

This Guideline was prepared by a Standing Committee of APEGGA whose mandate is "to enhance the quality and value of professional service provided to the public". Professional members representing both Clients and Consultants participated directly in developing the contents of the Guideline for approval and publication by the Council of the Association.

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FOREWORD

Companies who engage in the practice of engineering and offer services directly to Clients are referred to as Consultants. For the purpose of this publication, a Consultant is an individual proprietor or a company registered by the Association of Professional Engineer, Geologists and Geophysicists of Alberta (APEGGA) authorized to engage in the practice of engineering in the Province of Alberta. As members of the Association, Consultants and their professional employees are under the jurisdiction of The Engineering, Geological and Geophysical Professions Act and Regulations in all matter of technical qualifications, ethics and professional conduct.

This Guideline is applicable only to members of the Association and describes what the Council of the Association considers to be an equitable basis for establishing an appropriate fee for competent service on a specific project. It is intended that it be of assistance to members, as well as to Client representatives who are not members, in their respective fee negotiation activities. The Guideline is based on principles that are applicable to all engineering assignments. Special application of the principles may be required to accommodate the unique needs of complex or major projects.

Fee Guidelines published by the Association are not intended in any way to reflect an agreement or consensus amongst members of the Association that the payment for professional services should be based on a minimum tariff. APEGGA members are expected to undertake only those assignments in which they are competent and are encouraged to negotiate fees that are appropriate to each individual project. The fees negotiated should reflect the level of service which will fully satisfy the requirements of The Engineering, Geological and Geophysical Professions Act.

The Guideline is not a legal document and is not intended to supersede or replace contractual arrangements that are designed to satisfy specific situations. APEGGA will not be responsible for any damages, howsoever caused, resulting from its use or non-use on any assignment or project. Members are advised to seek their own legal counsel as required.

A separate publication titled "A Guide to Selecting a Consultant" is also available at APEGGA offices. It is designed to provide guidance to members of the public in selecting a Consultant, and is a complementary document to this Fee Guideline.

SECTION 1

CATEGORIES OF SERVICE

1.0 INTRODUCTION

For the purpose of determining an appropriate fee basis, consulting services for general engineering projects are divided into the following categories:

1. Consultative and Advisory Services
2. Pre-Design Services
3. Detailed Design Services
4. Contract Administration and Engineering Review During Construction
5. Resident Engineering During Construction
6. Post Construction Services

1.1 CATEGORY 1 — CONSULTATIVE AND ADVISORY SERVICES

Examples of this category are:

1. Expert testimony
2. Appraisals and valuations
3. Investigations (failures, accidents, etc.)
4. Rate structure and tariff studies
5. Inspection, testing or other services concerning the collection, analysis, evaluation and interpretation of data and information leading to specialized conclusions and recommendations

1.2 CATEGORY 2 — PRE-DESIGN SERVICES

These consist of services to establish requirement for design, including but not limited to:

1. Investigation
2. Exploration
3. Survey, soil investigation and other testing
4. Analysis of conditions or methods of operation, economic analysis, analysis of location of the project, and similar matters undertaken to establish the sizes, capacities, locations, methods of operation and other principal features which form the basis for the design of a proposed project
5. Preparation of preliminary estimates

1.3 CATEGORY 3 — DETAILED DESIGN SERVICES

These services follow the establishment of project requirements described in Category 2 and consist of the preparation of engineering designs, drawings, specifications and contract documents. They generally include the following:

1. Preparation of preliminary sketches, resolution of detailed problems, equipment selection and development of specification notes
2. Preparation of detailed calculations, design drawings and specifications
3. Preparation of detailed estimates of the cost of the work and completion schedules
4. Tender call
5. Assistance and advice to the Client during tender call including tender evaluation and award

1.4 CATEGORY 4 — CONTRACT ADMINISTRATION AND ENGINEERING REVIEW DURING CONSTRUCTION

These services consist of contract administration and periodic field visits during the construction period following the award of contract. They include the following:

1. Administration of the contract
2. Review of shop drawings as provided for in the terms of the construction contract documents

3. Periodic visits to the site by the Consultant or authorized representative to familiarize himself generally with the progress and quality of the work
4. Construction progress reports to the Client
5. Interpretation of contract documents as required by the Contractor or Client
6. Examination of progress claims for the purpose of approving progress payments
7. Final review of construction and issue of Completion Certificate

This service is distinct and separate from the services provided by field personnel and is in no way to be considered as a substitute for, or assumption of the responsibilities of Resident Engineering services.

1.5 CATEGORY 5 — RESIDENT ENGINEERING DURING CONSTRUCTION

These services consist of supplying resident staff on the project to determine if the Contractor is carrying out the work in general conformance with the contract documents, and to assist in administering the contract. If required by the Client, Resident Engineering services should include the recording of all details of construction for the preparation of record drawings.

Resident Engineering services may include items such as:

1. Survey layout and construction staking where this is not a Contractor responsibility
2. Quantity measurement and records
3. Inspection of construction for compliance with the drawings and specifications and communication with:
 - the Contractor regarding deficiencies in the work
 - the Consultant representative responsible for Contract Administration and Engineering Review During Construction
 - the Client regarding matters of direct interest or concern
4. Records of changes from design arising during construction
5. Field resolution of construction problems and administration of extra work in consultation with the Client representative

The services described above do not include the direction of Contractor personnel in methods, scheduling or equipment selection except as may be specifically prescribed in the contract documents, since these are normally a Contractor responsibility.

1.6 CATEGORY 6 — POST CONSTRUCTION SERVICES

The services in this Category vary in scope and detail according to the needs of the Client and should be described in the scope of the assignment.

They include but are not limited to:

1. Commissioning and start-up assistance
2. Preparation of Operation Manual
3. Preparation of record drawings
4. Determination of deficiencies during the guarantee period and final acceptance documentation at its expiry

SECTION 2

FEE BASIS OPTIONS

2.0 INTRODUCTION

The cost of engineering is typically a small percentage of the full life capital and operating cost of a developed facility. The most cost effective solution to a Client's needs may not coincide with the lowest cost engineering services. Care should be taken not only to select the best qualified Consultant but also to select a basis of fee that fully complements the services required to meet the needs of the project and the desired quality of the completed work.

There are three concepts on which fees for engineering services are commonly based:

1. Time Basis
2. Fixed Fee Basis
3. Combination of Time Basis and Fixed Fee Basis

Each has distinct applications and frequently combinations of the concepts are applied to different stages of a project. Variations involving targets, bonuses and cost plus and agreed fee are also used to reward the Consultant for innovations and to encourage efficient performance.

The term Fee, as used in the following pages, represents the total charges for engineering services which includes disbursements incurred by the Consultant.

2.1 TIME BASIS

This fee basis is particularly applicable in circumstances where the scope of assignment is not well defined or where the Consultant does not have control over engineering manhours and disbursements required on specific stages of a project. It should be used for:

1. Consultative and Advisory Services
2. Pre-Design Service
3. Resident Engineering During Construction
4. Re-Design arising from circumstances beyond the Consultant's control
5. Post Construction Services

It is also appropriate for:

1. Detailed Design Services
2. Contract Administration and Engineering Review During Construction

and, for these latter two categories of service, can be supplemented with a target or upset fee in circumstances where the scope of the assignment is firm.

Fees on a Time Basis are determined by multiplying the number of hours each member of the consultant's staff expends on the project by their respective hourly billing rates and adding the disbursements listed in Section 4.

The formula for Fees on a Time Basis is:

$$\text{Fee} = (\text{Hourly Billing Rates} \times \text{Hours Expended}) + (\text{Disbursements} \times \text{Factor})$$

where:

- Hourly Billing Rates — may be fixed for various staff categories, or
— may be expressed as an individual

Hourly Payroll Cost × Payroll Factor

for each member of the project staff (see Appendix B for Example Rates)

- Hours Expended — the actual number of hours that each member of the project expends on the project
- Disbursements — reimbursable expenses incurred on the project. See Section 4
- Disbursement Factor — typically 1.1 but subject to negotiation for special circumstances and conditions

and:

- Hourly Payroll cost —
$$\frac{\text{Annual Salary} + \text{Fringe Benefits}}{\text{Annual Working Hours (52} \times \text{Hrs/Wk)}}$$
- Payroll Factor — covers overhead Costs and Profit described in Appendix A and typically ranges from 2.0 to 2.5 depending on the number of manhours and the continuity of the manhour commitment to the project

- the Payroll Factor should be based on an estimate of total manhours for all services (excepting Category 5) and agreed to at the commencement of the project.

Following are guidelines:

- ~ projects regardless of size, which have distinctly intermittent manhour demands

Payroll Factor — 2.5

- ~ projects in which all services (excepting Category 5) involves less than 2,000 manhours

Payroll Factor — 2.5

- ~ projects in which all services (excepting Category 5) involves between 2,000 and 10,000 manhours

Payroll Factor — 2.3

- ~ project in which all services (exception Category 5) involves more than 10,000 manhours

Payroll Factor — 2.0

- ~ services in Category 5 (Resident Engineering During Construction) — normally attract a factor of 2.0 regardless of size when these services are a continuation of other Categories of Service provided by the same Consultant. A larger factor is appropriate for very small projects or when manhour demands are intermittent

- the above Payroll Factors are based on normal conditions where the overhead cost items described in Appendix A are borne by the Consultant. In circumstances where some of the overhead items are provided by the Client, this should be taken into account in negotiating the Payroll Factor

- Fringe Benefits — As described in Appendix A

2.2 FIXED FEE BASIS

This fee basis is applicable only to projects or components of projects where the scope of the work is clearly defined and where construction, if applicable, will be completed over a known schedule. The Fixed Fee for such assignments should be negotiated following preparation of a comprehensive estimate of the engineering manhours and overhead costs.

An agreement defining the services to be provided in detail and all categories of cost included in the Fixed Fees is essential. The agreement should cover schedule, time limits, inflation and other identifiable items that influence costs. Changes in the scope of the work after the Fixed Fee has been established should be compensated for on a Time Basis or by a negotiated Fixed Fee adjustment for each change.

The formula for Fees on a Fixed Fee Basis is:

$$\text{Fee} = (\text{Negotiated Fixed Fee}) + (\text{Disbursements} \times \text{Factor})$$

where:

- Negotiated Fixed Fee — the amount included in the agreement which covers specified scope of assignment and cost items
- Disbursements — reimbursable expenses incurred on the project. See Section 4.
- Disbursement Factor — typically 1.1 but subject to negotiation for special circumstances and conditions

On some projects the cost of engineering services in Categories 3 and 4 as described in Section 1, are relatively predictable as a percentage of the estimated construction cost. A graph illustrating this relationship is shown in Appendix C. The range of percentage fees shown on the graph corresponds to varying levels of project complexity as described. The graph may usually be used as a guide to determine if the Fixed Fee, resulting from the engineering cost estimate for these two categories, is reasonable.

2.3 COMBINATION TIME BASIS AND FIXED FEE BASIS

Projects frequently require several Categories of Service; some can be accurately quantified at the commencement of the project and others vary with schedule and conditions that cannot be predicted. In these circumstances the services that can be accurately described and quantified can be appropriately covered by a Fixed Fee and those that are unpredictable should be on a Time Basis.

A judicious combination of the Time Basis and Fixed Fee Basis for different engineering phases permit a variety of innovative fee concepts that encourage execution efficiency without sacrificing quality of service. These concepts include targets, bonuses, cost plus fixed fee and other variations.

SECTION 3

SPECIAL SERVICES AND CONDITIONS

3.0 INTRODUCTION

The Consultant responsible for the Design of a project should normally be retained to provide Contract Administration and Engineering Review During Construction. In circumstances where a Consultant is retained to perform these services on a project for which the drawings and specifications were prepared by others, it is recommended the fee be on a Time Basis.

For all special services and conditions the Consultant and Client should mutually determine the appropriate fee basis to be used. The following guidelines reflect the principle described in Section 2 that the Time Basis should be used in circumstances where the scope of the assignment is not well defined. In circumstances where the amount of work involved in the special service can be accurately predicted, the Fixed Fee Basis is also appropriate.

3.1 EXTRA WORK

Services required beyond the agreed scope of assignment regardless of the original basis of fee should be negotiated on a Time Basis as described in Section 2.

3.2 RE-USE OF DRAWINGS AND SPECIFICATIONS

The design represented by drawings and specifications prepared under the supervision and control of a professional engineer and stamped by him is his responsibility indefinitely. Fees for the use of the design by the original Client as described in this Guideline are intended to cover one project only. Re-use of the design on subsequent projects by the same Client or by another Client requires permission by the professional engineer and permit holder who stamped the drawings.

Payment for modifications to a design to accommodate different conditions encountered on a second project should be made on a Time Basis. Fees to cover professional responsibility resulting from second and subsequent re-use of the design should be the subject of negotiation for each re-use. The Fixed Fee negotiated should reflect the complexity of the design and the exposure to risk that arises from its re-use.

3.3 DELAYS

In circumstances where the fee is on a basis other than a Time Basis and delays beyond the Consultant's control cause an increase in the cost of the services provided by the Consultant, the additional costs should be paid for on a Time Basis.

3.4 ABANDONMENT OF PROJECT

If the project is abandoned or suspended, through no fault of the Consultant, the value of the service supplied by the Consultant should be determined on a Time Basis and should include an appropriate allowance for costs resulting from the suspension.

3.5 ALTERNATIVE DESIGN

When a Client requires the Consultant to prepare design for alternatives beyond the scope of assignment originally agreed to, the fee for all extra work required to prepare the alternative designs, should be on a Time Basis.

3.6 TRAVEL TIME

Payment for Travel Time should be negotiated taking into account the variations in circumstances from one project to another. The following are guidelines:

1. Payment for Travel Time should be covered in the agreement
2. The agreement details with respect to Travel Time should take into account individual project circumstances and include economics, convenience and special considerations.

3.7 AGREEMENT

A written Agreement should be prepared which covers as a minimum the scope of assignment, schedule of execution, basis of fee and payment conditions. A guideline for such a Client/Consultant Agreement is available at the APEGGA offices. Other Agreement formats are available at the offices of the Consulting Engineers of Alberta.

SECTION 4

DISBURSEMENTS

4.0 INTRODUCTION

Unless otherwise agreed between the Consultant and the Client, disbursements incurred by the Consultant in completing an assignment are properly chargeable to the Client.

4.1 REIMBURSABLE EXPENSES

Following are categories of expenses that are reimbursable in all Fee Basis options at cost multiplied by an agreed disbursement factor:

1. Reproduction of drawings and documents beyond those specified in the Agreement to be included within a Fixed Fee
2. Travel expenses
3. Telecommunications expenses
4. Living expenses for personnel where authorized by the Client
5. Advertising for tenders on the Client's behalf
6. Use of special consultants as approved by the Client
7. Use of highly specialized equipment detailed in the Agreement
8. Messenger Service
9. Specialized computer equipment and computer services
10. Any other proper expense paid out by the Consultant on the Client's behalf, and not covered by the agreed fee

COSTS OF ENGINEERING

Engineering consulting fees are commonly expressed as a function of the Consultant's operating costs. This Appendix describes the three components of cost that comprise the Consultant's hourly billing rates; direct costs, overhead costs and profit.

Following is a summary of the cost details to supplement the information included in Section 2 — Fee Basis Options.

1. DIRECT COSTS

This category of cost represent payroll costs and disbursements incurred by staff while engaged on the assignment.

(a) Payroll Costs

This cost is typically expressed as an hourly rate based on a 37½ hour work week using the following formula:

$$\text{Hourly Payroll Cost} = \frac{\text{Annual Salary} + \text{Fringe Benefits}}{1950 \text{ Hours } (52 \times 37\frac{1}{2})}$$

in which fringe benefits are typically 20% to 30% of salary to cover the employer's share of:

- UIC charges
- Workers' Compensation levies
- Medical and Hospitalization insurance
- Life, Dental and other insurance premiums
- Statutory holiday provisions
- Sick leave provisions
- Vacation pay
- Canada Pension and Company Pension

Note: It is intended that the actual cost of fringe benefits and the actual annual working hours be used to calculate the hourly payroll cost. Annual working hours are defined as the regular working hours per week multiplied by 52.

b) Disbursements

These costs are those incurred by staff engaged on the assignment and chargeable directly to the project.

2. OVERHEAD COSTS

This category of cost relates to the general operations and maintenance of a business and include:

a) Physical Plant

- office rental and operating costs
- furnishings
- usual engineering tools and equipment (excluding specialized computer equipment such as CAD and electronic survey equipment which are covered by negotiated rates)
- switchboard, telephones, telex, etc.

b) Operating Costs

- financing
- business and professional licenses
- professional and general liability insurance
- stationery and office supplies
- technical library and periodicals
- staff recruitment and training
- audit and legal fees
- bad debts
- administrative salaries
 - accountants and clerks
 - receptionists
 - librarians
- non-chargeable time by professional and technical staff in updating procedures, attending technical seminars and other activities which are not chargeable to projects

Overhead costs vary according to the size of operation, location of office and the nature of services provided. They vary also with the efficiency of the Consultant's organization, but are typically approximately equal to the direct payroll costs.

3. PROFIT

The balance after direct costs and overhead costs are deducted from total revenue represents the before tax profit. The level of profit should reflect the Consultant's management skills, efficiency and exposure to risk. In the long term, appropriate profit levels are a essential pre-requisite to proper Client/Consultant relations and the achievement of accepted standards of professional service.

HOURLY RATE CALCULATIONS

HOURLY RATE CALCULATIONS

In general, hourly rates can be determined based on an individual's salary and fringe benefits, the annual working hours and an appropriate payroll cost factor. For example,

$$\begin{aligned}\text{Hourly Payroll Cost} &= \frac{\text{Annual Salary} + 25\% \text{ Fringe Benefits}}{1950 \text{ hours per year}} \times \text{Payroll Cost Factor} \\ &= \frac{60,000 + 15,000}{1950} \times 2.0 \\ &= 76.92\end{aligned}$$

Annual salaries for typical positions and responsibility levels can be found in APEGGA's publication entitled *The Value of Professional Services*.

Hourly rates for principals of firms will vary according to individual qualifications and level of experience. The rates should reflect the additional authority and responsibility associated with such positions. A principal of a firm, as used here, is defined as a professional who undertakes to provide responsible technical and organisational direction to the consultant's professional practice and who represents that professional practice to clients.

CATEGORIES OF SERVICE 3 AND 4

EXPRESSED AS PERCENTAGE OF ESTIMATED CONSTRUCTION COST

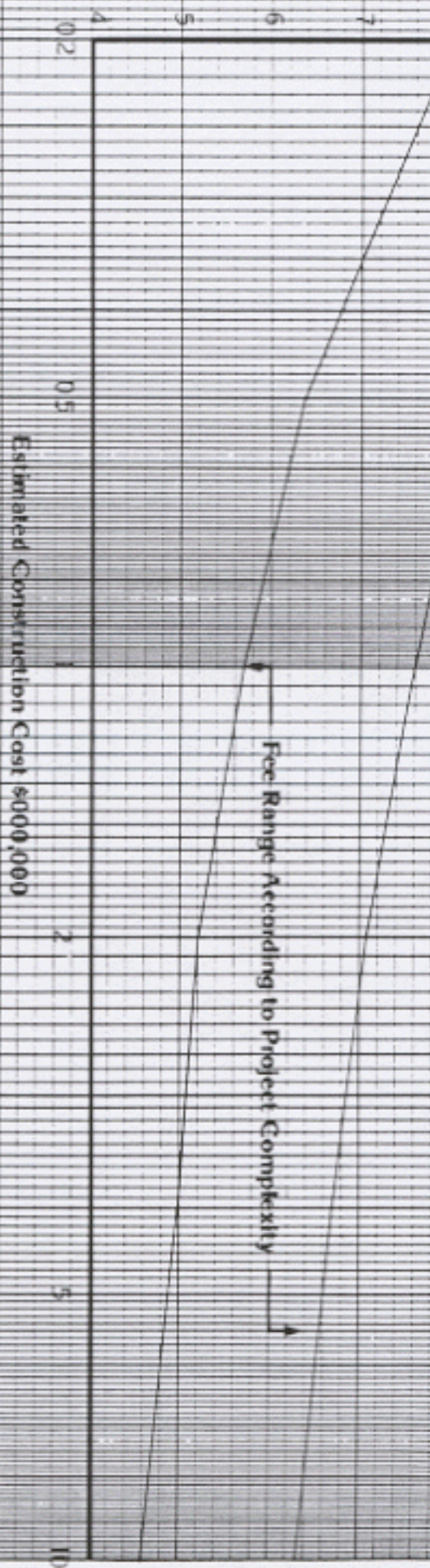
Traditionally, services in Category 3 — Detailed Design and Category 4 — Contract Administration and Engineering Review During Construction for certain project types have been provided on a Fixed Fee basis expressed as a percentage of Construction Costs.

In recent years the effects of wide swings in construction costs have introduced inequities that make this method of determining and expressing fees less appropriate even for projects in which there have been historically a predictable relationship between engineering costs and construction costs.

The attached graph represents data that is based on historical engineering and construction cost experience. It is recommended that it be used only as a guide and the Fixed Fees be based on properly prepared engineering cost estimates that take into account the complexity and special requirements of the project.

**FIXED FEE FOR CATEGORIES 3 and 4
AS % OF CONSTRUCTION COST**
(Disbursements Not Included)

**GUIDE FOR DETERMINING FIXED FEE
BASED ON CONSTRUCTION VALUE**



Note 1 For the purpose of progress billing for Consultant services 80% of the fee as determined by this Guide should be allocated to Category 3 and 20% to Category 4

Note 2 Project complexity for the purpose of this Guide is a function of engineering manhours required for Categories 3 and 4 in relation to the cost of construction. Following are range of complexity examples:

Range of Complexity

Low

- One storey warehouse with uncomplicated mechanical, electrical and site requirements.
- Urban street systems or highways with no special features.
- Urban water distribution and sewerage systems.
- Straight simple span bridges.

High

- Treatment plant with complicated mechanical, electrical and instrument control systems.
- Arterial street systems or highways involving grade separations, other special structures or geometry.
- Urban water or sewerage systems involving pumping stations, deep bury, storage or other special features.
- Asymmetric, curved, skewed, continuous span bridges.