major projects through the acceptance of design parameters or cost estimates or the level of implementation of regulatory guidelines through acceptance of proposed modifications.

V. Consequences of errors

Errors at this level would cause setbacks in the design and execution of engineering projects or the promulgation of regulatory guidelines which would result in damage to the Organization's civil engineering programme in terms of resources to correct the errors and credibility as technically competent.

P-5 GRADE LEVEL

A. Description of typical duties

Work at this level involves:

- Planning, directing and coordinating the work programme of a technical unit concerned with civil engineering functions (e.g., community water supply and sanitation (WHO), forest logging and transport (FAO), and aerodromes, air route and ground aids (ICAO)), including supervision of staff).
- Establishing priorities and work deadlines, reviewing and evaluating technical soundness of analyses provided by engineering staff.
- Developing and maintaining liaison with other units, regional and field offices, and, as directed, other international organizations.
- Representing the Organization at international technical meetings.
- Analysing project proposals for unusually complex engineering projects and recommend solutions to complex problems encountered in project execution.
- Analysing proposals for the development of established guidelines and methods of implementation relating to civil engineering projects, programmes and facilities (e.g., airport planning, design and maintenance, standards for provision of water and sanitation services, water conservation and erosion programmes, development of water resources for agricultural use).
- Leading planning and field mission as senior technical adviser or team leader.
- Preparing technical studies or reports on complex engineering problems and policy considerations for the development of the engineering programme of the Organization.

B. Factor rating rationales

I. PROFESSIONAL KNOWLEDGE

H. Theoretical knowledge

Knowledge equivalent to that obtained at the advanced university degree level is required to understand and apply advanced engineering concepts within a civil engineering subspecialty.

V. Practical experience required

A minimum of ten years' experience required. Experience in the planning and design of engineering projects and facilities in positions with national administrations or large civil engineering or construction firms for five to ten years. Two to five years' experience at the international level in project evaluation and management or the development of engineering standards and guidelines.

D. Language knowledge

Two languages are normally required (the working language of the Organization in that duty station and one other working language).

II. DIFFICULTY OF WORK

V. Individual contributions

Plans and directs ongoing projects within the Organization's civil engineering programme being carried out by civil engineering Professionals.

H. Complexity of assigned work

Projects which are supervised involve complex interrelated engineering problems (e.g., road and forest harvesting layout plans, airport design in land-restricted or difficult terrain area).

III. INDEPENDENCE OF WORK

H. Guidelines

Must adapt established technical standards and practices to unusual engineering problems. May develop internal guidelines and instructions for the direction of Professional staff.

V. Supervisory controls

Guidance regarding the overall approach to work is given. Work is reviewed for attainment of objectives.

IV. WORK RELATIONSHIPS

Internal

H. Skill

Acts as technical adviser to the Organization concerning civil engineering projects and the development of engineering programmes. Provides authoritative advice to senior administrative and programme officials and legislative bodies.

V. Importance

Contacts concerning the provision of technical advice are with various units throughout the Organization and in established field offices.

External

H. Skill

Coordinates engineering programmes with similar activities being carried out by United Nations and other international organizations. Advises States on the implementation of regulatory guidelines and the development of new engineering standards.

V. Importance

Contacts are primarily with counterpart officials in United Nations and other international organizations and in national administrations.

V. SUPERVISORY RESPONSIBILITY

H. Responsibility for support staff

Supervises normally between five and ten support staff.

V. Responsibility for Professional Staff

Normally supervises four or five Professional staff (in addition to temporary staff associated with particular projects).

VI. IMPACT OF WORK

H. Effect on work

Decisions at this level affect the scope and structure of civil engineering projects or regulatory standards. Decisions include the establishment of work priorities within the unit and the provision of expert advice to the Organization and to States. Incumbent must approve the technical content of studies and analyses produced by Professional staff. Proposals, if accepted, would affect the policy priorities within the civil engineering programme of the Organization (e.g., the direction of the development of regulatory standards, the priorities in the establishment of projects based on technical feasibility and effective utilization of resources).

V. Consequence of errors

Errors at this level in technical analyses and advice would not be immediately evident and, as a result, would adversely affect the design of projects and the direct implementation of standards. The Organization's programme would sustain significant setbacks in terms of staff time and resource expenditure and could possibly result in an inability to meet commitments to States.

D-1 GRADE LEVEL

A. Description of typical duties

Work at this level involves:

- Planning, directing, and coordinating the Organization's total engineering programme allocated to (divided among) several technical units.
- Establishing objectives and priorities for each unit programme to facilitate coordination among the engineering units.
- Establishing organizational and resource controls to ensure effective use of personnel, financial resources and equipment.
- Reviewing and evaluating programme objectives and performance with technical unit chiefs.
- Advising executive head and legislative bodies concerning the development of coordinated engineering programmes.
- Reviewing budget proposals submitted by unit chiefs and developing integrated proposal for submission to executive head and legislative bodies.
- Reviewing and approving guidelines and standards produced by technical units prior to submission to executive head and legislative bodies.
- Representing organization at international policy planning meetings.

B. Factor rating rationales

I. PROFESSIONAL KNOWLEDGE

H. Theoretical knowledge

Knowledge equivalent to that obtained at the advanced university degree level is required to understand and apply advanced engineering concepts within a range of civil engineering subspecialties.

V. Practical experience

More than ten years' experience with a minimum of five years at the international level required. Experience gained in planning and design of engineering projects and facilities through positions within a national administration or large civil engineering or construction firm. Experience at the international level in project management and in the direction of civil engineering specialists in the provision of technical analyses.

D. Language knowledge

Two languages are normally required (knowledge of the working language of the Organization in that duty station and one additional working language).

II. DIFFICULTY OF WORK

H. Individual contribution

Assignments require the exercise of managerial responsibility for a major programme element. Work at this level is primarily concerned with the establishment of a programme of work to achieve implementation of policy objectives. Direction of distinct groups of staff and the coordination of interrelated activities by subordinate groups of staff and with other technical programmes in the Organization.

V. Complexity of assigned work

Work at this level requires broad consideration of technically intricate aspects of work in civil engineering performed under incumbent's supervision. A programme of work is established to meet broad policy objectives in accordance with administrative directives and budgetary controls.

III. INDEPENDENCE OF WORK

H. Guidelines

Guidelines are available in the form of broad policy statements and resolutions by legislative bodies. Incumbent must interpret and adapt stated policy objectives to develop a programme of work, operational guidelines and instructions are provided by incumbent to subordinate groups of technical staff.

V. Supervisory controls

Policy objectives are discussed at the outset. Incumbent at this level develops work programmes and directs the assignment and execution of tasks to units of technical staff. Results are reviewed for attainment of policy objectives.

IV. WORK RELATIONSHIPS

Internal

H. Skill

Provides authoritative advice in civil engineering to executive head and legislative bodies. Represents the civil engineering programme before deliberations of legislative bodies and during the policy planning and budgeting process.

V. Importance

Directs subordinate technical staff locally and in field offices and maintains liaison with directors and unit chiefs throughout the Organization for programme coordination and administrative support.

External

H. Skill

Represents organization, negotiates with States and other international organizations concerning the establishment of engineering projects. Provides authoritative advice on the part of the Organization in international meetings concerning programme coordination.

V. Importance

Contacts primarily with senior officials of United Nations and other international organizations and national administrations.

V. SUPERVISORY RESPONSIBILITY

H. Responsibility for support staff

Normally supervises 11 to 25 support staff.

V. Responsibility for Professional staff

Normally supervises 10 to 20 Professional staff (as well as project staff temporarily assigned).

VI. IMPACT OF WORK

H. Effect on work

Decisions taken at this level determine priority to be given to the implementation of policy objectives as determined by the programme of work. Decisions are made on the assignment of staff resources to projects and studies and on the provision of engineering expertise in support of other programmes and in response to requests from States. Proposal at this level, if accepted, would affect the entire range of the Organization's activities in the civil engineering field, including policy objectives and the level of coordination and cooperation with related activities in United Nations and other international organizations.

V. Consequence of errors

Errors may not be detected prior to seriously damaging the Organization's programme. Programme objectives would not be met; loss or ineffectual use of resources could result in significant damage to Organization's credibility concerning the provision of high-quality civil engineering expertise.

D-2 GRADE LEVEL

A. Description of typical duties

Work at this level involves:

- Planning, directing, and coordinating the Organization's total engineering programme allocated to/divided among several technical units.
- Establishing objectives and priorities for each unit programme to facilitate coordination among the engineering units.
- Establishing organizational and resource controls to ensure effective use of personnel, financial resources and equipment.
- Reviewing and evaluating programme objectives and performance with technical unit chiefs.
- Advising executive head and legislative bodies concerning the development of coordinated engineering programmes.
- Reviewing budget proposals submitted by unit chiefs and developing integrated proposals for submission to executive head and legislative bodies.
- Reviewing and approving guidelines and standards produced by technical units prior to submission to executive head and legislative bodies.
- Representing organization at international policy planning meetings.

B. Factor rating rationales

I. PROFESSIONAL KNOWLEDGE

H. Theoretical knowledge

Knowledge equivalent to that obtained at the advanced university degree level is required to understand and apply advanced engineering concepts within a range of civil engineering subspecialties.

V. Practical experience

Performance of duties at this level requires more than ten years' experience at the national level in the planning, execution and management of civil engineering projects and facilities. Experience at the international level for five to ten years is also required in the design of standards and projects within a civil engineering subspecialty and in the management of a civil engineering programme and related technical programmes.

D. Language knowledge

Two languages are normally required (the working language of the Organization in that duty station and one additional working language).

II. DIFFICULTY OF WORK

H. Individual contribution

Work at this level requires the planning and direction of an organization's entire civil engineering activities carried out by subordinate technical units. Incumbent plays a significant role in the formulation of the Organization's policy in the field of work and is responsible for determining programme requirements in terms of staff and budget resources. Must integrate diverse engineering projects with the Organization's overall objectives.

V. Complexity of assigned work

Work at this level involves the coordination and direction of highly technical activities within the framework of established policy and administrative directives.

III. INDEPENDENCE OF WORK

H. Guidelines

Within the framework of general policy statements contained in the resolutions of legislative bodies, incumbent establishes the work programme and defines the objectives to be met within a specified time-frame. Incumbent establishes all operational guidelines needed to carry out the work programme.

V. Supervisory controls

The work programme, with defined objectives and time-frame for achievement, is developed by incumbent and communicated to senior management. Normally accepted as authoritative. Reviewed only for policy and budget implications.

IV. WORK RELATIONSHIPS

Internal

H. Skill

At this level, incumbent has full responsibility for development of policy proposals to the executive head. Incumbent provides authoritative advice concerning the development of the Organization's policy for the entire civil engineering programme and its impact on related programmes.

V. Importance

Work relationships of incumbent at this level are with senior managers of other functional areas within the Organization, including senior field staff.

External

H. Skill

Represents the Organization at the senior management level in policy negotiations and programme promotion, with authority to commit the Organization on matters of project and programme activities. Represents the Organization in policy discussions with senior officials of other United Nations and international organizations.

V. Importance

Contacts at this level are with senior programme managers in United Nations organizations and national administrations.

V. SUPERVISORY RESPONSIBILITY

H. Responsibility for support staff

The supervisory responsibility is for 26 to 50 support staff.

V. Responsibility for Professional staff

The typical supervisory responsibility is for 21 to 40 Professional staff.

VI. IMPACT OF WORK

H. Effect on work

Decisions at this level directly affect the design and execution of the Organization's civil engineering programme through the establishment of objectives and the allocation of staff and budgetary resources. Proposals, if accepted, would directly affect the entire range of civil engineering activities and the accomplishment of major policy objectives of the Organization (e.g., objectives of the International Drinking Water Supply and Sanitation Decade and H-2000 within WHO).

V. Consequence of errors

Errors at this level would result in the failure to meet established objectives of the civil engineering programme and possibly related programmes where policy objectives depend upon close coordination (e.g., H-2000 WHO). Resulting failure to meet commitments to constituents would cause significant damage to the Organization's credibility.

Annex I

DETAILED RATIONALE OF RATINGS

Factor I - Professional knowledge required

(a) Theoretical knowledge

Level 1. For all civil engineer positions the basic university degree in civil engineering (or its equivalent, such as a certification of competence by an equally recognized institution), is required. Training within this discipline cultivates the necessary analytical skills and provides background in the technical aspects relevant to the performance of civil engineering activities.

Level 2. At this level, a thorough knowledge of the general principles of civil engineering is augmented by a specialized focus in one of the subspecialties of civil engineering (e.g., airport, hydraulic or sanitary engineering). within many States, attainment of this level of training is recognized through professional certification by a national association of civil engineers. This knowledge in many cases must be combined with an acquired knowledge of administrative and management principles relevant to directing a civil engineering programme. Together, these requirements are the equivalent of theoretical knowledge at the advanced university degree level.

(b) Practical experience

Level B. (Applies to typical duties at the P-2 level.) A minimum of two (up to five) years' experience is required at the national level. This experience is usually gained through a position in a large civil engineering or construction firm. Background is gained in the basic planning and design of construction specifications, estimating material requirements for projects and reviewing accuracy of calculations prepared by contractors.

Level C. (Applies to typical duties at the P-3 level.) A minimum of five years' experience at the national level is required. Experience is usually gained through positions in a large civil engineering or construction firm or national administration. Experience is gained in the evaluation of engineering projects to determine whether specifications are accurate and conform to established guidelines. evaluations also include recommendations for planning and design improvements during project development.

Level D. (Applies to typical duties at the P-4 and P-5 levels.) The performance of duties at these levels requires two to five years' experience at the international level in the application of civil engineering guidelines or the evaluation of projects. Experience of more than five (up to ten) years at the national level is required to develop a practical understanding of civil engineering activities at the operational level. Experience is gained through the execution of engineering projects or the

administration of engineering regulatory guidelines in respect of specific activities.

Level E. (Applies to typical duties at the D-1 level.) More than five years' experience at the international level is required in the management of civil engineering projects and in the provision of expert analyses of engineering questions through the direction of a staff of civil engineers. Experience at the national level or more than five (up to seven) years is required to gain a thorough working knowledge of operational characteristics of engineering projects or the administration of regulatory guidelines in respect of specific engineering activities.

Level F. (Applies to typical duties at the D-2 level.) Five to ten years' experience at the international level, together with more than ten years' experience at the national level, is required, to ensure a thorough knowledge of the practical application of civil engineering expertise and broad managerial skills in the execution of a diversified engineering programme on a global scale. Typically gained through experience at the national level in the actual operations of a national government in the administration of an integrated civil engineering programme, followed by international experience in the coordination of all phases of programme development and execution.

(c) Language knowledge

Level 1. (Applies to typical duties at P-2 and P-3 levels.) Proficiency in only one language, the working language of the Organization in that duty station, is required. Contacts outside the Organization are restricted in scope.

Level 2. (Applies to typical duties at P-4, P-5, D-1 and D-2 levels.) In addition to requirements for proficiency in the working language of the Organization in a particular duty station, frequent contacts with representatives of national administrations and other international organizations usually require proficiency in at least one additional language in order to communicate effectively.

Factor II - Difficulty of work

(a) Individual contribution

Level 5. (Applies to typical duties at the P-2 and P-3 levels.) Work at this level involves the analysis of engineering problems posed in project documents or the application of guidelines to engineering activities, the identification of problems in specific components of projects or in the implementation of guidelines and the recommendation of remedial actions.

Level 6. (Applies to typical duties at the P-4 level.) Work at this level involves the analysis of engineering problems in the design and execution of major projects, including the costing of project

components. Incumbents must adapt existing engineering technology to specific projects and determine feasibility of project design. Incumbents must develop guidance material for engineering activities and evaluate application by States of established guidelines and recommend improvements.

Level 7. (Applies to typical duties at the P-5 level.) Work at this level involves the direction of civil engineering activities within a specific subspecialty. Incumbents establish priorities and make specific work assignments, review technical soundness of analyses produced by staff. They also carry out original technical reviews of complex engineering problems posed in project design and execution and review similar projects undertaken by States in respect of the application of engineering guidelines. Evaluation of work includes assessing the financial implications of project design. Incumbents coordinate activities of the civil engineering programme with other related activities in the Organization.

Level 8. (Applies to typical duties at the D-1 and D-2 levels.) At these levels, work involves determining programme requirements within the civil engineering field in terms of staff and budget resources. Incumbents play significant roles in determining programme focus and policy objectives. Within the established programme, work priorities are set and resources assigned to meet objectives. The work programme requires extensive coordination with other programmes within the Organization and internationally with State programmes and the work of other international organizations.

(b) Complexity of assigned work

Level I. (Applies to typical duties at the P-2 level.) Engineering problems analysed at this level are broad in scope, covering a variety of planning and design problems encountered in evaluating projects and determining material requirements for project execution.

Level J. (Applies to typical duties at the P-3, P-4 and P- 5 levels.) Work assignments are typically broad in scope, covering the full range of planning, design and execution phases of major projects. Problems encountered often require unusual application of engineering principles (e.g., airport design in land restricted setting, optimization of irrigation networks). In addition to technical considerations, analyses must include cost evaluation of project design.

Level K. (Applies to typical duties at the D-1 and D-2 levels.) Programme coordination problems are substantially intricate owing to the need to evaluate a full range of civil engineering planning, design and execution considerations within the framework of established programme objectives. In addition to the evaluation and direction of work carried out in subordinate units, incumbents must provide substantive input which shapes policy development in order that policy objectives remain feasible within organizational constraints. Programme execution requires a significant degree of coordination with related programmes in the Organization of country programmes carried out by national administrations and activities of other international

organizations.

Factor III - Independence of work

(a) Guidelines

Level 11. (Applies to typical duties at the P-2 level.) The work involves assessment of the technical soundness of project components in accordance with established procedures for project evaluation and application of accepted engineering standards. Procedures may vary, depending upon project demands. Incumbents may also be required to determine the most significant engineering considerations pertaining to project design.

Level 12. (Applies to typical duties at the P-3 level.) Guidelines for project evaluation are only generally available in the form of accepted standards for civil engineering projects. Incumbents must, on occasion, adapt accepted methods of analysis in order to effectively evaluate design parameters for unusual or complex projects or unusual problems encountered in application of regulatory guidelines. Budgetary precedents exist to cover most aspects of cost evaluation but must also be adapted to meet unusual demands in design and execution.

Level 13. (Applies to typical duties at the P-4, P-5 and D-1 levels.) Project planning, design and execution considerations usually pose unusual or complex engineering problems. Existing methods of analysis must be adapted to each case. Guidelines in the form of past precedents and general policy statements exist; however, these must also be interpreted, for they may not directly apply to the problem under consideration. At the P-5 and D-1 levels, incumbents regularly must establish guidelines, which direct the work of subordinate staff, in respect of work assignments. Incumbents at this level must also approve project design of proposals for new regulatory guidelines. These decisions act as guidelines for project funding and in programme deliberations by senior management.

Level 14. (Applies to typical duties at the D-2 level.) Guidelines are only broadly stated in the form of resolutions of the legislative bodies and other major policy statements. Significant adaptation of stated policy is necessary to structure a coordinated programme and to establish specific objectives. Incumbents establish programme objectives with regard to the approval of projects and the determination of programme priorities. Programme decisions on the part of incumbents significantly shape the development of policy within the field by senior management and the approval of new policy initiatives by legislative bodies.

(b) Supervisory controls

Level N. (Applies to typical duties at the P-2 level.) Specific work assignments are made by the supervisor, indicating each project component to be analysed and the desired time-frame for completion. Difficulties which arise in analysing planning and design parameters are discussed with the supervisor to obtain further guidance. Work in progress is periodically reviewed to ensure that the initial guidelines have been applied. Completed analyses are thoroughly reviewed for technical soundness.

Level O. (Applies to typical duties at the P-3 and P-4 levels.) General instructions accompany work assignments, usually indicating the objectives of the assignment and the desired time-frame for completion. Anticipated problems in project analyses are discussed at the outset. Complex or unusual engineering problems which are found in design parameters or in the development of regulatory guidelines are discussed at the discretion of the incumbent. Work in progress may be reviewed to ensure that desired deadline will be met. Completed analyses and proposals are reviewed for soundness of application of engineering principles and consistency with established programme objectives.

Level P. (Applies to typical duties at the P-5 level.) General guidance is given concerning programme objectives. The depth and focus of technical analyses are left to the discretion of the incumbent. Guidance is sought only with regard to the unanticipated impact of non-technical factors (e.g., unforeseen resource limitations) on programme development. Completed assignments are reviewed for attainment of stated programme objectives (e.g., level of project implementation, development of new regulatory standards) and consistency with established procedural guidelines.

Level Q. (Applies to typical duties at the D-1 level.) Policy objectives are indicated. Incumbents develop work programme and assign to subordinate units specific tasks to accomplish the integrated programme objectives. Any departure within the work programme from established resource allocation or standard administrative policy must receive prior approval. The work programme is reviewed by senior management for consistency with stated policy goals and for effective utilization of resources.

Level R. (Applies to typical duties at the D-2 level.) Within the framework of broad policy statements, incumbents identify objectives to be pursued in the programme of work. They also oversee resource utilization by individual technical sections and the development of specific work programmes. Review by senior management (usually the executive head) and the legislative bodies focuses upon consistency of programme objective with policy statements and the allocation of resources.

Factor IV - Work relationships

(a) Contacts INSIDE the Organization - skills

Level 16. (Applies to typical duties at the P-2 and P-3 levels.) Contacts are necessary to obtain information required to complete project analyses.

Level 17. (Applies to typical duties at the P-4 level.) The purpose of contacts with technical specialists in related fields is to obtain assistance in the completion of joint projects. Incumbents must persuade colleagues to adapt their plans to ensure the engineering feasibility of project design.

Level 18. (Applies to typical duties at the P-5 level.) Incumbents act as technical advisers to the Organization within the civil engineering subspecialty Provision or advice concerning the technical feasibility from an engineering standpoint and the appropriate financing levels required for execution is a primary responsibility. In coordination with counterparts from related technical fields, incumbents propose project initiatives to senior management.

Level 19. (Applies to typical duties at the D-1 level.) Incumbents provide authoritative advice to other programme areas within the Organization concerning all programme objectives of the civil engineering programme. They negotiate with counterpart staff from other programme areas the resolution of problems in the execution of integrated projects. They recommend, in concert with counterpart staff, new policy initiatives and changes in programme direction.

Level 20. (Applies to typical duties at the D-2 level.) Incumbents provide authoritative advice concerning the development of policy initiatives in the civil engineering field. Incumbents define objectives within stated policy guidelines and establish the necessary liaison with related programmes for effective programme execution.

(b) Contacts INSIDE the Organization - importance

Level 1. (Applies to typical duties at the P-2 level.) Contacts are limited to other engineering staff or staff in closely related functional areas (e.g., procurement) strictly within the duty station.

Level 2. (Applies to typical duties at the P-3 level.) Contacts extend to engineering staff located outside the duty station and with technical staff in the duty station in related technical fields. Contacts also include staff of support areas (e.g., personnel, finance, procurement) to exchange information on project implementation.

Level 3. (Applies to typical duties at the P-4, P-5, D-1 and D-2 levels.) Contacts extend outside the engineering programme to technical staff in related fields located throughout the Organization. Extensive contacts are maintained with staff from support areas to ensure effective management of projects. At senior levels, programme development considerations require extensive coordination with staff from other programmes and support areas.

(c) Contacts OUTSIDE the Organization - skills

Level 16. (Applies to typical duties at the P-2 level.) Contacts extend only to local contractors or suppliers to obtain information concerning project specifications and material requirements.

Level 17. (Applies to typical duties at the P-3 level.) In response to technical problems raised by States concerning project execution or the application of regulatory guidelines, incumbents provide advice concerning the interpretation of a technical guideline.

Level 18. (Applies to typical duties at the P-4 and P-5 levels.) At this level, incumbents represent the Organization on planning missions where possible projects are identified and at international meetings with other organizations and governments to define jointly programme objectives and maintain liaison required for project execution. Incumbents also provide advice to States concerning the application of regulatory guidelines to new or unusual engineering problems.

Level 19. (Applies to typical duties at the D-1 level.) Incumbents at this level represent the Organization in negotiations with governments concerning the establishment of an integrated civil engineering programme. Incumbents provide authoritative advice in international meetings concerning the Organization's participation in joint programmes. Incumbents establish necessary liaison to plan and execute coordinated programmes. They have authority to commit the Organization to the provision of funds for specific projects within the context of an established programme.

Level 20. (Applies to typical duties at the D-2 level.) Incumbents represent the Organization in senior programme planning negotiations with other international organizations or States. They participate in the development of new programme initiatives which require extensive coordination in planning and execution. Incumbents can commit the Organization in establishing programme direction aimed at achieving stated policy objectives.

(d) Contacts OUTSIDE the Organization - importance

Level 2. (Applies to typical duties at the P-2 level.) Contacts are limited to local contractors and suppliers and involve only routine discussion concerning project execution.

Level 3. (Applies to typical duties at the P-3, P-4 and P-5 levels.) Incumbents maintain contact

with officials of national administrations and other international organizations in order to provide input concerning project development or the application of regulatory guidelines. Contacts are predominantly at the working level with counterpart officials who are involved with project development and management or who are responsible for administering national application of regulatory guidelines.

Level 4. (Applies to typical duties at the D-1 and D-2 levels.) Contacts at this level are primarily with high-level officials of national administrations and other international organizations. Programme development and cooperation or coordination with national administrations and activities of other international organizations are the main focus of exchanges at this level. Negotiations which lead to the establishment of multilateral and bilateral agreements which significantly shape the programme objectives of the Organization's civil engineering programme are carried out by incumbents at this level.

Factor V - Supervisory responsibility

Level 22, U. (Applies to typical duties at the P-2, P-3 and P-4 levels.) Supervision of staff is not typically required.

Level 23, W. (Applies to typical duties at the P-5 level.) Work typically requires the supervision of 5 to 10 clerical and technical support staff involved in basic data collection in support of project analysis or the development of regulatory guidelines and the provision of general secretarial support. Incumbents are also responsible for the supervision of four to five Professional staff carrying out engineering feasibility studies or developing or amending regulatory guidelines.

Level 24, X. (Applies to typical duties at the D-1 level.) Work at this level is predominantly managerial, involving supervisory responsibility for Professional staff through subordinate supervisors. Total number of staff supervised is typically 11 to 15 support staff and 10 to 15 Professional staff.

Level 25, Y. (Applies to typical duties at the D-2 level.) Work at this level is predominantly managerial. Supervisory responsibility typically extends to 26 to 50 support staff and 21 to 40 Professional staff.

Factor VI - Impact of work

(a) Effect on work

Level 31. (Applies to typical duties at the P-2 level.) Decisions taken relate to the appropriate methods of engineering analyses to be applied to specific assignments of project analyses. Proposals are made concerning feasibility of project components and, if accepted, could influence the overall project analysis and the procurement of materials for project execution.

Level 31/32. (Applies to typical duties at the P-3 level.) Decisions taken at this level concern determining the appropriate method for analysing engineering feasibility of projects or the development of guidelines. Proposals in the form of recommendations concerning project feasibility or the development or amendment of guidelines, if accepted, could affect the attainment of programme objectives.

Level 32. (Applies to typical duties at the P-4 level.) Decisions at this level concern accepting the accuracy of design parameters of engineering projects or determining scope of regulatory guidelines. Proposals, if accepted, would determine focus of project execution within a programme or the focus of regulatory guidelines for civil engineering activities. Proposals concerning application of guidelines affect the attainment of overall programme objectives. Similarly recommendations concerning project management affect current project execution and the development of future project proposals.

Level 33. (Applies to typical duties at the P-5 level.) Decisions at this level directly affect the design and execution of civil engineering projects and the scope of regulatory guidelines. Decisions include the establishment of work priorities to accomplish specified programme objectives and the provision of expert advice to States concerning civil engineering activities. Proposals concern the initiation of new projects or guidelines, the assessment of resources (staff and financial) needed to attain future policy objectives and the technical feasibility of current projects under review.

Level 34. (Applies to typical duties at the D-1 and D-2 levels.) Decisions taken at this level concern the establishment of priorities in the attainment of policy goals through the development of a work programme. Within authorized funding levels, decisions are taken on the approval of individual projects. The establishment of necessary cooperative links with other international organizations and States is also determined at this level. Proposals on the Organization's resource commitment, policy objectives, level of coordination with other programmes within the Organization and with other organizations affect the long-range activities of the Organization in civil engineering and related fields.

(b) Consequences of error

Level d. (Applies to typical duties at the P-2 and P-3 levels.) Engineering analyses are reviewed by higher-level civil engineers for technical soundness. Errors discovered would require performance of remedial work by a more senior engineer, resulting in loss of time and resources to the immediate unit.

Level e. (Applies to typical duties at the P-4 level.) Since work is not normally reviewed in progress, errors at this level would not be discovered until project analyses had been completed totally. As a result, design and execution of projects or the promulgation of regulatory guidelines could be delayed. Typically, these delays would adversely affect the execution of related programmes and damage the Organization's credibility as technically competent.

Level f. (Applies to typical duties at the P-5 and D-1 levels.) Errors at this level would seriously damage the Organization's civil engineering programme. Programme objectives would not be met, and, as a result, commitments to States and other international organizations operating in concert would not be fulfilled. The Organization's credibility to provide high-quality civil engineering expertise would be seriously impaired and, as a result, adversely affect future programme development.

Level g. (Applies to typical duties at the D-2 level.) Errors at this level would result in a failure to meet long- range policy objectives and broadly affect the efficient execution of the civil engineering programme and related programmes in other technical fields. Major damage to the Organization's overall credibility would result, owing to errors in negotiating cooperative agreements with States and other international organizations and subsequent failure to meet commitments.
