CONSTRUCTION LABOUR IN QUEBEC: DEMAND, SUPPLY, AND INCOME CHARACTERISTICS.

by

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ABSTRACT

This thesis explains the functioning of the construction labour market in Quebec. History, institutions and market forces have produced a pattern of operation of the construction labour market in Quebec that is different from other provinces and most other industries.

The two chapters on demand and supply of construction workers are at the core of the analysis. Demand for labour is derived from the demand for investment constrained by technology and certain institutions. The supply of labour at any given time consists of the pool of trained workers available for work.

Demand side factors such as unstable demand for structures, the industrial organization of the industry, technology, seasonal work, and the nature of the product make construction work unstable. Instability coupled with a chronic excess supply of workers result in unstable employment and endemic unemployment.

Other features of the supply of labour are also considered: the unique aspects of the construction industrial relations system, training, geographic mobility, and Quebec's system of control over hiring.

The examination of the income characteristics involves reviewing wage developments and factors related to income.

Finally, a number of recommendations for further study are suggested.

PRÉCIS

Cette thèse explique le fonctionnement du marché du travail de l'industrie de la construction au Québec. L'historique, les institutions et les forces de marché ont engendré un certain nombre de charactéritiques qui rendent le marché du travail de la construction au Québec différent de celui des autres provinces ainsi que de d'autres industries.

Les deux chapitres concernant la demande et l'offre de main d'oeuvre constituent le noyau de l'analyse. La demande de main d'oeuvre est dérivée de la demande de biens d'investissements, qui elle même subit des contraintes technologiques et institutionnelles. L'offre de main d'oeuvre consiste en un ensemble de travailleurs qualifiés disposés à travailler.

Certains facteurs au niveau de la demande, tels que l'instabilité de la demande de structures, l'organisation industrielle, la technologie, l'aspect saisonnier du travail, et la nature du produit rendent l'emploi instable. L'instabilité de la demande et un excédent chronique de main d'oeuvre expliquent l'instabilité de l'emploi et un chômage endémique.

D'autres aspects de l'offre de main d'oeuvre sont aussi décrits: les charactéristiques uniques du système de relations industrielles, la formation des travailleurs, la mobilité géographique, et le système et le système québécois de contrôle du placement.

Un chapitre est consacré à l'examen des charactéristiques de revenu des travailleurs de la construction qui comprend l'examen des salaires et des facteurs reliés au revenu.

En conclusion, un certain nombre de recommandations pour d'autres études plus poussées est proposé.

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Chapter I Introduction

The central question to which this thesis addresses itself is how the Quebec construction labour market functions. Construction labour markets are unique in North America, they do not follow the same patterns as that of other goods producing industries. First, there is the persistence of craft organization. Second, unlike workers in many other unionized industries who enjoy some measure of employment stability, construction workers suffer from repeated bouts of unemployment. Third, unlike most other industries with high unemployment and low job stability, construction workers earn relatively high wages. The reasons for these differences are found in the way the industry is organized, and in the complex set of interactions between the product, the industrial organization, and the labour market, as well as the industry's institutions and historical development. The Quebec construction labour market presents a number of additional peculiarities, mainly because of the historical development of labour institutions. The presence of two major union bodies--the Quebec Federation of Labour (QFL) and the Confédération des Syndicats Nationaux (CSN)--in construction has had considerable influence on the development of labour market institutions and consequently on the functioning of the labour market.

Construction is a very important industry. Some 122,000 hourly rated men worked at least one hour in the Quebec construction industry in 1978, which was not a good

year, and almost 150,000 in 1975, the best year of the decade. In 1978, these workers were responsible for some 8.2 billion dollars worth of construction, close to 76% of investment expenditures in Quebec. In 1978, 652,000 man-years were employed in construction in Canada, close to six percent of the labour force if we assume that each man employed in construction worked a full year. Thus, more than six percent of those who participated in the labour force worked in construction at one time or another during the year since most construction workers do not work a full year. The construction industry also purchased some 13.7 billion dollars worth of goods and services from other Canadian industries in 1978.

According to Boyd and Wilson's study of technical change in construction, there are two alternative definitions of construction: a narrow one comprising the operations of contractors, sub-contractors, engineers and architects directly engaged in the design and erection of structures, and a broader one including not only those engaged in assembly and design, but also the manufacturers and suppliers of components, materials and equipment. (1) The narrow definition will be used for the purposes of this thesis. It would be interesting to study employment in supplier industries, but this is beyond the scope of this thesis. Studying the supplier industries would more than double the size of this work, and limitations of both time and space have made this impossible. Not only will the narrow

definition be used, but examination of the labour market will be focused on hourly paid production workers, and will exclude both salaried management staff and professional and clerical workers who are employed in architects', engineers', and contractors' offices. It will also exclude self-employed 'artisans'. The major reason for these exclusions is the lack of data.

The Office de la Construction du Québec (OCQ), the government agency that regulates the industry, conducts a continuous census of all hourly paid construction workers. This census provides data on hours worked, income from construction, and professional qualifications or trade of all workers who worked in construction in Quebec since 1972. This is possible because the OCQ manages the centralized fringe benefits system to which all Quebec construction workers belong, and employers are required to make a monthly report to it along with their monetary contribution on behalf of their employees.

However, OCQ data on hours worked and income from construction have certain deficiencies. The data are based on hours of work reported to the OCQ, but not all hours are reported. The data thus provide an almost certain systematic underestimate of hours worked. Often, overtime hours are illegally paid in cash at the regular hourly rate. This profits both workers and employers. It profits the former because the high marginal income tax rates mean that workers would actually receive a net wage less than the straight time

rate. It profits employers because they have to pay much less than the required time-and-a-half or double-time. However, the resulting decrease in labour costs will affect recorded profits and thereby increase taxes, but not to the full extent of the cost savings. Self-employed workers or artisans, and this includes most skilled tradesmen at one time or another, also tend to work for cash, and hence do not declare their income to either the tax authorities or the OCQ. This is probably still very common in rural areas, where most house construction is done on a cash basis by local self-employed 'ouvriers' who may not even have qualification certificates, and certainly do not declare their income to anyone. Even in the urban centres, many construction workers earn part of their income by working as self-employed artisans who take on small contracts. Most hours worked by artisans are not reported to either the OCQ nor is the income reported to the tax man. Nevertheless, despite their underestimate of income and hours worked in the industry, the OCQ data on construction workers' incomes and hours are unquestionably the best and most detailed available anywhere in North America.

The basic methodology used in this thesis is to identify, describe and analyse the institutions and market forces that affect the functioning of the Quebec construction labour market.

There is surprisingly little work done on the labour economics of the construction industry. Most studies of the

construction labour market focus on labour-management relations. The only study devoted strictly to the labour economics of the construction industry in Canada was done for the Economic Council of Canada's report on instability in construction by R.A Jenness. (2) Two Canadian studies on industrial relations in construction also looked extensively at certain economic aspects of the labour market. They are: Construction Labour Relations, edited by H.C. Goldenberg and J. Crispo (3), and Les relations du travail dans la construction au Québec, by Gérard Hébert (4). OCQ publications must also be noted. The OCQ publishes an annual report on the construction industry in Quebec (5) based mainly on its own statistics on hours worked, and since 1979, it has published a quarterly bulletin. (6) In 1978, it also published a major report on instability in Quebec construction (7). In addition, there are innumerable studies, reports, task forces and commission reports done on industrial relations in construction, but they only peripherally look at economic issues.

The lack of previous studies on the functioning of the construction labour market is undoubtedly due to the absence of adequate industry data. Most statistical information (except for the OCQ data) is very sketchy and broad.

This thesis is an attempt to synthesize the different aspects of the labour market into a coherent whole that describes their multiple interactions. It should serve to lay the groundwork for further studies by providing an

overall context into which they can be put. The need for additional studies is outlined in the concluding chapter.

Chapter II examines three basic aspects of the industry that have important repercussions on the labour market: the product structure, the industrial organization, and the basic organization of the work force.

The two chapters on demand and supply, Chapters III and IV, form the core of this thesis. Chapter III on the demand for labour describes how demand for construction output, i.e. investment, translates itself into the demand for labour. This chapter takes demand for investment and therefore its derivative the demand for labour as basically exogeneous. However, it explains how the demand operates on labour markets through existing institutions. A major aspect of construction demand is its instability. This instability results in periodic bouts of unemployment among construction workers.

Chapter IV describes how historical events have produced labour market institutions and a pool of trained labour that affects supply responses to changing demand. Particular attention is paid to one of Quebec's unique features, the system of control over entry into the industry's labour market.

Chapter V describes the income characteristics of construction workers, namely wages and annual income. Market forces, unions and employer associations, and government regulation have produced an observed pattern of wage rates

and income distribution that is described using mainly OCQ statistics.

Finally, Chapter VI summarizes the finding of the previous chapters, evaluates the functioning of the Quebec construction industry and suggests the need for additional studies.

Footnotes to Chapter I

1. A.D. Boyd and A.H Wilson, Technology Transfer in Construction, (Ottawa, 1974), p. 13.

2. R.A. Jenness, Manpower in Construction, (Ottawa, 1975).

3. H.C. Goldenberg and J. Crispo, eds., Construction Labor Relations, (n.p., 1968).

4. Gérard Hébert, Les relations du travail dans la construction au Québec, 2 volumes, (Ottawa, 1978).

5. OCQ, Analyse de l'industrie de la construction au Québec. It has been an annual publication since 1974.

6. OCQ, Bulletin Trimestriel, published since 1979.

7. OCQ, La stabilisation de la construction au Québec, (Montréal, 1978).

Chapter II The Economics of the Construction Industry

II.1 Introduction

The task of this chapter is to describe the economic characteristics of the construction industry. Although the Quebec construction industry has unique characteristics in the labour relations area, its basic organization is identical to that of the the industry in other parts of Canada and in the United States. Consequently, the discussion of the economic characteristics of the construction industry presented in this chapter is applicable to Quebec as well as other North American jurisdictions. Three basic aspects of the industry are examined in this chapter: product structure, industrial organization, and manpower characteristics.

Construction is perhaps the most complex industry in the economy with a myriad of interrelations and interconnections. It has facetiously been called a 'galaxy' rather than an industry. (1) It is necessary to clarify and disentangle this complex structure in order to lay the groundwork for the rest of the study of the labour market.

Part of the complexity of the industry stems from the complexity of what it produces. The outputs of the construction industry--structures--are very heterogeneous; each structure is built according to the specifications of individual buyers. The heterogeneity of output is the cause of a large number of problems encountered in the analysis of

this industry. Section 2 of this chapter will analyse the complexity of the product structure of the industry. It will also present the concept of components which is used to analyse the output of the industry. The basic idea presented in that section is that a structure, no matter how complex, is composed of a number of relatively homogeneous components that are created by the employment of a number of material, machinery, and labour inputs on a construction site. The idea of components is essential in any detailed analysis of the construction industry.

Another reason for the complexity of the industry is the number, function, and size of the firms that operate in it. Section 3 of this chapter presents a means of classifying the firms that operate in the industry and analysing the way in which they are related to one another. Crucial distinctions will be made between firms that are primarily engaged in construction, and those that do construction work on their own account, but whose main business is in other industries. Following that, the sizes and number of firms in the industry wil be described.

The complexity of the industry is also reflected in its labour market. Construction workers belong to a large number of skilled or semi-skilled trades or crafts, and members of each trade can only do limited types of work. This craft organization has by now been abandoned in most goods producing industries, but still persists in the construction industry. The craft organization of construction labour is examined in Section 4.

II.2 The product structure

Statistics Canada defines construction as the 'creation, renovation, repair and demolition of immobile structures and the alteration of the natural topography of the ground'. (2) The central idea in construction is that of a structure. Structures are the output of the construction industry; what is sold to the buyer. There are innumerable kinds of structures, since each one is usually made to the unique specifications of the buyer. The only exception to this is in housing construction where a small number of identical or quasi-identical units are built by tract developers. This heterogeneity of output poses considerable difficulties in analysing the industry.

There is an obvious classification by type of structure. Structures can be grouped into categories, each category being defined by the function of the structure. Nevertheless, even within each category there is considerable heterogeneity; in general, no two houses or factories or dams are identical. Two broad divisions of construction output are evident: building construction, in which the structure is a building such as a house, a factory or an office building; and non-building or engineering construction, where the product is not a building, such as dams, roads, etc. The two involve in most cases very different production techniques and uses of inputs. However, significantly for this thesis, the two divisions share the same manpower pool, although they use various skills or trades in differing proportions.

These two divisions are further subdivided into more specific classes presented in Appendix 1. For building construction, there are residential and non-residential buildings. The latter are also divided into four groupings of types of buildings: industrial, commercial, institutional, and a catch-all other buildings. This last category includes specialized buildings for the communications industry, farm buildings, and military buildings, as can be seen in Appendix 1.

Engineering construction can also be similarly subdivided into finer categories: marine construction, roads and runways, waterworks and sewage systems, dams and irrigation, electric power construction, railway, telephone and telegraph, gas and oil facilities, and, again, a catch-all other engineering construction. These categories can also be more finely divided. These divisions are enumerated in Appendix 1. It must be noted that even these finer categories could be further subdivided, but the classifications presented in Appendix 1 are, by and large, the most detailed for which data are available.

Building construction accounts for about 60% of the value of total construction for Canada, with residential construction accounting for approximately half of that. The proportion of residential construction in the value of building construction in Canada has been steadily increasing since 1966; from 42% of building construction in 1966, it

increased to 61.6% in 1977. The same pattern also exists in Quebec, as can be seen in Table II-1. The data on the relative importance of the major sectors of construction in Quebec are presented in Table II-1.

TABLE II-1
PERCENTAGE OF TOTAL VALUE OF CONSTRUCTION ACTIVITY BY MAJOR SECTORS, QUEBEC, 1966-1980

YEAR	BUILDING CONSTRUCTION			ENGINEERING CONSTRUCTION
	Residential	Non-residential	Total	Total
1966	26.4	34.2	60.6	39.3
1967	30.0	32.7	62.7	37.3
1968	31.1	32.4	63.5	36.5
1969	32.9	31.1	64.0	36.0
1970	31.2	31.9	63.1	36.9
1971	31.3	29.9	61.2	38.8
1972	32.1	29.1	61.2	38.8
1973	32.7	30.4	63.1	36.9
1974	33.4	33.3	66.7	33.3
1975	28.4	34.5	62.9	37.1
1976	37.1	27.8	64.9	35.1
1977	36.2	24.6	60.8	39.2
1978	33.9	22.0	55.9	44.1
1979	31.7	21.5	53.2	46.8
1980	32.2	22.2	54.4	45.6

Source: Calculated from Statistics Canada, Construction in Canada, Catalogue # 64-201.

In Quebec, building construction accounted for consistently over 60% of the total value of construction, with an average of 62.9% of total value of construction between 1960 and 1977. With the slump in building construction and the continuation of the James Bay hydro project, this proportion

fell considerably after 1976, falling to an estimated 54% in 1980. The greater importance of building construction in Quebec compared to the Canadian figure is due to the relative absence of construction of oil and gas facilities, which accounted for between 10% and 15% of engineering construction in Canada in the fifteen years from 1966 to 1980, and for only between 3% and 7% of Quebec engineering construction in the same years.

II.2.1 Components

Structures, even within any of the finer categories presented in Appendix 1, are very heterogeneous. However, any structure can be broken down into a number of fairly homogeneous and standardized components. A component is a sub-assembly of a structure, a number of which go into a particular structure. Examples of components are: square feet of 12" by 12" vinyl floor tiles, cubic yards of 8" concrete wall, installed finished wall covering (plaster or gypsum wallboard), installed 24" concrete culvert, paving a number of miles of two-lane highway, etc. Many components are amenable to direct measurement in their own physical units, as is indicated by the above examples. Other components are more difficult to measure. For example measuring electrical installations in their own physical units is difficult unless an electrical component is subdivided to the point of meaninglessness.

The definition of a components has been left

deliberately broad. A component can be specified in as narrow or broad a way as one needs for one's purposes. For example, installed gypsum wallboard, plaster, and wood paneling can be treated as separate components, or alternatively as one wall covering component, the component being heterogeneous. For purposes of getting accurate price and quantity indexes of construction output, one may wish to keep them as separate components, while for the purpose of analysing the effects of technical change on labour demand, one may want to combine them, since wallboard is an important technical development.

A component is created by the employment of a number of inputs on a construction site. These inputs include materials purchased from other industries, the use of a certain number of hours of certain machines and other capital equipment for some time, and man-hours of one or several trades. The material inputs may be in any state of fabrication. In some cases, considerable on-site work is necessary to fabricate or assemble the component, in others the component is completely pre-fabricated and the only on-site work is installation.

The concepts of structures, components and inputs must be credited to Norman N. Kaplan who first developed them for his work on the deflation of the value of construction output and the measurement of productivity for international comparisons. (3) His name for structures was 'projects', but Statistics Canada's terminology is used in this presentation

for reasons of consistency. The use of these concepts is standard in studies of the construction industry. For example, they are used by the Construction Division of Statistics Canada especially for its price statistics. (4) Other writers also use them, although they sometimes refer to components by different names, such as sub-assemblies or characteristics; nevertheless the same concept is present.

II.2.2 Measuring construction output

Components are important since they provide the conceptual framework with which construction output can be measured and analysed. Accurate price indices cannot be developed without using the concept of components.

The problem of measurement of output in the construction industry is analogous to that in other industries producing non-homogeneous goods. (5) The problem of the measurement of real output is caused by the very nature of construction output. Its heterogeneous and non-standard nature makes it impossible to measure output in its own physical units as with a more homogeneous commodity. The separation of output into its various components would make possible the measurement of output in its own physical units, except for the service components such as architects' and engineers' work. This is the approach originally suggested by Kaplan (6), and it is generally considered to be ideal, were it not for the onerousness of gathering the necessary data on all components.

The lack of a measure of real output makes it difficult to arrive at accurate price and productivity figures. A method for properly deflating the total value is needed. There are numerous ingenious ways of doing this. However, all of them have problems in obtaining sufficiently accurate indices for purposes such as productivity measurement.

The simplest method is to use an index of input prices as an index of output prices. However, this obviously ignores productivity changes by definition.

Another approach which has been used to some extent in deriving housing price indices is hedonic price indices. These indices were originally developed to obtain price indices that took account of quality changes in automobiles, another non-standard good. (7) Hedonic price indices are arrived at by regressing total value on various characteristics of a non-homogeneous product in order to arrive at a pure price index. Hedonic price indices are not published by Statistics Canada because these would require large arrays of data that are not presently available. (8)

Again another approach, this one used by Statistics Canada, is the model pricing approach. A representative model of a type of structure is chosen, usually by a survey. The cost of constructing the model at a particular time is then estimated using estimating handbooks. Year to year increases in cost are used to calculate indices. Indices of this type are presently published by Statistics Canada for house prices and certain other types of structures, such as

light industrial buildings, high schools, and small office buildings. (9) This approach appears to be the most promising, but, unfortunately, collection of these kind of data only began recently.

One approach attempts to completely sidestep the measurement of output by assuming it is proportional to materials input. This is the approach originated by Dacy. (10) This type of index is now used for the deflation of the value of construction in the calculation of real Gross National Expenditure in Canada. (11) By assuming that output is proportional to materials input, an index of materials can be used as an index of output. Price and productivity indices can then be calculated if an index of labour input is available. The major drawback with this approach is that it necessitates large amounts of data in order to ensure accurate indices for certain purposes, such as deriving accurate measures of labour productivity growth in construction. However, these indices are sufficiently accurate for incorporation into aggregate statistics such as real Gross National Expenditure. In fact, productivity figures for construction calculated by this method are not published by Statistics Canada because of their insufficient accuracy.

II.3 Industrial organization

This section provides a short description of the industrial organization of the construction industry. First a summary of the system of classification for construction developed by Statistics Canada is presented. It should be noted that this system differs from the Standard Industrial Classification (SIC) system. Secondly, the competitiveness of the industry is examined. Thirdly, the cost minimizing behaviour of construction firms is described.

II.3.1 Structure of the industry

Because of the manner in which Statistics Canada presents its data on firms in construction, a distinction must be made among total construction activity, contract construction, and the construction industry proper. The construction industry is a subset of contract construction, which in turn is a subset of total construction activity. A large part of the construction of certain types of structures is done on their own account by government agencies and firms outside contract construction. For example, in 1976, in Canada, 25% of highway, road and bridge construction was built directly by governments, and 29% of other engineering construction was built directly by public utilities, as is demonstrated by Table II-2. In fact, some 18% of total construction activity was done by firms and agencies outside contract construction.

The construction industry proper accounted for 52.6% of total construction activity. The other components of

contract construction make up the balance. These are construction done by firms that are included in the real estate industry, home owners who work on their own home, and contractual services for non-construction work related to the exploration and development by the oil, gas and mining industries. Table II-2 below shows the percentage of value of total construction activity by producers of construction activity in Canada in 1976.

TABLE II-2
PERCENTAGE OF VALUE OF TOTAL CONSTRUCTION ACTIVITY BY PRODUCERS OF CONSTRUCTION ACTIVITY, CANADA, 1976.

	TYPE OF STRUCTURE				
	Residential	Non-residential Building	Highway Road and Bridge	Other Engineering	Total
Construction Industry Proper: (includes work done by general contractors and special trades contractors)					
Total construction industry (1)	15.6	19.0	5.3	12.9	52.7
Contract Construction: Total construction industry plus:					
Mobile homes (2)	1.0	--	--	--	1.0
Contractual services for non-construction work (3)	--	--	--	5.0	5.0
Own account by real estate operators (4)	14.4	2.1	0.3	0.5	17.3
Own account by home-owners	5.0	--	--	--	5.0
Total contract construction (6)	36.0	21.1	5.6	18.4	81.0

(continued next page)

TABLE II-2 (cont'd)

	TYPE OF STRUCTURE				
	Residential	Non-residential Building	Highway Road and Bridge	Other Engineering	Total
Total Construction Activity:					
Total contract construction plus own account construction					
Total contract construction (6)	36.0	21.1	5.6	18.4	81.0
Own account construction by:					
Utilities	--	0.3	0.1	8.8	9.2
Governments	2.1	0.6	1.9	1.4	6.0
Miscellaneous (5)	2.1	1.4	0.1	1.4	5.0
Total construction activity(6)	38.3	23.4	7.7	30.0	100.0

Notes:
1. This Data is net of subcontracts in order to prevent double counting.
2. For purposes of reconciliation, this is considered non-construction work.
3. Expenditures made on contractual services for non-construction work in the oil, gas and mining sectors. Included are expenditures related to exploration and development such as air-borne surveys, drilling, catering, etc.
4. Portion done by real estate developers is an estimate obtained by taking the sales of products (net of subcontracts) and adding to this the increase in their gross depreciable assets (buildings), again net of subcontracts.
5. Includes own account work done by the manufacturing, forestry, mining, agriculture, finance, commercial, and institutional sectors.
6. Figures may not add up because of corrections for revised inflation technique, residual error and rounding error.

Source: Statistics Canada, Construction in Canada, 1977 issue, catalogue #64-201.

The construction industry proper includes those firms primarily engaged in construction on a contract basis; in other words, building structures or components for immediate buyers outside construction. Projects are built by general contractors and specialized trades subcontractors. General contractors are classified into four major groupings according to the type of structure they are primarily engaged in building: residential general contractors, non-residential building general contractors, highway, road and bridge contractors, and heavy engineering contractors. However, one type of contractor may build structures of other types, as can be seen from Table II-3, although contractors generally tend to operate within one broad structure category.

TABLE II-3
PERCENTAGE DISTRIBUTION OF VALUE OF OUTPUT OF THE CONSTRUCTION INDUSTRY, BY TYPE OF CONTRACTOR, CANADA, 1976.

	TYPE OF STRUCTURE				
	Residential	Non-residential Building	Highway Road and Bridge	Other Engineering	Total
Residential general contractors	14.3	0.6	--	--	15.0
Non-residential general contractors	0.4	9.8	0.2	0.3	10.6
Highway, road and bridge contractors	--	0.3	8.9	1.0	10.2
Heavy engineering contractors	--	--	--	14.2	14.2
Mechanical trades contractors	3.6	8.9	--	1.7	13.3
Electrical trade contractors	2.2	4.9	--	0.7	7.8
Other special trade contractors	11.0	12.0	--	3.5	26.5
Total construction industry (1)	29.6	36.1	10.0	24.7	100.0

Note:
1. The data is net of subcontracts in order to prevent double counting. Figures may not add up because of rounding error and residual error.

Source: Statistics Canada, Construction in Canada, 1977 issue, catalogue #64-201.

In addition to general contractors, there are specialized trades contractors. These specialties are listed in Appendix 2. These firms supply certain components to general contractors, usually by means of a subcontract. They are different from simple material suppliers because they do on-site work, and they generally build one or a few components. As a rule, they provide their components indifferently to different types of structures, insofar as these components are not specific to certain types of structures. Their contribution to the value of a structure obviously depends on the extent of the use of their components in that structure. For example, mechanical trades contractors (who include contractors in heating, ventilation and air conditioning, plumbing and pipefitting; millwrighting, and rigging) account for a large part (22%) of the value of non-residential buildings erected by the construction industry. Their importance is less in other types of structures. They account for 11% of the value of residential construction, 8% of heavy engineering, and they do not provide any components to highway, road and bridge construction which generally does not use subcontractors.

According to most observers and industry sources (12), the specialized trades subcontractors have become more important in the last twenty years or so. Originally, a general contractor would have his employees do most of the work itself, subcontracting only very specialized components such as plumbing and electrical installations, where

contractors were required to be licensed by law. Today, according to an industry specialist, general contractors in non-residential building are little more than brokers and coordinators. They coordinate the work of subcontractors and engage in cleaning and other similar work. This is evidenced in Table II-3 where sub-contracting is shown to be used most often in non-residential building. Unfortunately, there are no hard data to corroborate this trend towards subcontracting. Statistics Canada first started to take censuses of specialized trades contractors only in 1975. Data for mechanical and electrical contractors are available for much longer, but those kinds of subcontracts have long been established. It is in other components that the development has recently occurred.

III.3.2 Firm size and competitiveness

It is often asserted that construction is a competitive industry. This is generally true, although the industry does not conform to the textbook model of competition. In a background study done for the Economic Council of Canada's study of construction instability, Keys and Caskie examined the operation of construction corporations. (13) They found that 19,920 incorporated firms existed in Canada in 1970. In addition, there were innumerable unincorporated firms and individual artisans working on their own. Average sales for the incorporated firms in 1970 was $454,600 indicating their relatively small size. Their comparison of the average construction company

to the average firm in manufacturing, wood, and wholesale trade industries, showed that the average construction firm had smaller assets and lower sales than firms in each of these three industries. Construction firms were also less profitable. Profits were highly variable and generally lower than in other industries.

Even by looking at the industry on a more disaggregated level, it still appears competitive. For Quebec in 1970, 68.4% of building, 49% of highway road and bridge, 36% of other engineering, and 87.2% of specialized trades contractors had assets under $250,000. Firms with net assets of under $5 million accounted respectively for 78.9% of sales in building construction, 60.7% in highway road and bridge construction, 19.7% in other engineering and 95.3% in specialized trades contractors. (14) The small percentage of sales by small firms in other engineering construction is due to the large size of firms necessitated by the building of large hydro projects.

As Keys and Caskie recognized, asset size is not a very good measure of the size of construction firms. (15) Building firms rent most of the capital equipment they need, while engineering firms, especially the large ones, have extensive amounts of capital tied up in machinery, hence direct comparison of sizes on the basis of assets between these two types of contractors is apt to be misleading. Value of sales or size of labour force are much better indicators. More recent data published by Statistics Canada

measures size by value of sales. (16) Data for Quebec for 1978 does not contradict the assertion that construction is competitive. There were 1,777 general contractors in Quebec in 1978, with average sales of $1,976,000, and 19,034 average hours worked by wage earners per firm. There were also 9418 special trades contractors with average sales of $209,798 and 5944.4 hours worked per firm, much less than for general contractors. Data on the size of construction firms operating in the major sectors are presented in Table II-3.

TABLE II-4
SIZE OF CONSTRUCTION CONTRACTORS, QUEBEC, 1978.

TYPE OF CONTRACTOR	Number of firms	Average sales by firm, $'000	Hours worked by wage earners per firm	Average number of salaried employees per firm
Residential general contractors	1,017	600	5,129	1.7
Non-residential general contractors	374	2,378	27,028	5.7
Highway, street and bridge contractors	206	2,500	55,971	7.9
Heavy engineering general contractors	180	3,546	102,773	12.8
Total general contractors	1,777	1,976	19,034	4.4
Special trades contractors	9,418	210	5,944	1.2

Source: Statistics Canada, Catalogue #64-206, #64-207, #64-208, #64-209, and #64-210, 1978 issues.

Data presented in this table include only firms in Statistics Canada's definition of the construction industry, and exclude all own-account construction. (17)

If different types of general contractors are examined, the same pattern holds. There is a large number of small firms with few salaried employees and wage earners. However, there is a gradation in competitiveness. Residential construction general contractors are the smallest (18),

approximately the same size as specialized trades contractors. The firms with the largest average sales were in heavy engineering contracting, but there were nevertheless 180 of them in 1978 in Quebec. The two groups of engineering contractors with the largest sales (from $2,000,000 to $5,000,000, and over $5,000,000) had respectively 29 and 35 firms. Firms in highway road and bridge construction were the second largest with average sales of $2.5 million and 55,971 average man-hours. Non-residential general contractors had slightly lower sales, an average of $2.3 million, but the fact that they use sub-contractors more frequently than other sectors of the industry is reflected in their having much lower average man-hours (27,028 man-hours per firm). It must be noted that in all five groups, the smaller firms form the great majority of firms and account for a very large proportion of sales.

III.3.3 Contracting and cost minimization

The traditional approach to building in the construction industry is as follows: the buyer specifies his requirements to an architect who draws up plans and specifications with the help of consulting engineers. A number of general contractors are then invited to submit bids for the construction. In turn, as part of the procedure of drawing up his tender, the general contractor invites specialized trade contractors to submit bids for certain components. Usually, the contractor with the lowest bid

obtains the contract, and becomes responsible for all the work. Although there is no direct quantitative evidence, it has been noted by Keys and Caskie that more work is done in this manner than in any other. (19) However, because of certain disadvantages of this procedure, such as the length of time it takes from conception to final execution, and the inability to take advantage of the contractors' experience, certain alternative procedures are also used.

Many housing or commercial building projects are built by builder-developers, who buy the land, build the structure, often tract houses or high rise apartment buildings, and then either sell them or rent them out. They do not build to the specifications of buyers, but rather they build what they believe the market wants. Often, they build a model house, and then build as many houses as they can obtain orders for. Many of these builder-developers are not considered part of the construction industry, since their main source of income is not providing construction services to buyers, but rather sales of real estate to constructors and rental of units they have built.

Another building procedure is called 'fast-tracking'. With this procedure a project manager is hired by the buyer to be responsible for both design and construction. Project management is often a joint venture of engineering companies and large construction contractors. The main advantage to this approach is, as its name implies, speed, since construction may be started by the project manager before design is complete. It includes many variants. For example,

separate firms may be responsible for design and construction, or a number of firms may work in collaboration on both. The method of payment may also vary according to the type of contract and usually is negotiated by the buyer and the project manager before construction begins. (17)

The contracting procedure is related to the method of pricing. In a fixed bid contract, the price of a structure comes from the bid. A bid is arrived at by estimating the cost of building the structure. This is done by calculating the materials, labour and machinery costs for each component, adding on the subcontract bids, and then tagging on a mark-up which varies both according to the sector of construction and to the demand conditions. In sharp downturns, firms have been observed to submit unrealistically low bids and take a temporary loss in order to keep prized tradesmen and supervisory personnel.

The attribution of contracts by the fixed bid method encourages the minimization of costs, since the lowest bidder usually obtains the contract. The lowest bidder is the one with the lowest calculated cost. Once a contract is awarded, a budget is drawn up for the use of the superintendent on the job site. The budget is drawn up by engineers and estimators carefully going over the bid estimates and pruning any unnecessary cost. The superintendent is also expected to lower costs whenever possible as construction proceeds. He may do this by using cheaper equivalent materials, new types of production techniques, finding shortcuts, or by cheating

if he feels he can get away with it. Hence, for all practical purposes, contractors are cost minimizers in fixed bid contracts. Of course, with other arrangements such as cost-plus contracts or fast tracking, this is no longer necessarily true. With cost-plus contracting, costs may soar because of skulduggery on the part of contractors, as was seen in the construction of the Olympic facilities in Montreal. Cost-plus contracts are also commonly used when modifications must be made to an already awarded contract, and a substantial part of contractors' profits come from such 'extras', where there is no need to minimize costs. In contracts other than the fixed bid type, other methods of cost controls must be implemented by the buyer or his agents, but they may not be effective because of the possibility of bribery and other tactics.

Cost minimization is also affected by the availability of information on new techniques and products. If a contractor does not keep up with the latest technology, he may not, in fact, reach the minimum possible cost. Of course, this could not continue for very long because the bidding system ensures that those contractors with the lowest costs tend to obtain the most contracts. Contractors with higher costs would eventually go out of business.

The development of the specialized trades contractors may have gone some way in helping cost minimization. A specialist contractor is more likely to keep up with new methods and materials in his field than are the employees of

a general contractor who must be concerned with all aspects of construction.

Another recent innovation in construction which may help in cost minimization and in more efficient use of resources is the development of the rental of capital equipment. This has been noted by numerous observers. (19) However, there are no hard data to show the extent of this development. The significance of this development is that it may permit technical innovation in machinery to spread faster. Many construction firms no longer have the large stock of capital equipment they had in the past, and therefore no longer have to take it into account when they decide what production process to use. This means that technique changes can be introduced more rapidly since firms do not have large capital investments which they must amortize. Using Salter's terminology, we can expect most of the construction industry to use the current best practice technique in most of its operations. (22) Another effect may be the faster spread of information on new techniques by rental firms in their direct dealings with superintendents on ~~the job site, since the~~ latter make many of the decisions as to what equipment is to be used.

II.4 Manpower characteristics

Manpower in construction is very different from that of many other goods producing industries. Outside of construction, many industries are consciously or unconsciously run on F.W. Taylor's principles of 'scientific management'. According to Harry Braverman, the three principles are: 1) 'the dissociation of the labor process from the skills of the workers', 2) 'the separation of conception [of the work] from execution', and 3) 'monopoly over knowledge to control each step of the labor process and its mode of execution'. (23) When Taylor's principles are put into effect, most skilled employees are management technicians; the production workers become an undifferentiated mass of so-called 'semi-skilled' workers who are told how to perform every step of the work process. These semi-skilled workers are trained only for a specific task in the production process, and usually their training cannot be taken to another firm. The basic tools of 'scientific management' or industrial engineering are time-and-motion studies and job evaluation.

An older form of work organization is in place, in construction; it is akin to what Taylor called 'ordinary management'. Workers belong to skilled trades, have served a period of apprenticeship (whether formal or informal), and have a vast storehouse of knowledge. A piece of work is assigned and the worker organizes and performs it on his own using the knowledge of his trade. This has led to the

frequent comment that construction uses obsolete methods of management. However, the persistence of an older form of work organization cannot be due to the force of tradition only, since the construction industry has seen a large number of changes, including the creation of new trades or crafts.

Although it might be possible to save some labour time in the execution of tasks by adopting industrial engineering or 'scientific management' principles in construction work, the constantly varying nature of the work (due partly to the non-homogeneous nature of the output) would probably make 'scientific management' more onerous than the present system. (24)

In addition, attempts to standardize construction tasks would undoubtedly reduce work satisfaction which is very high for construction workers. (25)

While there may be little scope for 'scientific management' of on-site workers, industrial engineering has had an indirect but important effect on construction workers. Components that were previously built on site are now prefabricated in factories where industrial engineering methods are used. This is an important aspect of technical change in construction, perhaps the most important for the development of the labour market.

III.4.1 Craft organization

Accordingly, the majority of construction workers are skilled tradesmen or craftsmen who have served a formal or

informal apprenticeship and are secure in the knowledge of their craft. There is a rigid division between crafts, and each craft has its own training requirements and procedures to determine whether a worker has assimilated the necessary knowledge. Not all construction workers are skilled tradesmen; there are also a number of unskilled or semi-skilled occupations. But even in these occupations, there remains a rigid division between occupations, with a need for qualification procedures for most of them. Craft organization has historical roots that go back to medieval guilds of masons, joiners, carpenters, smiths, and other mechanics. Today, as in the past, each craft or trade is only permitted to do certain clearly specified types of work, for which it has exclusive jurisdiction, and which is usually regulated by government regulation and union insistence.

These jurisdictions require that one craft or a small number of complementary crafts have the responsibility for building a certain type of component. For purposes of relating trades to components, we can divide trades into two groups. One group is where the definition of the trade is keyed to a limited number of components. Carpenters, plumbers, tinsmiths, electricians, and the trowel trades are examples of one group. They are the ones that actually build components. The definitions of these trades, as can be verified in Appendix 3, are definitions of the types of components they may build. The services of the workers in a second group are used indifferently in the production of a

wide variety of components, but they do not actually make a component. These trades may be termed 'service' trades. This group includes, among others, labourers, truck drivers, and heavy equipment operators. As can be seen in Appendix 3, the definitions of these trades are keyed to processes that they can do, or to machinery that they may operate, rather than components they may build. The significance of this division is that a technical change affecting a trade in the first group only affects those components which the trade produces, while a technical change affecting the service trades can have repercussions throughout the industry.

For example, the introduction of the tower crane affected all aspects of the construction of the basic structure of tall buildings by changing the method of handling materials for all trades. It also made possible the use of new materials, such as pre-cast concrete cladding elements, which were too cumbersome to use with older handling methods. This particular technical change led to disputes between riggers and masons as to who should be responsible for the installation of pre-cast concrete.

There are some nebulous areas on the margins of trade jurisdictions, and the introduction of new techniques often leads to jurisdictional disputes. A recent example of this in Quebec, was the dispute that halted work on the Complexe Desjardins in 1975, where carpenters claimed exclusive jurisdiction over the handling and placing of scaffold jacks for concrete floor forms, while the labourers insisted on

doing part of the work. In fact, technical change seems to be the main source of jurisdictional disputes. (26)

III.4.2 Restrictive trade practices

Jurisdictional disputes are one aspect of restrictive trade practices. Restrictive trade practices which are often alleged to be prevalent in construction. However, the available evidence shows this not to be the case. The Economic Council of Canada, in its study of instability in the construction industry, undertook a study of collective agreements to probe this area. It found that less than 15% had practices that could be construed as featherbedding, and all of these were safety related. Restrictions on the use of tools were found in less than two percent of agreements. (27) An earlier study done in the United States by Haber and Levinson concluded that:

> ... an over-all evaluation of the extent and importance of union working rules strongly suggests that their adverse effect is much less than has been widely alleged. (28)

Another United States study undertaken by the National Commission on Urban problems entitled Building the American City found that restrictive practices did exist but that there were a number of mitigating factors, and often unions were active in breakthroughs involving new products and methods. (29) It should be noted that, while restrictive

practices may have retarded the introduction of new techniques, they have not prevented their eventual adoption.

Footnotes to Chapter II

1. A.D. Boyd and A.H Wilson, Technology Transfer in Construction, (Ottawa, 1974), p. 17.

2. Statistics Canada, Construction in Canada, catalogue #64-201.

3. Norman M. Kaplan, "Some Methodological Notes on the Deflation of Construction", JASA, September 1959.

4. C.M. Jones, G.J. Garston, and A.E. Ansmits, "Quantity and Price Indexes for Construction", Review of Income and Wealth, September 1978.

5. This problem led to a reformulation of the theory of consumer behaviour, where each good is considered as a bundle of characteristics and each distinct type of bundle is a different 'model'. This conceptualization has proved quite fruitful, not only in construction, but also in other industries. E. Chamberlain's Theory of Monopolistic Competition, is concerned with it with its focus on product differentiation. Some recent reformulations of utility theory to take account of heterogeneous goods were done by G. Debreu, The Theory of Value; H. Theil, "Qualities, Prices and Budget Inquiries", Review of Economic Studies, IX, no. 50; and K.J. Lancaster, "A New Approach to Consumer Theory", Journal of Political Economy, April 1966.

6. Kaplan, op cit.

7. See Z. Griliches, ed., Price Indexes and Quality Change, (Cambridge, Mass., 1971) for a full discussion of hedonic indices.

8. Jones et al., op cit., p. 270.

9. Ibid, p. 270-271, and Statistics Canada, Construction Price Statistics, Catalogue #'s 62-007 (monthly) and 62-008 (annual).

10. D.C. Dacy, "A Price and Productivity Index for a Non-Homogeneous Product", Journal of the American Statistical Association, June 1964; and "Productivity and Price Trends in Construction since 1947", Review of Economics and Statistics, November 1965.

11. P.S.K. Murty, "Revised Price Indexes of Construction Expenditures for GNE Deflation", Canadian Statistical Review, Nov. 1970, pp. 4-5.

12. See for example, Jones et al., op. cit., p. 263.

13. B.A. Keys and D.M.Caskie, The Structure and Operation of the Construction Industry in Canada, (Ottawa, 1975).

14. These data are taken from ibid., Appendix Tables.

15. Ibid., p. 11.

16. See the Statistics Canada publications on the construction contracting industry: The Highway, Road, Street and Bridge Contracting Industry, Catalogue #64-206; The Non-residential General Building Contracting Industry, Catalogue #64-207; The Residential General Building Contracting Industry, Catalogue #64-208; The Heavy Engineering Contracting Industry, Catalogue #64-209; and The Special Trades Contracting Industry, Catalogue #64-210.

17. C.f. Table II-3 and page 24 in this chapter for a description of the construction industry proper.

18. J. Lorimer, The Developers, (Toronto, 1978),asserts that there is a substantial monopoly element in residential building. However, the monopoly exists in the control over land and not in the actual construction. Large developers do build houses but they also sell a large part of their land to small residential contractors. In addition, Lorimer found that the Quebec developer industry is more competitive than that of other provinces.

19. Keys and Caskie, op. cit., p. 6.

20. For a more detailed discussion, see ibid., pp. 5-10.

21. Ibid., p. 25.

22. For a discussion of best practice technique, see W. Salter, Productivity and Technical Change, (London, 1966), pp. 6 and 23.

23. H. Braverman, Labor and Monopoly Capital, (New York, 1974), pp. 113, 114, 119, italics in the original.

24. One study done on industrial engineering principles for the Business Roundtable in the United States found that only 30 to 35 percent of paid time in utility construction was actually used in working. The rest was spent in idle time, waiting, getting tools, etc. (Cited in P.A. Cockshaw, "As Labor Costs Continue to Accelerate Stoical Owners Become 'Activists'", Industrial Construction Magazine, Nov. 1975, pp. 8 and 30). It must be noted that in utility projects, as in other large projects, workers have a greater opportunity to 'soldier' because of the greater difficulty in supervision, so the figures may be biased, and only reflect a lack of 'ordinary management' in F.W. Taylor's words. They

are most likely thus not representative of construction as a whole. It is also not explained in the article how applying industrial engineering would in fact result in lower costs.

25. J.W. Riemer, Hard Hats: The Work World of Construction Workers, (Beverley Hills, 1979), pp. 161-163.

26. Economic Council of Canada, Towards More Stable Growth in Construction, (Ottawa, 1974), p. 77.

27. Ibid., p. 76.

28. W. Haber and H.M. Levinson, Labor Relations and Productivity in the Building Trades, (Ann Harbor, Mich, 1956), p. 189.

29. "Exploring Restrictive Building Practices", Monthly Labor Review, July 1969, pp. 31-39.

Chapter III The Demand for Construction Workers

III.1 Introduction

This chapter is devoted to analysing the demand for construction labour in Quebec. The demand for labour is a derived demand; under given technical conditions, it depends on the demand for the output of the industry. The demand for labour in construction is determined by the demand for structures constrained by the state of technology and legal and institutional restraints. These three aspects of the demand for labour--demand for structures, technology, and legal restraints form the three themes around which this chapter is organized.

Sections 2 through 5 examine the first theme. There are four aspects to the demand for structures that need to be considered in analysing the labour market: the actual pace and composition of demand; the buyers who make the decisions on what is to be demanded; the firms that organize production and serve as intermediaries between the demand for structures and the workers who build the structures; and finally, the effects of the outcomes of the construction labour market on the demand for structures. All four have repercussions on the demand for labour.

The pace and composition of demand affects the overall amount of manpower demanded; the level of employment in construction depends on the amount of building that goes on. The pace and composition of demand in Quebec since 1960 are

described in Section 2 using published statistics.

The buyers determine the types of structures that get built, and hence, the composition of the manpower force. Governments, the private sector, and households each demand different types of structures and consequently the labour of different trades. The buyers of construction are examined in the Section 3 of this chapter.

Firms also have important effects on the demand for labour. While the industrial organization does not cause the employment instability, it does provide some of the conditions for it to exist. The effect of firms and their organization on the demand for labour is examined in Section 4.

Section 5 is concerned with the effects that the results of the construction labour market have on the demand for structures. Both macroeconomic and microeconomic effects are considered.

The second theme--technology--is examined in Sections 6, 7, and 8. Section 6 reviews important technological changes in construction. First, technological change is described, and then its effects on the demand for different skills and on productivity are sketched out in Section 6.

The demand for skills is analysed further in Section 6. The demand for different skills for a given demand for structures is determined by the techniques used in building the structures. Different structures require different trades in different proportions. Section 6 relates the

demand for types of structures to the demand for skills. Labour requirements data are presented in this section. Unfortunately, no data are available for Quebec on the labour requirements for different types of structures. However, there are some United States data published by that country's Bureau of Labor Statistics. While technology may differ in certain respects, especially because of climactic factors, the construction technology used in Quebec is essentially similar to that of the Northeastern United States, since, as Boyd and Wilson have noted, the Canadian industry is especially well connected to the American as far as technology is concerned. (1) So the United States data, especially those for the Northeast, may be directly applicable to Quebec.

Section 8 is also concerned with one aspect of technical characteristcs of the industry that has important repercussions on the labour market: that of seasonality. Construction work is seasonal, but there are claims that it need not be so, even with current technology and costs. Section 8 is devoted to exploring whether seasonality is due to technology or is rather a traditional holdover from when weather was a real obstacle to performing some kinds of operations.

Only one section is devoted to the third theme--legal restraints. There are laws and regulations which have been devised to directly and indirectly affect the demand for labour in cosntruction. Safety regulations and building

codes have an effect on the demand for labour and their effects are sketched out in Section 9.

The pace and composition of demand, the buyers, the industrial organization and the technology all conspire to make construction employment unsteady. The chapter ends with a section that summarizes its main findings, and discusses the issue of the instability of employment, which is bound to be the most important topic in any discussion of the demand for construction labour.

III.2 Composition and pace of demand

This section will provide a brief survey of the output of the construction industry in Quebec since 1960. The major trends in value of output and employment will be discussed. In this section, focus will be placed on comparisons of growth rates of the dollar value of output and on changes of the relative shares of each type of structure. A second source of information on the growth of output is the rate of growth of employment in equivalent man-years. This figure is obtained by dividing total wage payments by some average wage rate. These data does not correspond perfectly to the Office de la Construction du Québec's (OCQ) continuous census however they provide a rough guide to the amount of employment since 1952, while the OCQ data starts only in 1972. (2)

Construction is a notoriously unstable industry. This fact prompted the Economic Council of Canada (ECC) to undertake a major study of construction instability comprising a main report and several published monographs used as background studies. (3) There is both cyclical and seasonal instability in construction, in addition to instability of employment and frictional unemployment due to the nature of the work process and the organization of the industry. This section is concerned only with cycles. The cyclical instability is quite pronounced, but the cycles for different types of structures are not the same, nor are they apparently well correlated with the business cycle. (4) There

appears to be a cycle of approximately ten years for construction in Quebec, at least since 1960, unlike the 16 to 20 year cycle found by Ludwig Auer for Canada. (5) The cycles become evident if the employment figures published by Statistics Canada are examined. These data are tabulated in Table III-1 and charted in Chart III-1.

CHART III-1
CONSTRUCTION ACTIVITY IN QUEBEC, EQUIVALENT MAN-YEARS, 1960-1981

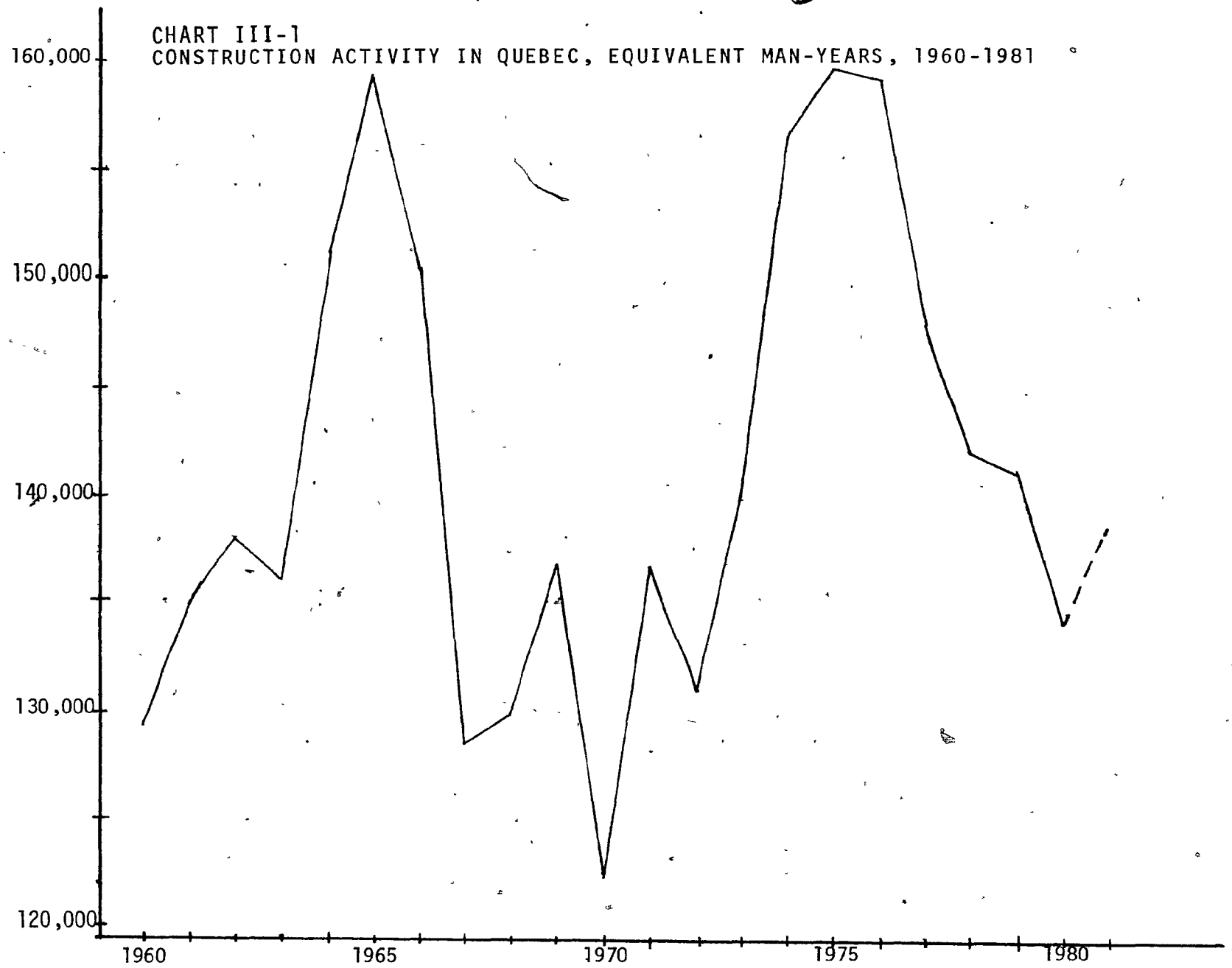

TABLE III-1
CONSTRUCTION ACTIVITY IN QUEBEC, 1960-1979.

	Total value of construction		Employment	
Year	$ '000	% change	equivalent man-years	% change
1960	1,654,161	-6.7	129,350	n/a
1961	1,732,739	4.7	135,116	4.7
1962	1.890,669	9.1	138,031	2.2
1963	1,963,920	3.9	136,121	-1.4
1964	2,365,945	20.5	150,963	11.0
1965	2,616,761	10.6	158,996	6.0
1966	2,688,832	2.7	150,198	-5.6
1967	2,542,813	-5.4	128,607	-14.7
1968	2,552,050	0.4	129,773	0.8
1969	2,695,564	5.6	136,816	5.4
1970	2,788,533	3.5	122,457	-10.2
1971	3,411,898	22.3	136,424	11.4
1972	3,745,055	9.8	130,961	-3.7
1973	4,373,282	16.8	139,682	6.9
1974	5,598,185	28.0	156,419	11.4
1975	7,110,980	27.0	159,583	1.9
1976	7,903,180	11.2	159,124	-0.3
1977	8,589,854	8.6	147,872	-6.9
1978	8,527,659	0.7	141,932	-4.0
1979	9,124,593	7.0	140,970	-0.7
1980	9,293,227	1.8	134,355	-0.5
1981*	10,375,506	11.6	138,415	0.3

* Provisional figures

Source: Statistics Canada, Construction in Canada, Catalogue #64-201.

The years 1965 and 1975 are clearly peaks of the cycle, while 1970 is clearly a trough. Figures for the 1950's would show that 1960 is also a trough. The year 1980 should also hopefully be a trough, but the recession and high interest rates may entail a persistence of the downward trend.

During the year 1960, the late 1950's slump bottomed out, at least for building construction, with a fall of 15.7%, 2.9%, and 2.6% respectively for residential, non-residential building and engineering construction. Table III-2 presents construction activity in Quebec by major type of structure.

TABLE III-2
CONSTRUCTION ACTIVITY IN QUEBEC BY MAJOR TYPE OF STRUCTURE, 1960-1981.

Year	Residential $ '000	% change	Non-Residential Building $ '000	% change	Engineering $ '000	% chan
1960	455,300	-15.7	545,238	-2.9	653,623	-2.
1961	511,800	12.4	610,651	12.0	610,288	-6.
1962	598,000	16.8	642,599	5.2	650,070	6.
1963	649,000	8.5	617,170	-4.0	697,750	7.
1964	705,300	8.7	706,026	14.4	954,619	36.
1965	732,600	3.9	846,120	19.8	1,037,033	8.
1966	725,100	-1.0	938,109	10.9	1,025,623	-1.
1967	762,600	5.2	834,057	-11.1	946,156	-7.
1968	794,904	4.2	826,289	-0.9	930,857	-1.
1969	887,098	11.6	837,765	1.4	970,701	4.
1970	869,600	-2.0	890,867	6.3	1,028,066	5.
1971	1,070,148	23.1	1,019,409	14.4	1,322,341	28.
1972	1,204,638	12.6	1,089,188	6.8	1,451,229	9.
1973	1,431,842	18.9	1,328,446	22.0	1,612,994	11.
1974	1,869,019	30.5	1,804,924	43.4	1,864,242	15.
1975	2,017,083	7.9	2,455,236	28.9	2,638,661	41.
1976	2,929,649	45.2	2,197,597	-10.5	2,775,938	5.
1977	3.113,727	6.3	2,109,526	-4.0	3,366,601	21.
1978	2,892,052	-7.1	1,876,011	-11.1	3,759,596	11.
1979	3,058,204	5.7	1,866,037	-0.1	4,200,352	11.
1980	2,812,962	-0.8	2,201,379	17.9	4,278,886	1.
1981*	3,178,010	13.0	2,286,084	3.8	4,911,412	14.

* Provisional figures

Source: Statistics Canada, Construction in Canada, catalogue #64-201.

During the five years following 1960, the great boom of the early sixties coincided with the quiet revolution. Construction was started on the Montreal Métro, Expo 67, and the Manicouagan-Outardes hydro-electric project.

Construction of educational facilities was stimulated by the presence of baby boom children and the creation of the Department of Education. Housing construction kept on growing until tighter monetary policies were imposed from late 1964 to 1966. The growth rate in the value of residential construction fell in 1965, and the absolute amount actually fell in 1966. The booming conditions kept industrial construction going strong until 1966. The institutional sector was also prospering with an exceptional growth rate of 22.1% in 1965. Expo 67 had a great effect on the commercial construction sector, both because the construction of the exhibition grounds was included in it and because ancillary facilities such as hotels and restaurants were being built. In addition, the construction of large buildings which completely remade the face of downtown Montreal, such as Place Ville Marie and Place Bonaventure, was proceeding apace. The commercial sector experienced growth rates of 14.3, 22.8, and 28.5 percent between 1963 and 1966. The bottom fell out in 1967 with a decline of 37.7 percent in the value of commercial construction. Engineering construction increased in an erratic fashion. The largest rise occurred in 1964 with a 36.6 percent increase over the previous year. This was accounted for mainly by road building and newly nationalized hydro developments. There was a decline to more usual levels of electric power construction in 1965: a 30 percent fall after two years of massive increases of 35,5% and 38.7%.

The years from 1966-67 to the early seventies are remembered as the notorious post-Expo slump. The value of output fell in 1967 and 1968 for nearly all sectors except for the residential and institutional sectors. Employment fell to 128,000 man-years in 1967 from the high of 159,000 in 1965, and in 1970, after small rises in the intervening years, it fell to a low point of 122,000 man-years, the lowest level in the twenty year period surveyed here. Most types of construction did poorly from 1967 to 1970. Where the total value of construction did not fall, growth rates slumped considerably. The only growing sectors were institutional construction, because of the continuing need to provide educational facilities to baby boom children, and the electrical sector with the construction of the Manicouagan-Outardes project. Despite this project, engineering construction saw a masive fall of 50% in 1968, and only returned to past levels in 1970.

Construction activity began to pick up starting in 1971. Employment rose by 11 percent and fell only slightly in 1972, to continue rising until a new high was reached in 1975. This period experienced the ending of the Manicouagan-Outardes project and the start of the James Bay one, the extension of the Métro in Montreal, and the building boom in the wake of the preparations for the 1976 Olympic Games. Practically all sectors were doing well. The only decline was in the institutional sector, which nevertheless went back to its 1970 level in 1974 after falling in 1972 and

1973. The residential and industrial sectors slumped in 1975 after steadily rising since 1971 in the wake of the Anti-Inflation Board and the accompanying restrictive monetary policy. The commercial sector which included the construction of the Olympic installations and the accompanying hotels rose massively in 1974 and 1975: by 72% and 65% respectively. Electrical power construction also experienced a massive rise of 73% in 1975 with the James Bay project coming on full stream, after seeing steady rises of over 20% a year since 1971.

Since 1976, a prolonged slump has settled in Quebec construction. All sectors except the residential did poorly in 1976, with the highest growth rates in other sectors being 6.2% in both electrical and institutional construction. These growth rates were most certainly below the rate of increase in prices, so it should be obvious that construction output fell everywhere in real terms. The following year was slightly better, with the industrial and electrical power sectors showing some real gains, the others slumping. Another very bad year followed in 1978. All sectors experienced actual reductions in the nominal value of output, again except for electric power construction. The decline continued in 1979, the only area showing any improvement being engineering construction, again the effect of the James Bay power project. It should be noted that in this period, electrical power construction became an increasingly important part of total construction in Quebec, going from a

range of between six and ten percent of the value of total construction activity before 1975, to 13.5% in 1975, a boom year, to 47.3% in 1981 according to Statistics Canada's latest figures.

There has been a building boom in the city of Montreal since 1980, but not elsewhere in the province, not even in the suburbs of that city. Residential construction is being stimulated by municipal government policies of subsidization and opening up city land to new construction. Commercial building construction is also clearly in a boom with tower cranes sprouting up all over downtown Montreal. The reason for this is partly a catching up; since 1976 vacant office space was becoming increasingly hard to find and developers were perhaps unwilling to invest until the fate of Quebec's position in Canada was no longer uncertain. Outside Montreal, the situation is bleak, and no improvement is in view in the short term because of the recession and high interest rates.

III.3 Buyers of construction

Three demand sectors are usually distinguished in construction for analytical purposes: government, residential, and private non-residential. Both the Economic Council of Canada and the OCQ used these categories in their studies of the causes of instability in construction. (6) Except for residential, these categories do not correspond to types of structures, and data are not available at a detailed level for demanders of the different types of structures. (7)

Nevertheless, some rough correspondences can be established using types of structures detailed in Appendix 1. Governments are responsible for most engineering construction in Quebec. The two most important sectors of engineering construction--roads and electrical power construction--accounted for at least 50% of engineering construction since 1962 and over 60% since 1972. Since Hydro-Québec is counted as part of the government sector (as are all crown corporations), these two sectors are almost all government construction. The next most important sector of engineering construction--sewage and waterworks--is also mainly the work of governments (municipalities), and so are marine construction (federal government) and the 'other engineering' sector (includes bridges, tunnels, incinerators, subways). Only gas and oil facilities, and railway, telephone and telegraph construction are not almost entirely government, and these account for less than 3% of engineering

construction in Quebec. (8) In addition to engineering construction, governments are also directly responsible for a large number of buildings. Except for churches, institutional buildings are mainly built for government agencies, and so are some commercial buildings, notably some office buildings and a good part of the theatres, arenas, amusement and other recreational buildings category. This only leaves the private non-residential sector part of commercial and industrial buildings. In fact, the government sector is the largest of the three sectors in Quebec, and it is larger than that of any other province, mainly because of the importance of hydro-electric construction. (9) The private non-residential sector is the smallest of the three sectors, with residential construction in between.

The basic determinant of residential construction is the income and tastes of family units, but the year to year fluctuations depend largely on government policy. Provincial and municipal governments have some influence on the level of housing construction, but the major influence comes from the federal government's monetary and housing policy. Monetary policy affects both mortgage interest rates and the availability of mortgage funds. In the past, it was not mortgage interest rates that affected the demand for new housing the most, but rather it was the availability of mortgage funds. Mortgage interest rates traditionally did not respond quickly to monetary policy, hence, in tight money conditions, other long term investments were more attractive

to lenders and little went for mortgages, and vice versa in easy money conditions. (10) It is only since 1980 that high interest rates directly affected the demand for residential construction by making financial charges too great for most households, with the depressing effects recently experienced in the housing market. Federal housing policy also had important effects on the availability of mortgage money. The Canada Mortgage and Housing Corporation, an agency of the federal government, provides loan guarantees and mortgage finance to a large part of new housing construction. The federal government thus directly affects the amount of residential construction by establishing CMHC's budget and consequently providing a large part of the financing for housing construction.

Government demand for construction can be divided into two parts: the demand by various government agencies and departments at the federal, provincial and municipal levels on the one hand, and the demand by Crown corporations on the other. The Crown corporations generally act on the same basis as other firms do. Their demand for construction is predicated autonomously on the future expected demand for their products, and is not affected directly by government spending decisions. Of course, the political process does affect investment decisions by Crown corporations, but the same is true of private corporations. The various government agencies, on the other hand, should theoretically adjust their demand for construction output according to the

macro-economic objectives of the government. As the OCQ report on instability in construction pointed out:

> Dans l'ensemble du secteur public, il n'y a à toutes fins que les dépenses de construction qui sont vraiment compressibles. (11)

Many other government expenditures generally call for the establishment of a permanent bureaucracy which cannot easily be curtailed after the need for the expenditure has passed. So variations in construction expenditures can be expected to play an important role in government stabilization policy. However, contrary to what one would expect in view of the general acceptance (until recently at least) of Keynesian theory by governments, there is, according to both the OCQ and the ECC reports on construction instability, very little coordination of public expenditure on construction with macro-economic policy objectives. According to the ECC report:

> ... it is evident that public spending on construction was not systematically varied countercyclically for the purpose of general economic stabilization. (12)

In fact, government spending has actually contributed to the cyclical instability in construction. The condition of government finances in boom periods permits the public sector to spend more, while reduced tax revenues in recessions necessitate cuts, often in construction expenditure. An interesting aside is the existence of a 'political business cycle' in road construction in Quebec among other provinces. The ECC study on construction instability found that road

construction tended to be concentrated right before elections. (13)

Private sector expenditure clearly depends on general economic conditions. Construction is the largest component of private investment, and private investment in non-residential buildings is clearly correlated with general economic conditions. In a boom period, firms wish to invest because their existing plant is not sufficiently large enough to meet demand, while in a recession, they find themselves with excess capacity and postpone building new plants. Of course, this is mitigated by a number of factors. Firms may look at longer term prospects and hence invest in a slump, while investing in a boom period may not be possible because of bottlenecks in the supply of construction inputs. Nevertheless, as the OCQ report on construction instability writes:

> Les phases de boom dans les investissements privés en bâtiments industriels et commerciaux correspondent à des périodes où la situation conomique était excellente au Québec, ailleurs au Canada et à l'étranger: 1964-66 et 1972-74. De même, les phases de dépression dans ces investissements correspondent à des périodes de récessions ou de stagnation de l'économie québécoise, canadienne et mondiale: 1967, 1970, et 1975 jusqu'à maintenant. (14)

There have been numerous recommendations to stabilize construction output, notably those by the ECC and by the OCQ. Both put the focus of their recommendations on government action, since government is the most important component of demand and government policies also affect the other two demand sectors. The major recommendation is that

governments should stabilize their demand for construction output by coordination of construction demand and attention to their overall macro-economic policy objectives.

III.4 Firms and the demand for labour

The industrial organization of the construction industry has important effects on the pattern of employment; it is a major factor in the high frictional unemployment seen in the industry. Coupled with the way production is organized, the industrial organization makes possible the instability of employment that pervades the industry. This is not to say that the industrial organization is the major cause of employment instability, rather the industrial organization acts as the transmission mechanism that directly reflects the instability of demand into employment instability.

Other industries manage to smooth out the effects of fluctuations in demand by the build-up or contraction of inventories. Only very large fluctuations in demand have an effect on employment through lay-offs and hiring new workers or establishing additional shifts. This, however, does not occur in construction; changes in the demand for the output of any firm is immediately and directly reflected in hiring and lay-offs. Except for some builder-developers, firms only produce structures on direct orders from buyers; there are no inventories or stocks. Even many builder-developers do not keep inventories; they will often build only one model house and then build others as they are ordered by buyers, or they will build only as many houses as they can reasonably expect to sell within a very short time. The result of this is that construction workers are hired only when building starts and are fired as soon as their role in building a structure ends.

Firms do not usually keep workers working continuously, hence workers can be expected to suffer from relatively high frictional unemployment.

The amount of frictional unemployment is exacerbated by the small size of firms. Large firms that obtain a large number of contracts may find it possible to maintain a relatively steady work force by shifting workers from one project to another, but small firms with few contracts have to lay workers off more often because they do not have other projects to which employees may be transferred. Small firms, by their very nature, cannot ensure themselves enough contracts to keep a steady work force.

Another factor which makes for unsteady employment is the mobility of firms themselves. Firms that close down obviously lay-off their workers and new entrants in the industry hire workers. The OCQ provides some data on all firms who do work regulated by the construction decree in Quebec. With around 20,000 firms employing construction workers, approximately 3,000 firms leave and enter the industry every year. Some of these firms only employ construction workers temporarily to build on their own account, but in recent years, over 2,000 firms a year wound up their operations and closed down. The number of failures is not as great as could be expected. In 1977, 1978, 1979, and 1980, there were respectively 72, 77, 84, and 82 bankruptcies. (17) The creation of the Régie des Entreprises de Construction du Québec in 1976 has led to more stability

among employers since it makes it difficult for anyone without the necessary financial and technical capacities to enter the industry.

There is also a large amount of inter-regional mobility among firms. From 1976 to 1979, over one-third of Quebec firms employed workers outside the region of their main place of busines, except for 1978, where the figure was 30%. (16) While they may bring some highly specialized workers and most management personnel from the home region, most hiring of construction workers is done locally. Hence, the geographic mobility of firms is another source of the transitional attachment of workers to firms.

As was established in the previous chapter (17), the bidding system compels firms to keep costs at a minimum if they are to stay in business. Firms cannot afford to keep idle workers on the payroll as this would drive up overhead and firms would have no means to recoup these costs in the face of stiff price competition. The bidding system, and the small, transitory and mobile nature of construction firms leads to a very transitory attachment of workers to firms and to frictional unmeployment. In other words, workers find it practically impossible to remain with one employer for any considerable period of time.

III.5 Wage effects.

This section examines the feedback effects that the result of the construction labour market has on the demand for structures. The wages and incomes of construction workers can affect the numbers and types of structures in two ways. There can be macroeconomic effects that operate through aggregate demand and microeconomic effects that operate through the construction structures market.

III.5.2 Macroeconomic effects

One macroeconomic effect is evident; the income of construction workers is part of the income of households, a major determinant of the demand for residential construction. Thus greater incomes for construction workers would lead to a higher demand for residential construction. The incomes of construction workers may also have an indirect effect on the demand for non-residential investment goods (of which construction is the major part) through its effects on the aggregate demand for goods. These effects undoubtedly exist, but are relatively small since construction employment accounts for approximately only 6% of total employment.

III.5.2 Microeconomic effects

Neo-classical economists generally maintain that increases in wages relative to the price of other inputs result in less employment. Three possible effects of wage changes on the

demand for labour are recognized: the substitution effect (where capital is substituted for labour in the event of a real wage increase), the output effect (analogous to the substitution effect in in consumer theory) where higher wage costs lead to higher costs, higher prices and less demand for the product, and induced bias technical change, where the rise in the relative price of a factor leads technical change to be biased against the use of that factor. In the case of non-homogeneous goods, a fourth effect may be added. This fourth 'model effect' is where a rise in wages leads to a switch to less labour intensive models.

Substitution effects depend on the existence of appropriate alternative techniques. Because of their small size, their lack of fixed plant and equipment, and the pervasiveness of rental markets for capital equipment, it should be possible for construction firms to switch easily to more capital intensive techniques when relative wage costs rise. However, this effect seems to be relatively unimportant. Soderstrom calculated a wage elasticity of demand of 0.088 for carpenters in residential construction in 1965 in Northern California. Soderstrom's figure is an estimate of the substitution effect and it indicates that it is very small. Most of the introduction of capital equipment was due to technical change, not pure substitution of capital for labour. The great numbers of changes in technique he found between 1935 and 1965 were pure technological innovation. Had these techniques been in existence in

1935, it would have been much cheaper to build the 1935 house with them than with the methods current at that time. (18)

Output effects are difficult to estimate. They necessitate the knowledge of demand functions for the product market. However, the demand for structures is probably fairly inelastic with respect to wages, hence the output effect would be very small. Soderstrom mentions an estimate of the price elasticity of demand for houses of 0.0024. (19) Since labour costs are between 20% and 40% of total building costs (excluding land and financing costs), the effect of wages on demand would be very small, with a wage elasticity of below 0.001 assuming that increases in wages are completely reflected in the supply price.

Model effects and technical change in the type of models built, induced or otherwise, are very difficult to distinguish. Salter tried to demolish the argument for induced technical change by stating that businessmen are concerned with minimizing unit total cost, not capital or labour costs, hence there is no reason for technical change to be biased. (20) Nevertheless, neo-classical economists continue to use the idea. Jenness, in his study on manpower in construction, describes a paper by Sunder Magun on technical change and factor substitution in construction. (21) Magun's paper uses an A.C.M.S. constant elasticity of substitution production function and finds some labour saving bias in technological change in

construction. (22) Apart from the methodological problems with such an approach brought out by the Cambridge controversy on capital (23), there are other problems with this study. Firstly, the real output data used are inadequate. As was described in Chapter II of this thesis, adequately sensitive real output data is not available for construction because of problems with existing price indices. Secondly, Magun completely neglects materials in his production function: materials are an extremely important component of cost, and are reflected in the composition of output.

Nevertheless, the relative wage increase construction workers gained in the 1960's are most likely bound to have some long term effects on the nature of output. While it may be impossible to immediately substitute off-site labour for on-site labour in response to every little change in wages, substitution has in fact been occurring over a longer period including the time necessary to build new plant and equipment to produce industrialized components. The acceptance of these substitutions also depends largely on architects and buyers rather than on construction entrepreneurs. Behman found some evidence in the fact that the most important replacements of on-site labour by off-site labour have occurred in the more labour intensive components. (24) How much of this replacement is pure technical change and how much is model effect is a question that is difficult to answer.

III.6 Nature of technological change

Technological change in construction does not usually occur by highly visible breakthroughs; there is a constant slow accumulation of small changes in materials, equipment, and organization of production. As Boyd and Wilson, in their study of technology transfer in construction, stated:

> The process of technology change in construction in Canada, and in other countries, are for the most part evolutionary. Revolutionary changes and innovations are relatively rare. (25)

The introduction of reinforced concrete and structural steel in the 19th century revolutionized building, but there have been no similar changes in this century. Plastics, which might conceivably have ushered another revolution have not done so, mainly because they are a costly, highly manufactured product, and because they do not possess the desired structural properties. (26) Plastic products have however been introduced in a large number of areas for specialized applications such as piping, adhesives, and finishing coatings (paints and wallpapers).

However, this idea of small evolutionary changes stems mainly from the perception of the construction industry as a unitary whole. There have in fact been revolutionary changes in the production of many components. There are, of course, also small constant improvements in materials and machinery.

Technical advances are spread mainly by a complex network of informal contacts among constructors, suppliers, numerous trade associations and a number of government

agencies. New machinery is introduced by manufacturers' agents or by rental companies on a trial basis. (27) New materials must first gain the acceptance of buyers and building codes. Trade journals give numerous examples of advances. The network is well connected to developments in the United States and in Europe where most technical advances originate.

According to Leggett, Hutcheon and Brown's article on technological change in construction in Goldenberg and Crispo Construction Labour Relations, the acceptance of technical change depends on a number of factors:

> A proposed innovation which shows the promise of reducing costs without any sacrifice in the other directions is almost certain to find acceptance. The main obstacle to rapid acceptance will be uncertainty that the cost saving will actually result or that there will be no sacrifice in performance or quality. Correspondingly, a proposed innovation which offers an increase in performance or quality at no extra cost will usually also find ready acceptance. (28)

III.6.1 Industrialization of construction

Prefabrication, or more properly industrialization is perhaps the only 'revolutionary' technical change in construction that is occurring in the 20th century. Industrialization means fabricating components or sometimes whole structures in a shop or factory where mass production techniques and industrial engineering can be used. It is sometimes referred to as 'systems building'. Although other types of changes in materials have been important in the past

(concrete, steel, plastics, substitution of one material for an equivalent one), most important changes in materials can be placed under the heading of industrialization.

Prefabrication proper is one aspect of industrialization. In this process, entire components, or structures in the case of mobile homes, are built in factories, to be assembled with other components on the construction site. Examples are numerous, a small number of them come readily to mind: roof trusses, prefabricated structural steel, pre-cast and pre-stressed concrete, piping assemblies, windows, pre-hung doors, and cabinets. Other materials are increasingly fabricated off-site, although this may not be strictly termed prefabrication: pre-cut lumber, concrete ready mix, plywood (replacing planks), gypsum board (replacing plaster and lath), and numerous kinds of panels of different types of composition. Gypsum board even comes with vynil wallpaper glued on for use in interior systems. Industrialization even encompasses certain types of capital equipment. Steel forms, plywood form panels, slip forms, and steel scaffolding all replace site fabricated items with shop or factory fabricated ones.

Another aspect of industrialization is systems building: constructing a structure or components according to a standard modular system. There are innumerable examples of this. Perhaps the most important has been the standardization of most construction materials, basing their dimensions on a module of four inches (10 cm in metric

measures) and its fractions and multiples. (29) There are also many 'systems' that have been developed for use in different types of structures and for different components. An important example is interior systems for offices. Suspended ceilings and wall partitions can easily be built up with steel framing and studding, covered with pre-finished gypsum and other composition panels, and jointed by aluminium or enameled metal joints, circumventing the need for any trowel work or other complicated operations. This type of interior can easily and cheaply be torn down and rebuilt, resulting in easy office renovations.

A number of systems have been developed for the structural elements of buildings. The Olympic stadium in Montreal was built in this manner with pre-cast concrete modules that were glued and tied in place. The federal government, through its Building Equipment, Accessories and Materials (BEAM) program has encouraged the use of systems building by publishing studies, organizing conferences and otherwise disseminating information, and by encouraging modular coordination of buildings built or financed by the federal government. There are numerous systems which have been developed in Europe that have not been widely used in North America because they do not result in any appreciable cost saving under North American conditions, even though they shorten construction time. (30)

III.6.2 Mechanization

Another aspect of technical change in construction has been the increasing mechanization of work. Hand sawing is almost a thing of the past, portable circular saws, bench saws, and radial saws are ubiquitous. Even the plane and the screwdriver have been replaced by their portable electromechanical counterparts. Carpenters are not the only ones affected, practically all trades have seen the extension of the use of power tools.

The hod carrier's hod has been replaced by lift trucks, his hoe and pan by an electric mortar mixer. Picks and shovels have been replaced by a multitude of contraptions: trenchers, backhoes, excavators, bulldozers, loaders, and graders of ever increasing quality and size; while labourers have been replaced by operators. Pneumatic tools and their accompanying air compressors are everywhere. Even the lowly hammer is being replaced in house construction by pneumatic stapling guns. Gasoline powered tampers and small diesel rollers are now used everywhere in tamping backfilled excavations.

Plumbers have seen their task of cutting and threading pipes mechanized, and electricians use small power tools such as drills and jig saws.

Plastering and stuccoing is now done with a platering gun whenever feasible, while the lather's peculiar hammer gave way to the electric screwdriver as the bundle of wooden laths was replaced by metal lath and gypsum wallboard.

Painters now use a spray gun on almost all new

construction, rollers where spraying is not practical; brushes have been relegated to edging and trim work.

Structural steel is now bolted using electric or pneumatic impact drills or welded in place; the bucket of hot rivets is a thing of the past.

Hoisting and materials handling have been revolutionized with the introduction of the tower crane, the more extensive use of older types, and the development of small self-propelled 'cherry-picker' cranes for small jobs. Portable conveyors are used whenever necessary in pouring concrete or relocating materials, and concrete pumps and motorized buggies have partly replaced the wheelbarrow.

Cement finishers now use gasoline powered trowels and mechanical levelers for floors and runways. Even concrete forms have been mechanized with the introduction of the steel slip form which is hydraulically lifted or propelled.

III.6.3 Effects of technological change on the demand for skills

The total effect of these technical changes --mechanization and industrialization--has been to reduce the on-site labour requirements and to change the composition of trades. While hard data are not available on the direct effects of technical changes (31), it is possible to indicate the direction of employment changes. The rest of this section is devoted to an impressionistic appraisal of the effects of technical changes on the various trades.

As a result of the large number of changes that have affected their trade, the effect on carpenters is hard to gauge. On the one hand, the various prefabrication techniques have definitely reduced the need for them. These techniques include: pre-cutting of lumber, more extensive use of millwork (windows, cabinets), form panels, plywood (which requires less nailing), mobile homes, steel scaffolding, etc. On the other hand, the more extensive use of gypsum board and pre-finished panels has certainly increased their jurisdiction, as has the use (not yet common in Quebec) of laminated wood structural members. Power tools have made carpentry less arduous, although they have also reduced labour requirements to some extent.

The effect on lathers is even more difficult to assess. Technical changes have completely revolutionized their work. These changes have resulted in the Quebec government changing their designation from lathers to interior systems installers. With the general replacement of plaster by gypsum board, they do very little lathing. However, they do a large part of the placing of gypsum board and most of the installation of interior systems for offices and other non-residential buildings.

The effect of technical changes on electricians seems to have been relatively small, a number of changes in materials but nothing revolutionary.

The introduction of plastic pipe, which takes 25% less labour (32), power tools and shop pre-assembly have

definitely reduced the workload of pipefitters.

Structural steel erectors have been somewhat affected by the introduction of power tools and better cranes.

Sheet metal workers, who fabricate and install ducting for forced air circulation systems, have seen a number of recent changes in the method of fastening and hanging ducts which will clearly reduce labour requirements. In addition, a good part of their work is done in the shop prefabricating ducting, where operations are becoming more and more mechanized. (33)

The trowel trades, apart from the plasterers, have not had their work cut substantially. A spate of Rube Goldberg bricklaying machines have been invented, but none of them has proved practical, so bricklayers' work is left unchanged.

Apart from the development of new adhesives, tile-layers' work has similarly been unaffected. Power trowels and levelers have reduced the amount of work for cement finishers. Plasterers have had significantly less work since the introduction of gypsum board. The small amount of joint pointing work entailed by the use of gypsum board clearly does not compensate for the loss of plastering. The introduction of interior systems is a further blow. With interior systems even joint pointing work is no longer necessary.

Painters have been greatly affected by the introduction of the roller and the spray gun, and there was initially a fair amount of resistance to them. The introduction of

interior systems with vinyl wallpaper already attached to the wallboard and other pre-finished wallboards also reduced the amount of work available for them.

Labourers have perhaps seen the greatest relative fall in demand. There is much less work for hod carriers; their two main functions--carrying materials to the tradesmen and mixing the mortar--have been mechanized. Other labourer functions have also suffered a similar fate, with much of their previous work now going to various machine operators.

The effect of technical changes on heavy equipment operators is again difficult to gauge. More machinery is used; cranes of different types have become more widespread, asphalt spreaders have replaced the labourer's rake, rollers are used in tamping backfill. However, increases in the capacity and improvements in the quality of equipment, especially in heavy engineering construction, has reduced the demand for them.

III.6.4 Productivity

Mechanization has unquestionably reduced labour requirements of construction workers for a given level of output. This is another way of saying that labour productivity has increased. However, it is difficult to estimate by how much. The basic problem in computing labour productivity growth is again the heterogeneous nature of the output of the industry. The lack of information on the composition of construction output prevents the construction of precise price indices, as has been described in Section 2 of this chapter. Were it possible to deflate the value of construction output with good price indices, it would be simple to divide each year's real or constant dollar output by man-hours worked and obtain productivity indices.

Despite these difficulties, attempts to calculate productivity growth in construction have been made. Statistics Canada calculates some productivity indices for construction, but they are not published because of lack of confidence in their accuracy. (34)

Given the nature of technological change, a substantial part of the productivity growth in construction was the result of the replacement of on-site construction labour by employment in supplier manufacturing industries. However, it is not known by how much manufacturing employment increased because of technical changes in construction. Thus the net effect of construction technical changes on overall productivity is not known.

A number of other effects of productivity growth must also be considered. Productivity growth does not necessarily result in loss of employment. Productivity increases may reduce the relative price of goods and thus increase demand. Increased demand may mean an increase in the number of jobs. Thus the overall effect of productivity growth on employment is by no means clear. Unfortunately, data of sufficient precision does not exist to enable estimation of employments effects of productivity growth.

III.7 The demand for skills

The demand for each type of skilled worker depends directly on the demand for components in which each skill is used. The technology of building a component and the size of the component itself determine the amount of labour of each skill used. Every different model of a particular type of structure will require differing amounts of labour. Nevertheless, despite their heterogeneity, one can expect some consistency in the labour requirements for different models of the same type of structure. There is an indirect link between types of structures and labour requirements as similar structures use similar components. It is therefore possible to develop some measures of skill requirements by type of structure that have some reliability. However, it is important to note that changes in labour requirements for structures are not due solely to productivity changes when the product is heterogeneous; they also reflect changes in the composition of output.

Another important aspect of labour requirements is their distribution through time. Building a structure takes time, from less than a month to several years, and a number of components have to be built sequentially primarily for technical reasons. Thus both the overall amount of labour and the demand for each skill will vary over the time it takes to build a structure. The time distribution of employment on any construction site provides an additional technical reason for employment instability. Most trades are

not employed throughout the construction of a structure, rather each trade comes in when the components it constructs are built.

The need for knowing labour requirements stems from the desire to project employment in the future, both to ensure an adequate labour supply of various skills (manpower policy) and to determine what the employment effects of government expenditures on structures would be. Another use is to estimate productivity growth. Once the future demand for structures is known, it is a fairly straightforward matter to determine how many skilled tradesmen of each craft would be needed and how many hours each would work.

In order to obtain ideal manpower requirements, one would first need data on the labour requirements for each kind of component, and then data on the component composition of structures (i.e. how much of each component goes into each structure). One would also need information on the time sequence in which components are built in order to determine the time distribution of employment. However, gathering these kind of detailed data is well near impossible except for very specific kinds of structures in a limited geographical area. This was done by Soderstrom in his study of the demand for carpenters in house building in Alameda County in California. However, he did not concern himself with the time distribution of employment since he was interested only in point estimates of the demand for labour. (35) He developed a linear programming model that

chooses the cost-minimizing set of techniques for any given model of house. The constraints in the model are technical and include the labour requirements for each component phase. Alternative techniques, and hence labour requirements, are included, and the programme picks the cheapest one. With this model , he found the main determinants of employment changes for carpenters between 1935 and 1965. The most important factor was, predictably, the increase in the number of houses built. Changes in technology, the scale of production and the type of model produced all had important effects. Less significant were changes in wages, relative price changes and building code changes.

Another study was done by Sara Behman using the same sample as Soderstrom, but this time attempting to discover changes in labour requirements for a number of trades. (36) In that study, Behman equates productivity change with changes in labour requirements per 1,000 square feet of living space. This methodology excludes the effect on labour requirements of quality changes in houses. However, for one purpose of the study--predicting manpower needs--the procedure she uses is valid. For the other purpose--estimating the contribution of wage increases in the inflation of house prices--the use of the multiplicative inverse of labour requirements per 1,000 square feet as a measure of labour productivity is innacurate. The increasing quality of houses that Soderstrom mentions would increase the labour requirements for a given amount of living space

although it would not reduce productivity. Nevertheless, Behman is aware of the quality changes that occurred, it is unfortunate that she does not incorporate them into her productivity estimates.

The United States Department of Labor's Bureau of Labor Statistics has produced estimates of labour requirements for a number of different types of structures. (37) To produce these labour requirements data, the Bureau takes a sample of a number of structures of a particular type and goes to the contractors to obtain all labour and material requirements for each structure in its sample. It also obtains information on the time distribution of employment.

Labour requirements have already been estimated twice for a number of types of structures: the first time in the late 1950's-early 1960's and again in the late 1960's-early 1970's. The structures they have studied twice are: private single family houses, public housing, hospitals and nursing homes, schools, and federal office buildings in building construction; and highways, sewer works, and civil works by the United States Army Corps of Engineers. Apartment construction has been studied once in 1970.

The main finding is that labour requirements have been falling for all types of structures, even in the face of increasing quality. The labour requirements data are expressed in terms of required man-hours per square feet (houses, public housing, and hospitals) or man-hours per $1,000 of construction. Both serve the purposes for which

they are calculated (predicting the effects of United States federal government expenditure), but they would not be satisfactory for measuring productivity change because there is no correction for quality changes. In fact, no claim is made that they are pure productivity measures.

Nevertheless, the relevant data from these studies will be sketched out here. The importance of carpenters reflects the wood structure of most single family houses in North America. Carpenters accounted for respectively 35% and 34% of man-hours per 100 square feet of single family house construction in 1962 and in 1969. Other important trades in house construction are, in the order of their importance in the United States data: labourers, painters, bricklayers, plumbers, cement finishers, and electricians.

Public housing in the Northeastern United States uses labourers the most, followed by carpenters, plumbers, bricklayers, electricians, painters, lathers and plasterers. Apartment houses in the Northeast are similar to public housing, except that they use more cement finishers and structural steel erectors.

Hospitals in the Northeast United States also needed labourers most, followed equally by plumbers and carpenters, then electricians, bricklayers, and tinsmiths. The large use of plumbers, electricians and tinsmiths in hospital construction reflects the great extent of mechanical work needed in these structures.

Schools also use labourers most, and then come

carpenters, plumbers, electricians, bricklayers and painters.

Federal office buildings follow the same pattern as schools, except that tinsmiths, lathers, plasterers, and structural steel erectors are also important.

Engineering construction (sewer works, highways and civil engineering construction) use labourers and operating engineers most, along with a considerable number of carpenters.

There were also two Canadian attempts at developing labour requirements in forecasting manpower needs: one in Ontario by Peter Barnard and Associates (38) and an abortive attempt by the OCQ. The OCQ project was abandoned mainly because it proved impossible to forecast the demand for structures, but also because the sample of structures that was taken proved too variable and too small to yield valid estimates. (39) Both had the merit of not only calculating total labour requirements for a number of types of structures, but also the monthly distribution of requirements throughout the period of construction. The calculations were not carried through by the OCQ, but Peter Barnard and Associates produced a voluminous report. They chose a sample of 100 structures divided into 33 categories of structural types. Each structure was estimated by a firm of quantity surveyors, and labour requirements for 17 trades were calculated. In addition, the distribution over time of these requirements was also estimated based on a number of assumptions (i.e. they were not calculated from the sample).

III.8 Seasonality

The demand for construction labour is seasonal. As Table III-3 shows, the winter months (December, January and February) have the least employment. In March and April, demand for labour begins to pick up and it continues at a high rate from May to November. July has a low number of hours worked because of the two week construction vacation period.

TABLE III-3
AVERAGE TOTAL NUMBER OF HOURS WORKED PER MONTH BY CONSTRUCTION WORKERS, QUEBEC, 1972-79, MILLIONS OF MAN-HOURS

Month	1972-79 Average
January	7.6
February	8.7
March	10.1
April	10.2
May	12.0
June	13.3
July	9.7
August	14.9
September	13.4
October	13.5
November	13.4
December	9.1

Source: Calculated from OCQ, Analyse de l'industrie de la construction au Québec, 1979, Tableau T-5, p. 94.

In the past, seasonality in construction was a matter of costs and the unavailability of technology for cold weather building. Today, the technology exists and costs of building in winter are supposedly not much greater than in

summer months. Most studies that deal with seasonality ascribe it to the persistence of tradition and not to cost or technical considerations. Their focus is usually bent on showing that winter construction is feasible. Typical of these is the part of the OCQ report on instability that deals with seasonality. (40) It cites a study that shows that winter building costs only 1% more than summer and attempt to demolish the idea that winter work is of worse quality:

> En fait, ce qui explique ce ralentissement marqué de l'activité dans l'industrie de la construction ne tient pas tellement de contraintes objectives. Cela tient surtout de facteurs tels quele poids d'une longue tradition en vertu de laquelle le travail cesse durant l'hiver, l'ignorance du fait qu'avec les techniques appropriées il est possible de travailler tout aussi bien en hiver qu'en été, le manque de connaissance de ces techniques elles-mêmes et l'idée fort répandue, tnat chez les maîtres d'ouvrage que chez les entrepreneurs eux-mêmes, qu'il en coûte trop cher de construire en hiver et que le travail effectué est de mauvaise qualité. (31)

However, despite these exhortations, seasonality persists. It is true that it has been greatly reduced since the second world war because of technical developments. Plywood and plastic sheets have made possible the temporary isolation of partially built structures from the cold, concrete can now be poured at temperatures below freezing, better oils and lubricants made possible the more extensive use of machinery. (42) Despite all this, some very real constraints still exist.

Engineering construction seems to be the most affected; some operations are impossible over snow-covered frozen

ground. In fact, engineering construction shows the most seasonal instability despite efforts by the Quebec government to attenuate its effects by doing as many road construction operations as possible during the winter. (43) It should be noted that a large part of the men and equipment used in road construction does not remain idle in winter: it is used for snow removal. There are also productivity considerations in outside work during winter. No adequate lubricants have been invented to enable human beings to work continuously outside in very cold weather. Workers must warm up after a while if they are not to suffer from exposure; this reduces the actual time they are working. Consequently, apart from the holdouts due to tradition, there are also some cost and technical reasons why construction work remains seasonal.

III.9 The legal framework and the demand for labour

Apart from the numerous laws and regulations controlling industrial relations in the construction industry which affect the supply of labour, there are also some laws which affect the demand for labour. The most notable of these are safety regulations for construction sites and building codes.

III.9.1 Building codes

Building codes affect the demand for labour indirectly, through the demand for structures or for certain components. Building codes are formulated to ensure the safety and longevity of structures. However, the number and strictness of regulation at the three levels of government has led to a certain uniformization of strucures (44), and sometimes are held responsible for retarding technological change. This is sometimes true; a ready example comes to mind in the Montreal regulation for piping where plastic piping is not yet allowed. Building codes often specify what types of materials may be used, ensuring the quality of components. This obviously has repercussions on skill requirements. Another way building codes operate is to impose the incorporation of certain components into newly-built structures, for example sprinkler systems. These additional components necessitate labour to build them, hence they increase the demand for labour somewhat.

III.9.2 Safety regulations

Safety regulations for construction work have more direct effects on the demand for labour. Construction work is often dangerous, hence the need for safety regulations. (45) Although construction workers formed only 6% of the labour force, they account for nearly 15% of injuries reported to the Commission des Accidents de Travail (Workmen's Compensation Board). (46) In Quebec, it has been the provincial government that established safety regulations under the 'Loi des Etablissements Industriels et Commerciaux'. The regulations for construction were consolidated and improved in a 1972 order-in-council and the application of the regulation was left to the Comité de l'Industrie de la Construction (CIC), the forerunner of the OCQ. When the OCQ came into existence, it continued the system of inspectors. A revision of the safety code was completed with the publication of the Code de Sécurité pour les Travaux de la Construction in 1974. The adoption of Bill 17 (Loi sur la Santé et la Sécurité au Travail) in 1979 changed the regulatory framework; inspection is now being done by the Ministère du Travail.

A number of safety regulations impose the use of additional manpower, while others simply affect the disposition of work and have no effect on the demand for labour. Examples of the first kind of regulation are: the obligation to put up a barricade at the edge of openings, the obligation to have two exits from any building in

construction with appropriate stairways, the obligation for the employer to provide a place where workers can eat, the obligation to shore certain types of excavations, etc. (47) The effect of these regulations is to increase directly the demand for labour, especially carpenters, beyond what employers would otherwise use if they were unconcerned with safety.

III.10 Conclusion: employment instability

The demand for construction workers is a derived demand, it depends on the demand for structures and of what structures are composed. This is determined by buyers and their specialist agents, architects and engineers. Governments account for a large part of this demand for structures, both directly and indirectly. The overall demand for labour is a product of not only the demand for structures but also of technology and a number of legal and institutional restraints (building codes, safety regualtions, and tradition). As an indicator of demand for skills, labour requirements by type of structure have been examined. These are the product of the composition of structures and the institutional framework, coupled with the basic determinant of technology.

Another important aspect of the demand for labour is its distribution through time. Construction provides extremely unstable employment to the workers engaged in it, and the basic reason for this lies in demand. The instability and cyclicality of the demand for structures lead to cyclical patterns of employment. The industrial organization leads to a very transitional relation between firms and workers. The small size of firms, the bid system and the competitiveness of the industry make it impossible for most firms to keep a steady work force, hence we can expect high frictional unemployment. The technology of building a structure ensures that work is discontinuously

spread through time; different amounts and types of labour are needed as the construction of a structure goes through a number of phases. In addition, seasonality of demand means that workers find it hard to be continuously employed throughout the year. Originally, seasonality existed because of a number of technical and cost considerations. Today, although these are still present to some extent, it is claimed that it is mainly the force of tradition and ignorance of new technology that perpetuates seasonality's existence.

This instability of employment is the major problem facing construction workers. It has ramifications in all other aspects of their work world. It may account for the high wages they demand, compensating partially for the lack of steady work. The application of safety rules by workers is almost impossible since they can easily find themselves fired for 'lack of work' if they complain too much, and they may also find themselves labeled as troublemakers and possibly black-listed by employers if they strongly insist on their rights, as happened on the Olympic construction site. This is a major reason why the Confédération des Syndicats Nationaux (CSN) has been demanding a rigid system of seniority since the late sixties. The instability is also at the root of the system of quantitative controls of manpower in Quebec and the union hiring hall system. Numerous studies, notably by the Economic Council of Canada and by the OCQ have demonstrated the need for stabilizing the

industry by government action, and they have also suggested anumber of concrete steps that should be taken in order to do so, but as yet little has been done.

One of the technical problems involved in attempting to stabilize construction is predicting what the future demand for structures will be. This depends on developing an adequate theory of investment behaviour by firms, governments and households. Present attempts at predicting construction output have necessarily a very limited time horizon. Statistics Canada only gives projections for the current and the following year, and these predictions have to be substantially revised when the actual data comes in. In other words, they are not very accurate. The OCQ also developed a very short term model for forecasting the total demand for labour based on the value of contract awards. But it has proved unfeasible to extend the model to different trades as they originally intended to do or to lengthen the forecast. Without such forecasts, it will prove difficult to develop adequate manpower policies unless demand is completely stabilized by government action. Estimating the demand for skills once the demand for structures is known is complex and involved, but not beyond our present capabilities, and, in fact, it is being done in the United States; the major problem lies in forecasting the demand for structures. (48)

Footnotes to Chapter III

1. A.D Boyd and A.H. Wilson, Technology Transfer in Construction, (Ottawa, 1974), op. cit., p. 94.

2. C.f. Chapter I, Introduction, pp. 3-4 of this thesis.

3. Economic Council of Canada, Towards more Stable Growth in Construction, (Ottawa, 1974).

4. L. Auer, Construction Instability in Canada, (Ottawa, 1975), pp. 34-36.

5. Ibid., p. 34.

6. ECC, op. cit., and OCQ, La stabilisation de l'industrie de la construction au Québec, (Montreal, 1978).

7. This is confirmed by OCQ, ibid., p. 34.

8. Calculated from data in Statistics Canada, Construction in Canada, Catalogue # 64-201.

9. See Statistics Canada, Private and Public Investments in Canada, Catalogue #61-205, Table 7D for various years.

10. This is discussed in J.H. Chung, Cyclical Instability in Residential Construction in Canada, (Ottawa, 1976), pp. 33-35, and in the ECC report, op. cit., pp. 140 and 155. OCQ, Stabilisation..., op. cit., pp. 38-40 attributes the effects of monetary policy on residential construction purely on the quantity of money, but this is inaccurate. It is the availability of mortgage funds (which may be correlated to the quantity of money) that is important, as Chung demonstrates unequivocally.

11. OCQ, Stabilisation..., op. cit., p. 37.

12. ECC, op. cit., p. 173.

13. Ibid., p. 181.

14. OCQ, Stabilisation..., op. cit., p. 42.

15. These data were obtained from OCQ, Analyse de l'industrie de la construction au Québec, 1977, 1978, 1979, and 1980 issues.

16. Ibid., 1979, pp. 32-34.

17. C.f. above, Chapter II, Section 3.2 of this thesis.

18. L. Soderstrom, The Demand for Labour in Residential Construction, unpublished Ph.D. dissertation, University of California at Berkeley, n.d., p. 57.

19. Ibid., p. 62.

20. W.E.G. Salter, Productivity and Technical Change, (London, 1966), pp. 43-44.

21. R.A. Jenness, Manpower in Construction, (Ottawa, 1975), Appendix B. The original paper is by Sunder Magun, "Technical Change and Factor Income Shares in the Canadian Economy".

22. The ACMS production function is first described in Arrow, Chenery, Minhas, and Solow, "Capital-Labour Substitution and Economic Efficiency", Review of Economics and Statistics, XLIII, 1961, pp. 225-50.

23. For an account of the issues in that controversy, see G.C. Harcourt, Some Cambridge Controversies in the Theory of Capital. He discusses the ACMS production function in pp. 51-56.

24. Sara Behman, Productivity Change for Carpenters and Other Occupations in the Building of Single Family Dwellings and Related Policy Issues, unpublished, Berkeley 1971, p. 84.

25. Boyd and Wilson, op. cit., p. 94.

26. R.F. Leggett, N.B. Hutcheon, and W.G. Brown, "Technological Change", Chapter 3 in Goldenberg and Crispo, eds., Construction Labor Relations, (Ottawa, 1968), p. 107.

27. B.E. Roth, Sector Analysis: The Construction Industry, Ministry of Tourism, Ontario, Nov. 1975, p. 105.

28. Leggett et al., op. cit., p. 105.

29. Ibid., p. 113.

30. Boyd and Wilson, op. cit., p. 156.

31. Labour Requirements data that are available from the United States Bureau of Labor Statistics are not appropriate for examining the employment effects of technical change since they do not isolate the effects of pure technical change. These labour requirements studies are numerous and have been done twice for each type of structure studied. They will be presented and discussed in Chapter III. The only study which even comes close to analysing the effects of technical change on employment is L. Soderstrom's Ph.D.

dissertation on the demand for carpenters in residential housing. He develops a detailed linear programming model where the constraints are the techniques that can be used for each component. With models of this kind for different types of structures it would be possible to delineate the effects of each technique change. However, it is doubtful that the undertaking would be worthwhile, since it would be extremely expensive and the only conceivable use to which it could be put is manpower forecasting; where the main difficulty lies in predicting the future state of demand for construction.

32. B. MacDonald, Technological Change and Manpower Requirements to 1975 in Ontario's Mechanical Construction Industry, Research Branch, Ontario Department of Labour, Feb. 1971, p. 28.

33. Ibid., p. 35.

34. Productivity statistics were nevertheless provided in ECC, op. cit., p. 46. They indicate that productivity in construction increased by an average of 2.9% a year from 1951 to 1971, compared to 4.0% in manufacturing and a computed 3.2% for the Canadian economy as a whole.

35. Soderstrom, op. cit.

36. Behman, op. cit.

37. For a complete list of these studies, see the Bibliography. The methodology used in these studies is described in "Construction Labor Requirements", Chapter 33 of the Bureau of Labor Statistics' BLS Handbook of Methods, pp. 238-240. The results of these studies have been published in a number of Bulletins and in the Monthly Labor Review.

The coverage in these presentations is uneven. In the earlier studies, complete statistics were presented, while in the later ones, the presentation is sketchier. The distribution over time is divided into tenths of total construction time. It is presented for total employment in most studies, but only in the 1959 federal office building study is it broken down by trade. These data show great variation in the distribution over time of the various trades, as would be expected. The trades concerned with foundation work, such as heavy equipment operators and truckdrivers are more important in the early phases, while the finishing trades (painters, resilient flooring layers, plasterers, etc.) are more important in the later phases in this kind of structure.

The labour requirements themselves are not evenly presented either. While some studies give the requirements in more detail as far as the division of trades is concerned, other give only the major trades or group together relative

trades such as plasterers and lathers, or structural, ornamental and reinforcing ironworkers. The regional pattern is not always presented either, but it is very important because regional variation in climate and tradition lead to different labour requirements. It is also important for our purposes of applying these data to Quebec, since our particularities make us most similar to the northeastern United States as far as construction is concerned.

38. Peter Barnard and Associates, Reducing Cyclical Unemployment in the Construction Industry, "Phase 3 Report: Pilot project: Approach and Methodology".

39. According to conversations held with Jean Luc Pilon and Louis Roy of the OCQ, Division de la recherche.

40. OCQ, Stabilisation..., op. cit., pp. 48-53 and 115-124.

41. Ibid., pp. 116-117.

42. F. Wildgen, "Economic Aspects", Ch. 2 in Goldenberg and Crispo, op. cit., p. 86.

43. OCQ, Stabilisation..., op. cit., p. 116.

44. Habiter au Québec, Rapport du Groupe de Travail sur l'Habitation, Gouvernement du Québec, 1975, p. 43.

45. Most so-called restrictive work practices are in fact safety related as the ECC showed. C.f. Chapter II, Section 4 of this thesis.

46. OCQ, "Mémoire à la Commission des Accidents de Travail sur la sécurité au travail dans la construction", mimeographed, section 1.2.1A)2-.

47. All these examples are taken from the Code de Sécurité pour les Travaux de Construction, Ministère du Travail et de la Main d'Oeuvre, Québec.

48. Jean Luc Pilon of the OCQ described to me the idea of projecting the demand for structures as "utopique".

Chapter IV The Supply of Construction Workers

IV.1 Introduction

This chapter will examine some of the major factors that affect the supply of labour in construction. The supply of workers in construction is rarely in equilibrium with the demand. This results in unemployment for some workers at one time or another all of the time, and in the necessity of finding alternative work in other industries. However, in periods of great boom, shortages of certain skilled workers may result in certain regions. The mis-match of supply and demand also necessitates a way of apportioning work among the numerous available workers.

Unlike the demand for workers which can be pinpointed with accuracy once the demand for structures is known, the supply of labour is a much vaguer concept. It is possible to add the number of workers engaged in the industry to unemployed workers who are looking for work in construction at any given time, but that number is constantly changing as workers move in and out of the industry. Therefore, a labour force concept as described above gives no accurate measure of the number of workers potentially available for construction work. There is a large number of people with the requisite qualifications who would be ready to work in the industry at any given time. Some of these are unemployed, others are employed in other industries, sometimes doing work totally unrelated to their construction

abilities, and there are workers who can occasionally come into the industry: students, unemployed, etc. Thus there is a pool of workers who are potentially available for work in construction at any given time. It would be extremely difficult to assign a precise number to this pool as a measure of the supply of labour, and, unless there was a strong dedication to manpower planning, probably useless. Nevertheless, it is important to analyze what affects this pool and therefore the supply of labour in the industry.

The size of this pool is large compared to the demand, therefore construction in Quebec generally suffers from a large excess supply of workers. This is not without its effects on employment stability. Section 2 on the nature of the labour force examines this question.

Before going on to study the determinants of the supply of labour, a basic understanding of the industrial relations system is essential. This is done in Section 3. The industrial relations system in Quebec construction presents a number of peculiarities compared to both other industries and the rest of North America. Quebec's unique structure permits the development of certain institutions not present elsewhere and prevents the existence of others that do exist in the rest of Canada.

The major institution peculiar to Quebec is the formal system of quantitative control on manpower through the use of classification certificates based on the number of hours worked previously in this industry. There has always been an

informal system for the control of manpower in construction through the use of hiring halls by craft unions, but this system has never been able to operate well in Quebec because of the unique labour relations system. However, the question of controlling the amount of manpower is intimately related to the way workers are hired, in Quebec and elsewhere. The task of Section 4 is to describe these methods of controlling manpower and hiring.

Before workers are assigned jobs, they must come from somewhere and be trained. Logically, this should precede the discussion of hiring practices, but a prior understanding of the Quebec system of hiring is important as it affects both training and geographical mobility of workers. Section 5 examines the question of training and qualification of workers, and the way the regulation on hiring affects them. Apprenticeship programs should theoretically be the most important way of training workers, but on-the-job training is of equal if not greater importance.

But apprenticeship and on-the-job training have not been the only source of skilled manpower; Canada has traditionally imported much of the skilled manpower it needed. The importance of immigration in the supply of manpower in construction is examined in Section 6 migration and geographical mobility, along with the controversial question of the geographical mobility of workers. This question of mobility is doubly important particularily because of the controversy over the new constitution. The

Quebec system of manpower control has become an important political issue. The precise effect of the new Quebec regulation on hiring on both interprovincial and intraprovincial mobility is examined.

The final section summarizes the findings of this chapter and attempts to briefly evaluate the question of quantitative controls over manpower by presenting a number of issues that need to be raised.

IV.2 The nature of the labour force

Construction workers are divided into two groups: skilled trades, and semi-skilled or unskilled occupations. The skilled trades are far more important. In 1979, for example, skilled journeymen and apprentices accounted for close to 70% of all construction workers and slightly over 70% of all hours worked in Quebec. (1) Most occupations, with the obvious exception of labourers and truckdrivers, have very few workers in them. The Quebec government recognizes twenty three trades and forty-four occupations. These different trades and occupations are listed and defined in Appendix 4.

Data on the relative importance of the 10 most important trades and occupations are presented in Table IV-1.

TABLE IV-1
RELATIVE IMPORTANCE OF MAJOR TRADES AND OCCUPATIONS BY NUMBER OF WORKERS AND HOURS WORKED, QUEBEC, 1979.

Trade or Occupation	Percent of all workers	Percent of total hours
Carpenters	20.4	20.5
Labourers	18.2	16.7
Electricians	9.6	11.0
Pipefitters	7.3	8.4
Heavy equipment operators	5.9	5.8
Painters	4.0	3.4
Bricklayers	3.5	2.9
Tinsmiths	2.5	2.8
Truckdrivers	2.0	2.2
Structural steel erectors	1.7	1.8

Source: Calculated from OCQ data on hours worked.

Carpentry is by far the most important trade in construction. Carpenters accounted for 20.5% of hours worked in construction in 1979. The second most important category, and the most important unskilled occupation is that of labourers (including specialized labourers) which accounted for 16.7% of hours worked and who made up 18.2% of the people who worked in construction in 1979. Electricians and pipefitters are next with respectively 11% and 8.2% of hours worked, and 9.6% and 7.3% of the labour force. The next most important trade is that of heavy equipment operator, and the last five are, in order of importance: painters, bricklayers, sheet metal workers, truckdrivers, and structural steel erectors.

The difference between the proportion of hours worked by each trade and the total number of workers is due to the difference in average hours worked by workers in each trade. Table IV-2 presents average hours worked by a number of important trades. The data for the three years 1975, 1977 and 1979 were chosen because 1975 was a boom year, 1977 a downturn year, and 1979, although it also was a downturn year, represents the first year of the application of the regulation on hiring, which should have had the effect of raising the average hours worked.

TABLE IV-2
AVERAGE ANNUAL HOURS WORKED PER CONSTRUCTION WORKER, QUEBEC, 1975, 1977, and 1979.

	1975	1977	1979
Carpenter	1058	1016	1052
Labourer	823	729	944
Electrician	1350	1342	1232
Pipefitter	1317	1248	1226
Heavy equipment operator	1095	1018	1049
Painter	806	810	903
Bricklayer	966	954	907
Tinsmith	1249	1238	1218
Truckdriver	1033	1105	1196
Structural steel erector	1375	1233	1152
All skilled trades	1157	1114	1104
all unskilled occupations	903	867	1067
All workers	1036	999	1070

Source: Calculated from OCQ data bank.

The average annual number of hours per worker varies substantially among trades and occupations, from 806 for painters in 1975 to 1375 for structural steel erectors in 1975. Similarly, in 1979, average hours worked by tradesman varied from 907 for painters to 1232 for electricians. In a boom year, workers work more hours on average, but even in 1975 few workers worked a full year. A full year's work would amount to approximately 1900 hours, so these data indicate that a large number of workers, even among highly skilled ones, do not work a full year. A better indication

of this is the average hours worked by full scale journeymen. Journeymen are the workers who are to be expected to have the greatest attachment to construction work, unlike apprentices who may have entered the industry during the course of the year, and hence may not have been in a position to work a full year, or unskilled workers who can work in any number of industries. Journeymen only worked a n average of 1242, 1151, and 1139 hours respectively in 1975, 1977 and 1979. (2) This is nowhere close to the average that would have been worked had most workers been employed full time.

Comparing the monthly average number of workers engaged in construction with the total number of workers who worked at least one hour in the course of the year, as in Table IV-3, gives the same impression.

TABLE IV-3
ANNUAL NUMBER OF WORKERS AND MONTHLY AVERAGE NUMBER OF WORKERS IN QUEBEC CONSTRUCTION, 1972-1979

Year	Monthly Average number of workers engaged engaged in construction	Total number of workers who worked at least one hour during the course of the year
1972	80,053	140,239
1973	86,938	147,179
1974	91,286	149,120
1975	91,515	149,679
1976	86,146	146,557
1977	84,928	136,518
1978	74,718	122,477
1979	68,309	104,652
1972-79 Average	89,987	137,053

Source: Calculated from OCQ data bank.

There is obviously a large number of workers who do not work during every month. In fact, between 1972 and 1978, the average number of workers working in each month was only about 60% of the yearly total, as Table IV-3 demonstrates. The proportion went up in 1979, reflecting the implementation of the regulation on hiring, but only to 65%. On average, the difference between the monthly average and the yearly total is 54,000. Even in 1979, the difference was still 36,343. These people, potentially available for construction work, presumably either worked in other industries or collected unemployment insurance in the months they were not working, unless they left the labour force entirely by going back to school or abandoning work.

The instability of employment makes it difficult for an

individual to remain employed in the industry for a long period. Out of a total of 136,518 workers active in the industry in 1977, 28,282 were new entrants and 35,556 left the industry (they did not appear in 1978). (3) Of the unskilled workers, only one-fifth of those who worked in 1977 had been in construction in 1972. The situation is more stable for tradesmen, of whom half of those working in 1977 had been doing so since 1974. (4) The OCQ has another measure that indicates the amount of instability in employment: it is the number of monthly appearances in the industry in any given year. It means that a worker worked at least one hour in a given month for each appearance. Only 20 percent of all workers worked every month of 1977. Another 14.7 percent worked ten and eleven months, and 63.1 percent worked at least six months. (5) These figures mean two things. First, there is a large number of casual workers in construction, and these workers must obviously find employment in other industries or remain unemployed during the other months, except for summer workers. Second, even workers who look for permanent employment in construction do not work steadily.

It should be clear by now that there is a large oversupply of construction workers. Consequently, most of them cannot manage a full year's work, since every time they are laid off, they must compete with a large number of other workers for the available jobs. This is not to say that there cannot be shortages in certain trades. In fact they

do occur during the summer months of boom years in certain regions, creating bottlenecks, slowing down the construction of certain projects, and necessitating the use of overtime.

The nature of the work organization, coupled with the excess supply of labour, makes it possible, or rather imperative, for workers to sell their skills indifferently among different employers and different industries, often incurring bouts of frictional unemployment in the process. Construction jobs exhibit the highest rate of turnover of any industry in the economy, with the possible exception of forestry and agriculture. (6) For example, 35% of Quebec construction workers who worked more than 500 hours in 1977 were employed by more than one employer. (7)

Demand conditions are therefore not the only cause of unstable employment for construction workers; there is also a chronic excess supply of workers. Without that excess supply, the industry could hardly function the way it does now. Without a large pool of workers available to be drawn upon at need, employers would be faced with bottlenecks at every upturn in demand because of lack of skilled workers. This occasionally happens under present conditions, but only at the peak of booms. Since it is only a temporary condition, no long term adjustments are necessary, and in any case, booms are never so widespread as to preclude the importation of manpower from other regions.

However, in a permanent state of manpower shortage, employers would have to take measures to ensure themselves a

steady labour force in order to meet their contractual obligations. They could only do so by keeping employees on the payroll even though they may temporarily have no work for them. Employers would no longer be free to lay off workers at anytime. This would have to be eventually reflected in overhead costs, and it would drive up the cost of building. Buyers of construction output would therefore have to bear some of the costs of unemployment that are now being borne by construction workers themselves and by society in the form of unemployment insurance. Unlike the present situation, buyers would also have to be concerned with the construction labour market. They would have to be careful of when they build in order to make sure that labour is available to construct the structures they want. This would perhaps result in ironing out the instability of demand, both cyclical and seasonal.

Other effects on the industry might also follow from the shortage of labour. There may be an erosion of craft divisions by the increasing use of unskilled workers to perform some operations that were previously done by skilled tradesmen. Firms might find it harder to enter the industry because of the difficulty new firms would have in attracting labour. The present organization of the construction industry depends very much on the existence of an excessively large and mobile labour force.

The oversupply would still exist if the demand for structures were completely stabilized. There are far more

workers available to work in construction than there would be stable full time jobs. According to the OCQ report on instability in construction:

> ...si l'on parvenait à réduire substantiellement l'instabilité cyclique et saisonnière de la construction, alors le surplus de main-d'oeuvre dans l'industrie serait encore plus considérable qu'il ne l'est présentement. (8)

In fact, the unstable nature of work necessitates a far greater number of workers in the pool than would be the case if demand was completely stable. If demand were stabilized, there would be no reason to believe that the excess supply of construction workers would be absorbed by other industries, especially in the presence of high unemployment in the Quebec economy. Given the transient relations between employers and workers in the industry, individual workers who were laid off would still have to face bouts of unemployment while waiting for their turn for a job. The presence of this excess supply of workers is the major reason for attempts to control the number of workers in the industry, both by unions and by the Quebec government.

IV.3 The industrial relations system.

The industrial relations system must be considered at this point, for without a basic understanding of it, much of what follows in this thesis would be unintelligible. There are a large number of studies on industrial relations in the construction industry (9), and it is not the purpose of this section to add anything new, but rather to sketch out the features that are relevant to the main topic of the functioning of the labour market. The main aspects of the North American labour relations system in construction is first sketched out and then the peculiarities of the Quebec system are described. Quebec's system has many unique aspects, but its basic structure is in many respects essentially similar to the rest of North America's.

The standard North American industrial relation system is characterized by single union certification and single employer bargaining. In Canadian federal and provincial labour codes, there is the added prohibition of strikes for the duration of a contract and the consequently necessary arbitration system for the resolution of grievances. This system was established in the 1930's in view of the organization of major manufacturing industries by industrial unions. This system is not well suited to the structure of the construction industry, where workers are mostly strict craftsmen, and employers are small and transient. (10) Construction unions in North America have always been craft unions claiming exclusive jurisdiction over certain types of

work. They attempted to set work rules and to ensure a monopoly over labour by the use of hiring halls. The substantial interfirm mobility of workers and the fragmentation of the industry makes the standard industrial relations system used in other industries impractical. Unions usually bargain trade by trade with employer associations at the local level. There are also non-union employers, especially in the residential and road building sectors, who hire non-union workers and generally pay them lower wages. This system is changing in Canada, where provincial governments are attempting to centralize bargaining. Most provinces have opted for province-wide contacts for each trade, but in Quebec and British Columbia all trades are included in one province-wide collective agreement. (11)

Quebec is also different in at least three other respects: compulsory union membership, the decree system, and the presence of the Confédération des Syndicats Nationaux (CSN) and its offshoots, all industrial type unions.

The decree system is peculiar to Quebec. The law regulating decrees provides for juridical extension of certain clauses of a collective agreement to all workers in an industry in a particular region. Before 1968, when a special law regulating labour relations in the construction industry was passed, the industry was regulated by a number of regional decrees, 15 were in existence in 1968 before the law came into force. Plumbers and electricians negotiated on

a provincial level, but the provision of their agreements were incorporated into the regional decrees. Three other trades--elevator mechanics, structural steel erectors, and electrical transportation linemen--had their own provincial decrees. (12) The existence of the regional decrees meant that there had to be multi-trade negotiation on a regional level from very early periods, since 1934 when the decree system was first established. This posed no difficulty for the CSN and its predecessor, the Canadian Confederation of Catholic Workers, which were organized along industrial lines, but it encroached on the traditional craft autonomy of the international union locals in the Quebec Federation of Labour (QFL), who had to get together in order to bargain with employers associations.

The 1968 Loi des relations de travail dans la construction (Bill 290) established a special regime for the industry. Union membership was made compulsory and the whole industry was subjected to one decree. In 1969, the parity committees, which had been in charge of enforcing the decree, were abolished, and a new Commission de l'Industrie de la Construction (CIC) was set up in 1971 after an interregnum regulated by the Minimum Wage Commission. Following the Cliche commission hearings in 1975, the CIC was abolished and replaced by the new Office de la Construction du Québec (OCQ). (13)

When Bill 290 was first passed, two representative associations were recognized: The CSN and the Conseil

Provincial des Métiers de la Construction (Provincial Building Trades Council) of the QFL. Workers are free to choose which association they wish to belong to at a vote that is held before each decree negotiation starts. In 1972 and 1974, the QFL was the bargaining agent for all construction workers because it obtained an absolute majority of votes. However, the CSN, the Centrale des Syndicats Démocratiques (CSD), which split off from the CSN in 1972, and another splinter group (the Syndicat de la Construction de Sept-Iles) were recognized as representative associations. In 1978, the rules were again changed, and any association that obtained over 15% of the votes was entitled to participate in the negotiations, so the CSN with 24.1% of the vote participated in the negotiations that took place in 1979-80. (14) The rules were changed another time for the 1982 negotiating session. At present, any association or group of associations representing more than 50% of construction workers is eligible to bargain for all construction workers.

The multi-trade bargaining system put a number of strains on the QFL. The law recognized the QFL as the bargaining agent rather than the various locals of which the QFL is composed, thereby giving it much more power than the international craft unions traditionally allow their Building Trades Councils. (15) It is this aspect of the law that recently permitted many QFL locals to split off from the Conseil Provincial des Métiers de la Construction and form

another representative association called the FTQ-Construction. It also previously permitted the CSD to split off from the CSN. Thus there are at present five recognized worker representative associations in Quebec construction, none of which obtained a majority in the elections for the 1982 negotiations.

The province-wide decree system ensures that fringe benefits (pension, insurance, and vacation pay) are centrally managed and are portable for all workers throughout the province. The performance of its duties regarding fringe benefits permits the OCQ to gather information on hours worked and income of all construction workers, and hence makes possible control over the supply of manpower using hours worked as a criterion of classification.

There are a number of other aspects of the Quebec construction labour relations system which will not be described in greater detail since they are not related to the question of labour supply. Two may be mentioned here: compulsory membership of firms in employer representative associations, and ministerial power to set the decree if no agreement is reached by negotiation.

IV.4 Hiring and employment security

IV.4.1 Hiring hall system

In collective agreements in other industries, the most important non-monetary or normative clauses deal with the questions of hiring, firing, and seniority. Because of the nature of the construction industry and the consequent mobility of workers, it would be extremely difficult if not impossible to enforce the usual seniority and other clauses relating to employment. Construction workers nevertheless aspire to some kind of employment security, and the union hiring hall is the instrument they use to ensure some stability of employment and fairness in the allocation of available work. But for the hiring hall to ensure some measure of steady employment presupposes that all workers must be hired with the consent of the hiring hall, if not exclusively through it. This means in practice that the union must impose a closed shop on employers: all workers must be members of the union. The union hall can also be used to impose solidarity upon the workers, since without it they are unable to obtain a job; and this can lead to abuses, as the Cliche commission has shown. (16) As Paul Malles put it, in his study on Employment security and Industrial Relations in the Construction Industry, done for the Economic Council of Canada:

> ...notre analyse a démontré que les expressions "sécurité d'emploi" et "sécurité syndicale" sont, en pratique, devenues

> synonymes dans l'industrie de la construction. (17)

A closed shop enables the union to impose a hiring hall system on employers. In all of Canada except Quebec, this system is in force in the unionized sector of the construction industry. According to Malles' study of Canadian construction collective agreements, 700 of 785 collective agreements had a closed shop and another 65 had a union shop. (18) Only sixty four of the 785 collective agreements did not provide for a union hiring hall. (19) Union hiring halls are used to restrict the number of workers entitled to work, and this is freely admitted by union leaders. Malles quotes from a brief submitted to the Economic Council of Canada by the Advisory Board for the Building and Construction Trades Unions in Canada:

> Si un syndicat refuse quelqu'un, c'est généralement parce qu'il compte un nombre suffisant de membres pour effectuer les travaux prévus dans l'avenir prévisible.
>
> Accepter un nouveau membre quand des hommes de métier sont disponibles reviendrait à refuser à un membre actuel une possibilité d'emploi. Jusqu'à présent, le seul espoir de continuité d'emploi pour un travailleur de la construction était offert par les syndicats qui refusent de nouveaux membres tant que ne s'ouvrent pas de nouvelles possibilités d'emploi. C'est pour le travailleur la seule garantie qu'il obtiendra du travail lorsqu'il s'en présentera. (20)

Of course, there is still a possiblity of easy entry for new workers through the non-union sector where entry is much freer. However, most of these workers would probably suffer from higher job instability and unemployment than unionized

workers, although no statistics are available to confirm this.

IV.4.2 Evolution of the Quebec system of control over hiring

The presence of two major unions in Quebec has prevented the hiring hall system from functioning properly. The two unions competing for members has meant that a new worker could join either of the two unions at any time. If one union refused him, he could always threaten to go to the other. Being a member, he could not fairly be denied the possibility of working. The two unions have been well aware of this. In the first negotiation under Bill 290 in 1969, the CSN's main demand was "la sécurité d'emploi par les bureaux de placement conjoints". (21) The QFL eventually acquiesced and signed a formal agreement with the CSN, despite some original opposition mainly because of fear for its well developed hiring hall system in the mechanical trades. (22)

This agreement was eventually set aside in the subsequent negotiations. A collective agreement was signed only by the QFL and the employer associations for the Montreal region and it was subsequently extended to the rest of the province. This agreement accepted in principle the main union demands for employment security, but relegated to a mixed commission the working out of details, with a provision for arbitration if no agreement was reached. No agreement was in fact reached and Judge Gold was asked to

arbitrate. His decision became the inspiration for all the later systems of manpower controls which were established or proposed.

Judge Gold's arbitration decision was the first to use hours worked as a criterion for hiring. Workers were divided into four categories: regular provincial, who had to have worked over 1,500 hours in the previous year for the same employer; regional regular, who had to have worked between 800 and 1,500 hours for the same employer; permanent, who had to have worked 800 hours in the previous year or 2,400 hours during the previous three years; and reservists, all those who had worked less than 800 hours. There would have been regional priority in hiring, permanent workers of the region would have been the first to be hired, then permanent workers of other regions who wanted to work in the region in question, and only then could reservists from the region and from the region and after them reservists from other regions be hired. The regular workers could be employed in preference to all others by their regular employer, either throughout the province for the provincial regular, or his region for the regional regular. The permanent workers were to be hired either through a Quebec Manpower Centre or through a union hiring hall. The reservists could only be hired through a manpower centre. Significantly, this would have taken all control over manpower away from the unions and put it in the hands of the Quebec Manpower Centres, since all workers would have had to register with one of these, and the

centre would have had to be informed of all hirings and firings. The CSN accepted this decision, but the QFL was completely opposed to it because it practically eliminated the role of union hiring halls.

It is generally claimed that union halls have numerous advantages. The business agent, who does the job placement, knows the members of his union and their particular abilities, and can therefore match the particular requirements of a job with the members most apt to perform it. (22) Of course, this must be tempered by some measure of fairness by giving the members longest unemployed the first shot at jobs that become available. So there is a greater element of flexibility than in a government run system which must necessarily rest on rigid criteria for the referral of workers, such as hours worked, period of unemployment, and category of worker.

Despite the QFL's opposition, the government attempted to implement the provisions of Judge Gold's arbitration with Order in Council 1975 (23) and Order in Council 4119 (24). By O.C. 4119, the system should have begun on January 1st 1971, but the continuing opposition of the QFL and the impossibility of establishing an inventory of manpower made it impossible to enforce the system on such a short notice.

In July 1971, the government adopted a new Order in Council (O.C. 2711) abolishing the non-functioning system of O.C. 4119. (25) The major change was that control over hiring was abolished, and there was no more priority in

hiring. The main provision of this new order was to limit employment in construction to those having a work permit. A work permit was to be granted to all workers who had worked at least one hour in the 18 months preceding June 1st 1972, the date when the order would come into effect. The effect of this was to severely restrict entry into the construction industry, as very few new workers would be admitted. Another new provision was to let the regulation be applied by the newly formed CIC, whose structure was inspired by the old parity committees: unions and employers both had a voice in it. The CIC was to establish regulations for the entry of new workers. But despite an extension of its original deadline, the CIC was unable to do so. So the government intervened again with a new Order in Council which established a system that was in force until 1978.

The system established under the new Order in Council 3297 came in force on November 1st 1972, and maintained for skilled workers the obligation of obtaining a work permit. (26) However, workers in unskilled occupations no longer needed a work permit--there was complete freedom as to their hiring and firing--despite the fact that these workers are the ones who most need employment security provisions. (Labourers and other semi-skilled occupations work less hours on average than the skilled trades, and hence have a lower income. Since they do not need a certificate of qualification, they can also be most easily replaced.)

New skilled workers were granted permits only if there

was a need in their region or trade, as determined by the CIC. Permits would be renewed according to criteria based on hours worked. Workers who worked more than 900 hours in the previous year would be granted a renewal automatically. Those who worked between 450 and 900 hours would have their permit renewed only if they made the express demand and declared themselves available for work. Those who worked for between 120 and 450 hours would be granted a permit valid for six months if they also satisfied the above two conditions and had obtained an employment guarantee from an employer. All others would be treated as new workers who could obtain a permit only if workers of other categories were unavailable, and if they had an employment guarantee. This system functioned with minor modifications until the major overhaul in 1978 following the Cliche Commission report.

Although it was not strictly within its mandate, the Cliche Commission discussed and made recommendations regarding employment security. It rightly recognized that much of what it called the 'chaos' in the industry was due to the insecurity of employment that workers are subjected to. (27) Because of the abuses it found in four QFL locals, it recommended that union hiring halls be abolished entirely. (Both the QFL's union rivals and all the employers concurred in this.) In the place of union hiring halls, it recommended the setting up of a single placement organization under the control of the OCQ, whose creation was the object of its main recommendation. (28) Similarly to Judge Gold's report,

it also recommended a criterion of 500 hours for a worker to be considered permanent, and thus be given preference in hiring. Among the permanent workers, three other criteria would also be used to determine priority. In order of importance, they were: special abilities of workers, region, and the length of unemployment. The new hiring system was to be implemented in conjunction with coordination of demand for structures, a better system of training an qualification, a system of guaranteed income for permanent workers, and a centralized pay system, all of which would supposedly have solved most of the industry's problems.

IV.4.3 Present system of control over hiring

None of the Cliche commissions recommendations on employment security have as yet been adopted. The newly formed OCQ was made responsible for the drafting of regulations concerning hiring following the Cliche commission report, and a proposed draft regulation was presented in June 1976. The Liberal government then in power did not have time to adopt it, and the P.Q. government elected in November 1976 first thought of establishing an overall manpower policy for the whole province, rather than only a regulation for construction. (29) This idea was abandoned, at least temporarily, and the new regulation was adopted in September 1977 by Orders in Council 3282 and 3283. (30) The new system came into effect on July 1st 1978.

The new system did not follow most of the

recommendations of the Cliche commission. In fact, the only thing it had in common with the Cliche commission recommendations was the use of the letters 'A', 'B', and 'C' for designating classes of workers who would be given preference in hiring. Three classes of workers were defined, designated 'A', 'B', and 'C'. 'A' workers had to have worked at least 1,000 hours in the previous year, 'B' workers between 500 and 1,000 hours, and 'C' workers included new workers and those who had worked less than 500 hours. For skilled tradesmen, holders of the 'A' classification had absolute preference in hiring in their region, and were equal with 'B' workers in other regions. The holders of a 'C' classification certificate could only be employed if there were no 'A's' available in the province, or no 'B's' in their region; they had equal priority with 'B' workers of another region. For the unskilled and semi-skilled workers, there was absolute regional preference in hiring: all classification certificate holders had to be unavailable to take a job in the region before workmen from other regions could be employed. There were also special certificates issued for workers from other provinces and for apprentices.

The system was modified in February 1980 by Order in Council 493 because of numerous complaints of unfair treatment by holders of the 'B' certificate. (31) In any case, the number of 'B' workers was fairly small; only 8,590 'B' certificates had been issued by the OCQ by December 1978, out of a total of 119,324. (32) The main changes were to

abolish the 'B' and 'C' certificates, and replace the previous certificates with only two types, 'A' and 'special', and to replace the period of reference for counting hours worked from one year before the issue of the permit to two years. To obtain an 'A' certificate, a worker now has to have worked at least 1,000 hours in the past two years. With some exceptions for older workers, all others obtain a 'special' certificate. Holders of an 'A' certificate have absolute preference in hiring in their region. For skilled tradesmen, 'A' holders from other regions are next in line, with holders of a 'special' permit last, while for unskilled occupations, holders of the 'special' permit resident in the region have equal priority with 'A' holders from other regions.

Under the new regulation, hiring can be done as before, either through union hiring halls or directly between a worker and an employer, although workers can also be referred by the OCQ which has to maintain a continuous inventory of workers available for work. However, all parties must obey the regulation regarding hiring, and the union hiring halls are subject to a code of ethics and need a permit from the OCQ to operate. This permit can be revoked at any time by the OCQ. The Cliche commission recommendation to abolish hiring halls was not heeded, since it would have entailed a major conflict with the QFL. Since it is part of the OCQ's mandate to maintain a good climate in the industry, it chose not to abolish union hiring halls, especially since a simpler

expedient existed in inspections and licensing of hiring halls. (33)

The system has not been in effect long enough to accurately evaluate its effects, but some data can already be presented. There was a decline in total man-hours worked in 1979, so it could be expected that, ceteris paribus, average hours per worker would decline as they had done in the previous three years. In fact, they did not; most trades and occupations saw an increase in the number of hours worked per worker compared to 1978, but the most dramatic increase was in the unskilled occupations. Contrary to what would normally be expected in a downturn year, average hours per unskilled worker went up to 1,067 hours, the highest level since the OCQ started gathering data on hours worked. (34) Labourers went up to 944 hours, again a record high. The rise in hours per worker for skilled trades was not as large; it went up to 1,104 in 1979 from 1,093 in 1978. The 1979 figure is actually lower than that of all years since 1971 except 1972, 1976, and, of course, 1978, reflecting the poor demand conditions in 1979. There are two basic reasons for this comparatively small rise in hours worked per skilled tradesman: 1) because of the fact that a qualification certificate is needed to work as a tradesman, entry of new workers is restricted to qualified workers, unlike labourers where anyone can go to work as one without any experience; and 2) skilled tradesmen already had some measure of job security with the permit system, where work permits were

issued only if there was work available.

The effect of the new regulation is clearly to restrict the entry of new workers, so that those already in the industry can obtain higher income and suffer from less unemployment. It is also hoped that the system is flexible enough, so, that in the event of a shortage, it would be possible to have new workers enter the industry. It functions much as the union hiring hall system does in other provinces, a system that has proved impossible to implement in Quebec because of the presence of dual unionism. However, Quebec's system reduces the unions to simple bargaining agents and takes away much of their bargaining power which stems from control over hiring.

IV.5 Training and Qualification

Construction tradesmen are highly skilled workers divided into a number of trades that have exclusive jurisdiction over certain types of work. Workers therefore need some training before they can practice their trade: this usually means some period of apprenticeship, whether formal or informal, possibly combined with some vocational schooling. Because of the nature of their work, construction workers need extensive 'general' training, but little 'specific' training, to use Gary Becker's terminology. (35) This discourages firms from investing in training workers, since they cannot hope to recoup their investment; trained workers may sell their skills to any firm in the industry. Training costs must therefore be borne by the workers themselves since firms are not willing to assume them. Apprentices, being supposedly less productive than journeymen, are paid less. However, apprentices may be used to do many of the simpler tasks with no loss in productivity, and employers are wont to take advantage of this by hiring more apprentices at the expense of journeymen. (36) Apprentice-journeymen ratios are used to limit this.

The high interfirm mobility of workers, the need for control of apprenticeship, and the unwillingness of employers to assume responsibility over training mean that there is a need for mechanisms to regulate the process of training and certification of workers. Some type of certification is necessary if the skills of a particular worker are to be

recognized by different employers. The regulation of training could conceivably be done by the unions, but this is generally not the case in North America. It is done instead by either a joint union-employer body, as in the United States or in Quebec before 1970, or by a government regulatory body, as in all the Canadian provinces today.

The traditional way of training a worker in construction is through a formal apprenticeship. The aspiring tradesman must work at his trade for a number of years under the supervision of skilled journeymen, with the length of the period of apprenticeship depending on the trade. The on-the-job training may be supplemented by vocational schooling in the classroom. However, this is not the only way of acquiring a trade, and, in fact, there are not very many tradesmen who have gone through a formal apprenticeship. It is only in the mechanical trades that a majority of journeymen have gone through this process. (37) Most tradesmen actually obtain certification by other means. Where there is a non-union sector, as in most Canadian provinces, anyone may be employed and learn a trade in the non-union sector by purely on-the-job training, and eventually make his way into the union sector. The lack of compulsory certification in all except mechanical trades in most provinces makes this relatively easy. Workers may also learn a trade in industries other than construction, and then move into the industry. These workers can obtain certification by either passing an exam or by being

recognized as a tradesman by the unions for those trades where certification is not compulsory.

With the implementation of Bill 290 in 1968, routes other than apprenticeship became much more difficult in Quebec because of compulsory unionization for all construction workers. In addition, the consolidation of the various regional decrees also caused difficulties because apprenticeship, training and qualification were previously under the control of regional parity committees. There were different definitions of trades for each region. In some regions, sub-specialties of certain trades, such as hardwood floor layers and pile setters for carpenters, were considered trades in their own right. There were also different requirements for the duration of apprenticeships and apprentice-journeymen ratios in different regions.

These problems were solved by the enactment of Regulation No. 1 on Vocational Training and Qualification of Manpower in the Construction Industry of Order in Council 3606 in October 1971. (38) This new regulation recognized and defined 24 trades, and set up regulations on apprenticeship (duration, pay, apprentice-journeymen ratios) and qualification of workers for the whole province. This regulation was modified, but not substantially, in 1976 in order to put it into accord with the new law regulating the OCQ. (39)

Control over all training and qualification was taken out of the parity committees and put under control of the

Ministère du Travail. The government now sets apprenticeship standards and controls the qualification of workers. All apprentices are required to pass a qualification exam, but acquired rights of workers under the parity committee system were recognized. The system was different from that of other Canadian provinces in that all trades are subject to the regulation, not only the mechanical ones.

The time needed to complete an apprenticeship varies from one period--for resilient flooring layers, reinforcing steel erectors, roofers, and crane, shovel and heavy equipment operators--to five periods for elevator mechanics. Most trades need three periods, pipefitters and electricians need four, and cement finishers, structural steel erectors and ornamental iron workers need two. (40) A period of apprenticeship is defined as 2,000 hours of both on-the-job training and schooling at a recognized institute.(41) Since apprentices work an average of less than 1,000 hours a year, it takes a long time to become a journeyman. This is indicated by Table IV-4: in all but the mechanical trades, the number of apprentices declines with the period, implying that many more people start apprenticeships than finish them.

TABLE IV-4
NUMBER OF APPRENTICES BY TRADE AND BY PERIOD OF APPRENTICESHIP, QUEBEC, MARCH 31, 1979, MAJOR TRADES.

Trade	Number by period of Apprenticeship 1st	2nd	3rd	4th	Total Quebec
Carpenter	1,590	1,156	1,306		4,052
Electrician	790	883	884	1,051	3,608
Pipefitter	658	509	453	619	2,239
Heavy equipment operator	622				622
Painter	452	200	154		806
Bricklayer	425	231	176		832
Tinsmith	223	204	271		698
Structural steel erector	95	75			170
Shovel operator	158				158
Cement finisher	143	66			209
Crane operator	113				113
Total (includes 12 other trades)	6,555	3,694	3,597	1,732	*15,604

*Includes 26 elevator mechanics in their 5th period.

Source: Ministère du Travail et de la Main d'Oeuvre, Québec Rapport Annuel 1978-79.

Another factor in the high quit rates is the difficulty of getting a job for later year apprentices. Employers prefer hiring apprentices in the earlier periods when the wage rate is so much lower. For example, plumbers earned an average of $13.35 an hour including fringe benefits in 1979 in Quebec; first period apprentices earned 50% of that, those in the second period 60%, those in the third period 70% and those in the fourth period 85%, meaning respectively $6.68, $8.01, $9.35 and $11.34 for each category of apprentice. When it is considered that a labourer earned $9.76, it can easily be

seen that it can prove immensely profitable for an employer to use apprentices as cheap labour, and the earlier the period, the greater the profit. So employers generally ask for earlier period apprentices when hiring and later period apprentices have a harder time finding jobs. (42) This creates problems with the issuing of work permits to new apprentices. One previously unresolved question in the regulation on hiring was whether new apprentices should be admitted when apprentices of later periods were available. The 1978 regulation on hiring said nothing on the priority of hiring of apprentices, anyone with a job guarantee could obtain an apprentice's certificate. The modifications enacted in February 1980 now give priority to workers already having a certificate; all apprentices holding a certificate in a particular region must be hired before new certificates of classification are issued.

In the past, this caused considerable difficulty. The CIC and later the OCQ maintained that the availability of work permits should be the main criterion for admitting new apprentices, but the David Freed arbitration decision had decided that the overall journeyman-apprentice ratio should be the determining factor. New apprentices could be admitted as long as the overall ratio was not fulfilled. (43) As can be seen by Table IV-5, overall ratios do not conform to the legal ratio.

TABLE IV-5
JOURNEYMEN-APPRENTICE RATIOS, QUEBEC, 1972-1979, SELECTED MAJOR TRADES.

Trade	Legal Maximum	Actual Annual Ratios (1) Maximum (year)	Minimum (year)
Carpenter	5:1	4.6:1 (1979)	2.1:1 (1974)
Electrician	2:1	2.3:1 (1979)	1.5:1 (1975-76)
Pipefitter	2:1	3.1:1 (1979)	1.8:1 (1974-75)
Heavy equipment operator	2:1	10.2:1 (1979)	1.9:1 (1973)
Painter	5:1	4.5:1 (1979)	2.5:1 (1976)
Bricklayer	5:1	3.4:1 (1979)	2.0:1 (1976)
Tinsmith	2:1	3.5:1 (1979)	1.5:1 (1974-75)
Structural steel erector	5:1	11.5:1 (1979)	2.1:1 (1975)
Shovel operator	1:1	8.9:1 (1979)	3.2:1 (1976)
Cement finisher	5:1	4.6:1 (1977)	2.1:1 (1974)
Crane operator	1:1	8.2:1 (1979)	1.8:1 (1976)
Plasterer	5:1	5.2:1 (1979)	2.7:1 (1976)

(1) The ratios in the two right columns are calculated from data on the number of apprentices and journeymen who worked in each year from 1972 to 1979.

Source: Legal maximum: Règlement No. 1 , A.C. 3606 du 20 avril 1976, G.O.Q., 108, 21 (30 avril 1976).
Actual ratios: calculated from OCQ data bank.

In some trades, there are consistently too many journeymen, while in others there are more apprentices than the regulation permits. The same is true if hours worked rather than number of workers is used. This means that either employers violate the regulation by hiring too many apprentices in some occupations or that the structure of the regulation permits this to happen. For example, in the case of a 5:1 legal ratio, an employer can hire an apprentice as soon as he has hired a journeyman, and he can hire another as soon as six journeymen are hired. In this last case, this

would give an actual ratio of 3:1, although the employer is within the law. With the new regulation on hiring, the only criterion for admitting new apprentices is the availability of apprentices with work permits. Legal ratios are used only for determining the number of apprentices an employer may hire, not for determining the number of new apprentices to admit to the industry.

After a workman has completed his apprenticeship, he is required to pass a certification exam before being granted the status of journeyman and obtaining a qualification certificate that attests to this. Regulation No. 1 states that apprenticeships are compulsory, but there are some exceptions. An attestation of experience may be granted to to some workers. This attestation of experience takes the place of a qualification certificate. These were originally meant for workers who had exercised a trade in regions where a qualification certificate was not required. In 1973, the possibility of obtaining an attestation was extended to all workers on the basis of a decision of an arbitration council. According to Hébert, this provision is used by a large number of new-Canadians. (44) But it is likely that it also is used by workers who worked in a trade illegally and wish to regularize their situation. An OCQ official mentioned that there is still a number of workers working at a trade without the requisite papers, and whose hours are reported by employers as tradesmen. The OCQ does not bother with them since, according to the same person, it is not in the

business of establishing a police state. (45) There is also a number of workers working outside the decree in residential construction in rural areas. Before the 1978 redefinition of the artisan status, these workers were working illegally. They still are today if they do not possess a qualification certificate, but there is little information available on these workers.

There is another possible route for workers to obtain a qualification certificate. A worker may be permitted to sit for a qualification exam if he can prove that he has worked the required number of hours in the trade. According to Regulation No. 1:

> 4.02 Qualification Examination Eligibility
> ...
> (a) (2) Anyone who is able to prove by supporting documents that he has plyed a trade or specialty and has gained experience in working hours and, if necessary, in applicable apprenticeship credits, at least equal to the number of periods provided for in appendix "B" of this regulation is also eligible for this examination. (46)

Apprenticeship is nevertheless the main route. From 1971 to 1979, some 12,183 attestations of experience were delivered compared to 56,610 certificates of qualification after passing the exams. The great majority of those taking the exam had completed a formal apprenticeship.

The apprenticeship system does not seem to have impeded an adequate labour supply. There were no obvious shortages of tradesmen due to the lack of new entrants, even during the 1975 boom. The system has also proved quite adaptable.

During the expansion from 1972 to 1975, the number of apprentices hovered around 30,000, and in the slump starting in 1976, the number of apprentices continuously declined: from 30,515 in 1976, it dropped to 19,339 in 1977, 16,775 in 1978, and 14,329 in 1979. (47) The regulation also permits the OCQ to admit more apprentices if it predicts manpower shortages in certain trades, although this has not yet occurred.

The skilled trades are not the only ones that need a system of training. Many of the so-called 'unskilled occupations' also involve highly skilled work and require some kind of certification. However, these occupations are not regulated by Regulation No. 1 but by various other laws. Shot firers, who handle dynamite and blasting, must pass a qualifying exam testing their knowledge of the handling of explosives after being recommended for the job by their employer. They are regulated by the Construction Safety Code. (48) Steam-boiler firemen and generator operators are regulated by the Stationary Engineman Act. (49) Linemen who work on electrical power and distribution lines, on transformers and on power plants are regulated directly by the decree. They have their own system of apprenticeship and qualification, with three classes of linemen plus apprentices. Pipe welders, who work on pipelines and other pressurized pipework, are regulated by the Pressure Vessels Act. (50) Even the unskilled occupations such as labourers and truck drivers need some training, but this is done on the on the job, and there are no regulations concerning them.

6. Migration and geographical mobility

Migration is an important determinant of the supply of labour in a particular region or area, especially in Canada where there has not only been a large influx of rural people into urban areas, but where there has also been a large interprovincial mobility of people, and perhaps more importantly, a large immigration from abroad since World War Two. This section will examine how migration has affected the supply of labour in construction in Quebec. First, foreign immigration will be examined, this will be followed by an examination of inter- and intra-provincial mobility of construction workers.

IV.6.1 Immigration

Canada has traditionally relied on foreign countries for much of its supply of skilled workers. This is especially true of construction; of 563,440 male construction tradesmen enumerated in the 1971 census, 140,885 were foreign born, some 25%. By comparison, only 20% of Canada's male labour force was foreign born. In Quebec, the opposite pattern is true; while immigrants formed 11.3% of the male labour force, only 9.5% of the construction labour force were immigrants. Nevertheless, this is still a considerable percentage. Although Great Britain was the most important area from which immigrants came to Canada, Southern Europe (Italy, Greece, Portugal, etc.) was the most important source of immigrant construction workers. Southern Europeans, who

are the most important group in Quebec, are better represented in the construction trades than other immigrant groups. Only Southern Europeans have a greater propensity to work in construction than native Canadians in Quebec. Table IV-6 outlines the place of birth of construction workers and the male labour force in Canada according to the 1971 census.

TABLE IV-6
PLACE OF BIRTH OF CONSTRUCTION WORKERS AND MALE LABOUR FORCE, BY PERCENT OF TOTAL, QUEBEC AND CANADA, 1971.

	CANADA		QUEBEC	
	MALE LABOUR FORCE	CONSTR. LABOUR FORCE	MALE LABOUR FORCE	CONSTR. LABOUR FORCE
Foreign countries	20.2	25.0	11.3	9.5
United States	1.4	0.9	0.8	0.5
Great Britain	5.0	3.7	1.3	0.4
Northern Europe	0.8	1.2	0.1	0.1
Western Europe	3.3	4.3	1.9	1.3
Southern Europe	4.6	10.3	3.8	5.8
Eastern Europe	3.0	3.4	1.7	1.0
Canada	79.8	75.0	88.7	90.5

Source: Calculated from Statistics Canada, Census of Canada 1971, Volume III (Part 3), Occupations, Bulletin 3.3-7. Catalogue #94-734, February 1975.

No detailed occupational breakdown has been published for Quebec, but for Canada as a whole, the majority of the workers in the bricklayer, stonemason, and tile setter group, and in the concrete finisher group were immigrants, with close to two-thirds of immigrants in the first group and over three quarters in the second group coming from Southern

Europe. Table IV-7 shows the proportion of immigrants in selected trades for Canada, according to 1971 census figures.

TABLE IV-7
PROPORTION OF IMMIGRANTS IN SELECTED TRADES, CANADA, 1971.

TRADE	PERCENT OF IMMIGRANT WORKERS	PERCENT OF SOUTHERN EUROPEANS
Electricians	20.8	4.2
Carpenters	27.0	9.4
Bricklayers, stonemasons, & tilesetters	52.5	33.9
Concrete finishers	64.3	50.2
Plasterers & related	38.7	21.2
Painters & paperhangers	33.4	11.4
Roofers	19.2	7.1
Pipefitters	19.4	4.9
Structural metal erectors	18.7	7.4
Labourers	27.0	18.7
Heavy equip operators	13.6	7.1
TOTAL CONSTRUCTION	25.0	10.3
TOTAL ALL OCCUPATIONS	20.2	4.6

Source: Calculated from Statistics Canada, Census of Canada 1971, Volume III (Part 3), Occupations, Bulletin 3.3-7, Catalogue #94-734, February 1975.

Immigrants accounted for over one-third of the workmen in the plastering and in the painting trades. They also were slightly over-represented in the carpentry and in the

labouring trades. In the other trades, native Canadian workers accounted for more than the 80% they account for in the male labour force. Detailed data are not published for Quebec, but with suitable reductions for the smaller relative number of immigrants, the trade distribution of immigrant workers should be fairly consistent with the Canadian one.

IV.6.2 Interprovincial mobility

Workers can come not only from other countries, but also from other provinces. This is a doubly important topic because of the recent furor over the effects on interprovincial mobility of the Quebec construction hiring regulations. The regulations prompted the premier of Ontario, Bill Davis, to threaten to pass a special law forbidding Quebec construction workers from working in Ontario, and the regulations are probably one of the roots of the federal government's exhortations on mobility and its inclusion of free movement of people and goods in its constitutional proposal. Even the construction unions' Building Trades Council condemned the restrictions, although its attempt to get the C.L.C. to also condemn it was thwarted by the president of that body, Dennis McDermott after he consulted with the QFL.

The regulation on hiring is quite specific on the requirements needed for a worker from another province. A worker from another province can obtain a certificate of classification under two conditions: 1)the same way any other

new worker obtains one, i.e. if he has an employment offer, and there is no other construction worker with a classification certificate available to take that job, or 2) if the worker is a regular employee of the employer hiring him. This undoubtedly makes it difficult for construction workers from other provinces to obtain jobs in Quebec, but no more difficult than for any Quebec worker from another industry. On the other hand, Quebec is the only province to recognize the 'red seal' programme in its legislation on manpower qualification (51). This federally administered program permits construction tradesmen who have the red seal affixed to their qualification card to have their qualifications recognized in a number of provinces and jurisdictions. Hence, a tradesman coming into Quebec from another province does not need to pass exams in order to have his qualifications recognized. Other provinces do not have government regulated hiring in construction, but mobility in the union sector is just as restrictive as in Quebec. Local unions will consent to permit holders of travelling cards to work in their district only if there is work available and all their current members are either employed or unavailable for work. Therefore, entry of workers from other regions or provinces is severely restricted in the union sector. On the other hand, entry is completely free and at the whim of the employer in the non-union sector, but there may still be some informal barriers to hiring people from outside because of potential local resentment,

especially in rural areas. Nevertheless, entry in the non-union sector in other provinces is still much freer than in Quebec. This sector is fairly important in other provinces, accounting for 35-40% of construction workers. (52)

The extent of inter-provincial mobility of construction workers is extremely small, at least in Quebec. The OCQ is the only body that has accurate data on interprovincial mobility of construction workers, and at that, data is limited to only the number of non-residents who worked in Quebec. As Table IV-8 shows, there are very few workers from outside the province working in Quebec.

TABLE IV-8
NUMBER OF, AND HOURS WORKED IN QUEBEC BY CONSTRUCTION WORKERS NOT RESIDENT OF QUEBEC, 1972-1979.

YEAR	NUMBER	NUMBER OF NEW ENTRANTS IN QUEBEC	NON-RESIDENTS AS A % OF TOTAL NUMBER OF WORKERS	NON-RESIDENTS AS A % OF TOTAL HOURS WORKED
1972	6213	N/A	4.4	1.2
1973	3132	N/A	2.1	0.8
1974	2879	N/A	1.9	0.8
1975	2764	N/A	1.8	0.9
1976	2392	1254	1.6	0.8
1977	2167	770	1.6	0.8
1978	1177	349	1.0	0.5
1979	637	161	0.6	0.2
1980	494	154	0.5	0.2

Source: OCQ, Analyse de l'industrie de la construction au Québec, 1976, 1977, 1978, 1979, and 1980 issues.

The number of individuals involved and the hours they work is very small compared to the total number of people who work in

Quebec construction in any given year. At its height in 1972, only about four percent of construction workers in Quebec were from outside the province. The percentage has been diminishing since then. It is interesting to note that most outside workers work in Quebec year after year, as is demonstrated by the small proportion of new entrants among the non-resident workers. This is evidence for the fact that most of the interprovincial mobility is in the border areas: Ottawa-Hull, Cornwall-Valleyfield and the areas bordering New Brunswick. The mobility clearly goes both ways but there are no data on Quebec residents working in other provinces. The number of non-resident workers in Quebec has clearly been declining partly because of the increasing difficulty for any person to begin working in construction in Quebec. In addition, the large decline in construction activity in Quebec, leading to a much smaller number of available jobs has discouraged entry into the industry by non-residents. In the early seventies, the large number of federal building projects in Hull encouraged Ottawa workers seek work in that city. Today, there is very little construction in the Hull region, and construction workers who are residents of the region are forced to find work elsewhere, either in other regions of Quebec, many of which are suffering from their own unemployment problem, or in the adjoining regions of Ontario. Unemployment in Hull means less entry into Quebec of Ontario construction workers, since the region where inter-provincial mobility was by far the most important was

precisely the Ottawa-Hull region.

The problem of interprovincial mobility of construction workers seems to be a very minor one compared to others that the industry suffers from. Nevertheless, the publicity that has been given to the effect of the Quebec hiring regulations on inter-provincial mobility may lead to retaliation on the part of other provincial governements and of local unions in the border areas. This problem can become particularily serious for Quebec workers living in border regions when there is high unemployment in their region, as is now the case in Hull. It is Quebec construction workers who probably would suffer most from retaliatory barriers to mobility because of the high unemployment in the border regions.

A possible solution to potential retaliation is to give classification certificates to construction workers residing in Ontario's and New Brunswick's border regions who wish to work in Quebec. Of course, these workers would have to meet the same requirements as Quebec workers in terms of hours worked, qualifications, and regional priority in hiring. The out of province worker who requests a classification certificate would have to prove that he had worked the requisite number of hours in the previous reference period, the same way Quebec workers must now do if they wish to have the hours they worked outside the province recognized.

In conclusion, it should be pointed out that the furor over the Quebec hiring regulations on the part of the federal and the Ontario governments was quite unjustified,

since the Quebec regulations were no more restrictive than the regulations that exist in the union sector in other provinces, and they were imposed for the same reasons. The Quebec government also showed some bad faith in its uncompromising stance. This is understandable only in the sense that the Quebec government wanted to make some short-term political gains, because, even in its idea of a sovereign Quebec, it accepts the need for an economic association with the rest of Canada, which would imply some measure of mobility between Quebec and Canada.

IV.6.3 Inter-regional mobility

Intra-provincial mobility has also caused some problems in Quebec. In the discussion on quantitative control of manpower, it has been noted that an important aspect of any regulation of hiring is what amount of regional preference should be granted in hiring practices. The two major unions have had considerable differences over the question. The CSN has always been in favour of strict regional preference in hiring, calling the QFL members 'itinerant' workers. (52) The CSN is relatively strong in the rural areas, where there exists some resentment against people coming from Montreal to work in their region. Workers from the Montreal region are perceived as a major threat to the employment security of workers in non-metropolitan regions because the relative size of the Montreal region compared to any other make workers from that region so much more visible. It

should be noted that some QFL locals are also very jealous of their local prerogatives in hiring. For example, the Sorel labourers' and carpenters' QFL locals refused to admit any member of the Montreal locals of their unions unless there were no more jobs available for the members of the Sorel local. (54) However, most QFL locals have province-wide jurisdiction, and, hence insist on province-wide mobility for their members.

The provisions on regional preference in the regulation on hiring are the result of this tension between demands for free mobility of construction workers throughout Quebec and insistence on local priority in hiring. Skilled tradesmen must first be hired among certificate holders residing in the region of the project, and then they may be hired among residents of other regions. New workers come last. For unskilled workers, where the CSN has most of its membership, local residents holding a certificate have first priority in hiring, while certificate holders from other regions are equal with new workers from the region where the project is to be built.

Interregional mobility is very important for Quebec construction workers. Over 40% of construction workers worked outside their region of residence in every year from 1973 to 1980. (56)

The geographical extent of the regions is presented in Appendix 4. Regions vary widely in geographic extent, but their relative importance is more accurately gauged by the

number of hours worked in them by construction workers. This is shown in Table IV-10.

TABLE IV-10
RELATIVE IMPORTANCE OF OCQ ADMINISTRATIVE REGIONS IN TERMS OF HOURS WORKED, 1978-79 AVERAGE.

Region	Percent of total hours worked
Rimouski	3.3
Chicoutimi	4.8
Québec	14.2
Trois-Rivières	5.4
Drummondville	1.8
Sherbrooke	2.7
Montréal	35.5
St.-Hyacinthe	4.0
Sorel	0.9
Joliette	1.7
St.-Jérôme	2.7
(Grand Montréal)	(44.8)
Hull	2.5
Val d'Or	2.9
Baie James	13.5
Hauterive	0.6
Sept-Iles	1.1
Unknown	2.4

Source: OCQ, Analyse de l'industrie de la construction, 1978 and 1979, Tableau T-14.

As can be seen from this table, Montreal is by far the most important region followed by Quebec City and James Bay. All other regions are far behind. If the regions around Montreal (St.-Hyacinthe, Sorel, Joliette ans St.-Jérôme) are combined to form what the OCQ calls the 'Grand Montréal' region, close to 45% of construction employment occurs in this region.

According to OCQ data, all regions except James Bay

export and import manpower to some extent. Most regions are net exporters of manpower; in other words, workers resident of these regions work more hours in other regions than residents of other regions work in the formers' region. (55) The most important importing region in recent years has of course been the James Bay region. In 1979, it was the third most important region in terms of hours worked (after the Montreal and Quebec City regions) with some 14,520,000 hours, close to 13% of all hours worked in construction. The small number of residents of that region ensures that almost all of its manpower is imported. The Hauterive and the Sept-Iles regions of the North Shore of the St.Lawrence had also been important importers of manpower in the past with the large hydro-electric and mining projects in the early and middle seventies. But interregional mobility is not limited to movements into remote areas. The Montreal region also has a large amount of mobility, especially of workers living in the surrounding areas into the Montreal region. In fact, residents of the St.-Jérôme and the Joliette region usually work more hours in the Montreal region than in their own. Although the Montreal region is a net importer, mainly because of suburban workers, it is also a large exporter. If what the OCQ calls the Grand Montréal region is considered, there was a tendency to equilibrium between its exports and imports of manpower in this region up until the completion of the Olympic projects in 1976, and since then it has been a net exporter of manpower. However, according to the OCQ,

Montreal tends to export more highly skilled manpower:

> [La région de Montréal]... est également une des principales régions exportatrices de -main-d'oeuvre, en particulier de main-d'oeuvre qualifiée. (57)

It should be clear that interregional mobility is an important factor in the flexibility of the construction labour market. It means that the labour supply in a region is not limited to the residents of that region, but also includes workers coming from other regions, thus contributing to the oversupply of construction manpower. It also means that workers faced with unemployment in their region can seek work in other regions where there are temporary shortages because of booms; such as in Montreal during the summers of 1975 and 1981; and in James Bay. The regulations on mobility should not affect the availability of workers in boom periods, since mobility is permitted whenever there is a shortage of workers. These regulations were expressly designed to permit interregional mobility when the need for it arises.

IV.7 Summary and conclusions

IV.7.1 Summary

The supply of labour in construction can best be defined as a pool of workers available to work in construction. That pool includes all workers presently engaged in construction work added to all those looking for work in the industry. There are also potential additions to that pool: workers who have the requisite qualifications and experience to be construction workers, but who are not looking for construction work at a given time. Members of this potential labour force include workers who are working in other industries, some students, and during the winter a number of unemployed workers who do not wish to or are not able to work outside. These workers cannot be left outside of most considerations of manpower policy in construction.

The pool of workers is best viewed in terms of a large number of available workers, each with his own characteristics. A worker may have the qualifications and the willingness to work in more than one trade or in more than one region. This means that one cannot simply add up all the workers in each trade and region, and set up separate regional pools for each trade, since this would result in double counting of certain individuals. The pool of workers varies throughout the year. In summer, more workers are available. Students are looking for summer work, and tradesmen who prefer to work 'inside' during the winter

months return to the industry. In winter, on the other hand, the pool shrinks, not only as a result of returns to school and preference for working inside, but also possibly because of a discouraged worker effect, where unemployed construction workers do not believe there is work available in the industry, and hence stop looking in construction.

The pool must also be looked at from another dimension, that of region of work. There is a given pool for any region, some of it composed of residents of the region and the rest of residents of other regions who are available for work in the region in question. Any construction worker may be a member of a number of different regional pools.

To become a member of the pool, tradesmen must also have the requisite professional qualifications. Construction labour is not homogeneous, there are 23 recognized trades and a number of sub-specialties in each trade. In addition, there is a large number of so-called unskilled occupations, which often involve a fair measure of skill; linemen and shot-firers for example. Professional qualifications imply some means of training, hence the apprenticeship programs and the regulations on the certification of tradesmen. The 'unskilled' workers often need a considerable amount of specific training which they acquire on the job, while others are actually 'unrecognized' skilled trades which are regulated outside Regulation No. 1, which controls the training, apprenticeship and certification of Quebec tradesmen. A worker may have the requisite qualifications to

work in a number of trades, and this in fact is being encouraged by the OCQ because it permits workers to take on any number of jobs and would theoretically increase the chances of any particular worker of obtaining a job. (58) The training and apprenticeship program is not the only way skills are supplied in a given labour market. Migration and immigration of skilled tradesmen is also quite important, especially for Canada. Intra-provincial mobility is also important, over forty percent of Quebec construction workers work outside their region in any year. It would be hard to imagine how some regional labour markets would obtain the necessary manpower without that mobility.

The construction labour market is generally very loose; there clearly is an oversupply of workers at most times. Local shortages may sometimes develop in boom times, but these can usually be remedied by bringing in workers from other regions, or people in the potential construction labour force. The chronic oversupply means that there must be some way of apportioning the available work among the large number of workers. In other provinces, the construction union locals hold a tight rein on the local labour market, not letting in new workers when there is lack of work, and operating an employment service to members which ensures some measure of fairness in the distribution of available work. The multi-union structure in Quebec has prevented the effective functioning of union hiring halls, which depend on a monopoly of the individual union over labour in their

trade. Only a small number of highly skilled trades have been able to effectively establish a monopoly in Quebec. One of the major concerns of the union bodies has been to ensure some measure of employment security for their members, and this has resulted in the drawing up of a number of plans to enforce some kind of control over hiring. It culminated in the present system of work permits and quantitative control.

The inability of the two major union bodies to agree on control over hiring has made the intervention of the government inevitable. The QFL has sought to completely control any system that was set up, and this has obviously been unacceptable to its CSN rival. Government control over hiring entailed a major loss of bargaining power on the part of unions, by completely removing control over hiring from the collective bargaining process. In other provinces, the control over hiring halls is an important tool of the construction unions in their relations with the employers.

!V.7.2 Conclusion

Perhaps the most unique aspect of the supply of labour in Quebec is the government regulated controls on hiring. This has been criticized for a number of reasons. The most cogent criticism was that presented by Gérard Hébert. (59) He mentions three criticisms: first, the right to work can be considered a fundamental human right, and it should not be abrogated unless it affects the rights of others; second he deems it fallacious to imply that there is a fixed fund of hours which needs to be distributed; and, third, he believes

that construction acts as a shock absorber in the labour market, temporarily absorbing a number of people who need some short term work before they 'settle in'.

His first criticism that the right to work is a fundamental human right may be true, but, on the other hand, he recognizes the rationale for quantitative controls as being the same as seniority rules in other industries. The right of a younger worker to obtain a job may be in conflict with the right of an older one to retain his. In the same way, the right of a new worker to enter the construction industry may well be at the expense of an already established construction worker.

His second criticism that there does not exist a fixed demand for labour is not entirely accurate. He equates the idea that there is a fixed number of hours to be worked in construction to the classical wages fund theory, which held that there was only a certain amount of money available for wages, and any wage increase would result in less employment.

> Quand on veut enlever du travail à certains travailleurs pour le transférer à d'autres, surtout quand on veut retarder des travaux pour conserver des emplois pour les travailleurs permanents durant la prochaine période creuse, on raisonne comme s'il existait une quantité déterminée d'heures de travail qui doivent être exécutées peu importe quand ni par qui. Le raisonnement fait penser à la théorie du fonds des salaires de John Stuart Mill,... (60)

He contends that not permitting casual workers to take a job does not necessarily mean that a permanent worker will get

it. The work might be done on overtime or it might not be done at all. We have observed that the demand for labour is wage-inelastic; buyers of construction output have many more considerations on their minds beside the cost and availability of labour. Excess supply of labour means unemployment, not more jobs. In any case, under the present regulations, if permanent workers are not available, an employer can hire anyone residing in the region with the requisite qualifications.

His third criticism has some validity. The relatively high hourly wages paid to construction workers make entry into the industry attractive to casual workers since they can gain a relatively higher income than if they went to work in the low-paid, low security secondary labour market or at the bottom rung in a primary one. (61) In the present economy, with high involuntary unemployment, unskilled construction work (along with a few others such as taxi driving) has traditionally been used as a staging area for new workers, immigrants, and others who need temporary income or casual employment. The regulation on hiring has intentionally shut off this possibility in favour of workers with a permanent attachment to construction work.

But the questions raised by the regulation on hiring are more fundamental than that. They call into question the much broader issues of the scope of manpower policy and societal welfare. No one has seriously studied the negative effects of the construction hiring regulations, and not even

its positive aspects outside the unquestioned fact that it increased employment and therefore the income of unskilled construction workers. The OCQ has not done so, because, as was admitted by one of its officials, that agency has only been concerned with showing the good side of its 'baby'. (62)

While the regulation on hiring has helped permanent construction workers, those who had only a marginal attachment to construction work have obviously suffered. Many of these would-be marginal construction workers now suffer from longer periods of unemployment, and obtain their income from unemployment insurance or social welfare, at some cost to society. These excluded people include recent immigrants, new entrants in the labour force, and students. Students are now prevented from obtaining summer employment in the construction industry. This reflects itself in costs to society in the form of higher loan and bursary payments by the Quebec government. There has been a net transfer of income from these marginal workers to permanent construction workers.

In an unregulated labour market, there may well be a need for some kind of staging area for these marginal workers, but one may ask why construction workers should be the ones to pay for the costs of a malfunctioning labour market. In the presence of large unemployment, some individuals and possibly society must pay the costs. Nevertheless, individual and social costs and benefits of the construction hiring regulation still exist, and there is a

need for an objective analysis of its effects. An overall assessment of the regulation must await such a study. Only the benefits to construction workers have been documented at all, all its other costs and benefits are open to speculation.

Footnotes to Chapter IV

1. OCQ, Analyse de l'industrie de la construction au Québec, 1979, p. 48.

2. Calculated from data on average hours worked in OCQ data bank.

3. OCQ, Analyse de l'industrie de la construction au Québec, 1978, pp. 45-46.

4. OCQ, Analyse de l'industrie de la construction au Québec, 1977, p. 40.

5. Calculated from ibid., Tableau T-13, p. 79.

6. R.A. Jenness, Manpower in Construction, (Ottawa, 1975), p. 44.

7. OCQ' Analyse de l'industrie de la construction au Québec, 1977, p. 50.

8. OCQ, La stabilisation de la construction au Québec, (Montreal, 1978), p. 127-128, makes exactly this point. The discussion that follows the quoted statement provides some statistical evidence.

9. Just to mention a few: Gérard Hébert, Les relations de travail dans la construction au Québec, 2 Volumes, (Ottawa,1978); Goldenberg and Crispo, Construction Labour Relations, (n.p., 1968); Paul Malles, Employment Security and Labour Relations in the Canadian Construction Industry, (Ottawa, 1975); not to speak of the innumerable reports, studies, task forces, and commissions on the construction industry done in practically all the provinces, of which the Cliche Commission report is an example for Quebec.

10. This has been noted a large number of times, see for example, Goldenberg and Crispo, op. cit., p. 346.

11. Financial Post, March 14,1981, Special Report on Construction, p. S6.

12. Hébert, Volume I, op. cit., pp. 14-16.

13. Commission d'enquête sur l'exercice de la liberté syndicale dans l'industrie de la construction, Juge Robert Cliche, président, Editeur Officiel du Québec, 1975.

14. OCQ, Analyse de l'industrie de la construction au Québec, 1978, p. 21.

15. This has been noted by Hébert, Vol. I, op. cit., p. 21.

16. Commission Cliche, op. cit., pp. 347, 362, and passim.

17. Malles, op. cit., p. 86.

18. Ibid., p. 101.

19. Ibid., p. 102.

20. Ibid., p. 54, cited from The Advisory Board for the Building and Construction Trades Unions in Canada, "Causes, Effects, and Recommendations on Cyclical Instability in the Construction Industry", mémoire au Conseil Economique du Canada, septembre 1972, pp. 6-7.

21. For a more detailed description, see Hébert, op. cit., Vol. II, pp. 85-102. The following is based mainly on his description.

22. See ibid., p. 89, and Malles, op. cit., p. 55.

23. A.C. 1975 du 23 avril 1970, G.O.Q., 102, 18 (2 mai 1970), pp. 2568-2572.

24. A.C. 4119 du 4 novembre 1970, G.O.Q., 102, 45 (7 novembre 1970), pp. 6468-6486.

25. A.C. 2711 du 28 juillet 1971, G.O.Q., 103, 32, (7 août 1971), pp. 6289-6292.

26. A.C. 3297 du 31 octobre 1972, G.O.Q., 104, 45 (11 novembre 1972), pp. 9886-9893.

27. Commission Cliche, op. cit., p. 395.

28. Ibid.

29. Hébert, Vol. II, op. cit., p. 154; from La Presse, Thursday, 20 January 1977, pp. A-1 and A-6.

30. A.C. 3282-77 et AOC 3283-77, les deux du 28 septembre 1977, G.O.Q., 109, 43, (26 octobre 1977).

31. According to interviews of OCQ officials.

32. OCQ, Analyse de l'industrie de la construction au Québec, 1978, p. 24.

33. According to an interview with André Cournoyer of the OCQ.

34. Calculated from OCQ data bank.

35. Gary Becker, Human Capital - A Theoretical and Empirical Analysis with Special Reference to Education, (Washington, 1964).

36. Jenness, op. cit., pp. 33-35, presents evidence for this.

37. According to interviews with OCQ officials.

38. A.C. 3606 du 20 octobre 1971, G.O.Q., 103, 44 (30 octobre 1971), pp. 7805-7819.

39. A.C. 1551-76 du 30 avril 1976, G.O.Q., 108, 21 (30 avril 1976), pp. 2933-2952.

40. Ibid., pp. 2951-2952.

41. Ibid., p. 2938.

42. Interview with Jean-Luc Pilon of the OCQ. See also footnote 38 above.

43. For a discussion of this issue, see Hébert, op. cit., Vol. II, pp. 141-143.

44. Ibid., Vol. I, p. 175.

45. Interview with Jean-Luc Pilon of the OCQ.

46. A.C 1551-76, op. cit., p. 2936.

47. Calculated from OCQ data bank.

48. A.C. 1576-74 du 1er mai 1974, G.O.Q., 106, 20, Section IV.

49. Loi des mécaniciens de machines fixes, S.R.Q., 1974, c. 157.

50. Loi des appareils sous pression, S.R.Q., 1964, ch. 156.

51. Jenness, op. cit., p. 48.

52. Economic Council of Canada, Toward More Stable Growth in Construction, (Ottawa, 1974), p 72.

53. Hébert, Vol. I, op. cit., p. 101.

54. I know this from personal experience of working as a labourer in that region.

55. OCQ, Analyse de l'industrie de la construction au Québec, various years; Appendix table on: 'Salaires versés aux salariés de la construction selon les régions de domicile et de travail'.

56. Obtained from OCQ, Analyse de l'industrie de la construction au Québec, 1974 to 1980 issues.

57. Ibid., 1974 issue, p. 72.

58. OCQ, Stabilisation..., op. cit., pp. 131-132; and ibid., 1980 issue, p. 60.

59. Hébert, op. cit., Vol. II, pp. 160-163.

60. Ibid., p. 162.

61. The dual labour market theory asserts that there exist two different kinds of labour markets--primary and secondary--with little mobility between them. The primary labour market is characterized by employment stability, relatively high wages or salaries, a promotion ladder, and better working conditions. The jobs in this market are usually in large unionized firms. The secondary labour market, on the other hand, is characterized by low paying jobs, unstable employment, and little or no chance of advancement. The idea of a dual labour market is most extensively presented in P.B. Doeringer and M.J. Piore, Internal Labour Markets and Manpower Analysis, (Lexington, Mass., 1971).

61. According to an interview with André Cournoyer of the OCQ.

Chapter V Income Characteristics of Construction Workers

V.1 Introduction

Market forces, unions and employer associations and government regulation have produced a pattern of wages and income distribution that is examined in this chapter. The income a worker receives from construction is the product of the number of hours he works and the hourly wage he receives. The demand for structures coupled with the state of technology and a number of institutional factors determines the overall number of hours worked in each trade, and, given wages, the total employment income of all construction workers. The distribution of available working hours is set by supply side factors, and hence so is the distribution of income of those who work in construction.

Section 2 of this chapter examines wage developments in the Quebec construction industry. A number of issues are considered: real wage growth, changes in relative wage differentials, and the growth in importance of fringe benefits.

Section 3 reviews the hours worked and the income of construction workers. Three issues are considered. First, the supply side factors which are associated with the distribution of income among construction workers are examined. Second, the sources of income outside construction are considered. Very few construction workers work a full year, and most of them must obtain income from other sources.

The only study of the income characteristics of construction workers that included income from outside construction was done by Gérard Hébert for the Economic Council of Canada using 1972 income tax and OCQ data. (1) Hébert's study is reviewed and summarized in this section. Finally, the Cliche Commission's recommendation of a guaranteed annual income for construction workers is examined.

V.2 Wages

V.2.1 Average basic hourly wage rates

Table V-1 presents average nominal and real basic hourly rates for construction workers in Montreal.

TABLE V-1
AVERAGE NOMINAL BASIC WAGE RATES, BASIC RATES IN 1971 DOLLARS, AND PERCENT INCREASES IN REAL BASIC WAGE RATES, CONSTRUCTION, MONTREAL, 1971 DOLLARS, 1962-1980

YEAR	NOMINAL BASIC RATE	REAL BASIC RATE	PERCENT INCREASE
1962	$2.47	$3.25	5.5
1963	2.57	3.33	2.4
1964	2.66	3.38	1.5
1965	2.85	3.54	4.7
1966	3.13	3.75	5.9
1967	3.62	4.18	11.4
1968	4.05	4.50	7.7
1969	4.25	4.52	0.4
1970	4.64	4.77	5.5
1971	4.94	4.94	3.6
1972	5.17	4.93	-0.2
1973	5.61	4.98	1.0
1974	6.12	4.90	-1.6
1975	7.30	5.27	7.6
1976	8.06	5.41	2.7
1977	9.17	5.70	5.3
1978	10.04	5.73	0.5
1979	10.57	5.53	-3.4
1980	11.60	5.51	-0.4

Source: Calculated from: Statistics Canada, Construction Price Statistics, Service Bulletin, Vol. I, No. 6, Catalogue #62-006; Construction Price Statistics, Catalogue #62-007; and Cansim, Matrix # 7000, Consumer Price Index, Montreal.

The wage gains construction workers made in the 1960's considerably outstripped increases in the cost of living. As Table V-1 shows, the average base rate in 1971 dollars for construction workers went from $3.25 in 1962 to $4.94 in 1971, a real increase of 52% in ten years, or an average of 4.3% a year.

The rate of increase of real wages fell considerably in the 1970's. Construction workers saw their purchasing power diminish from 1971 to 1975. A cost of living increase was obtained in 1975 only after a number of illegal strikes and illegal 'mini' collective agreements with individual employers. Real wages increased from 1975 to 1978, but they fell again in 1979 and 1980 because of increasing inflation in these two years. The downturn in construction did not give workers enough bargaining power to obtain real wage increases. In the 1970's decade, real wages rose by only 11.5% or at an average annual rate of 1.1%.

Wage increases are to some extent related to the state of the demand for structures and hence the demand for labour. When collective bargaining occurs in good years, the unions are in a position to demand fairly large wage increases since the employers cannot take a long strike without very large losses, and wage increases can usually be passed on to buyers. As Jenness put it:

> Because of competitive pressures, the high over-head cost of strikes that leave whole projects idle, and the ability to pass wage increases on to the ultimate buyer, individual contractors and even employer

associations are not inclined to prolonged confrontations. (2)

This seems to be what was occurring in the 1960's booming conditions, except for the last three years of that decade when workers managed to obtain substantial wage increases despite slack demand conditions.

The collective bargaining that occurred in the 1970's was done mainly in downturn years, except in 1973, where, in any case, the unexpected inflation of the following two years led to real wage losses. In the boom year of 1975, construction workers managed to obtain an 85 cent an hour increase because they were in a position to effectively but illegally strike. The 1976 negotiation was postponed by the provincial government to the autumn; the decree was extended to December of 1976 instead of the original date of May first. The original date would have given the construction workers considerable leverage, since it was felt that a strike had to be avoided at all costs because of delays in Olympic construction. By December 1976, the downturn was already beginning to be felt, and construction workers received a lower wage increase than they would have only a few months before. The decree was again extended beyond its expiry date in 1979, with the proviso of a 40 cents an hour raise for all workers. This was of course not enough to compensate for increases in the cost of living, but the unfavourable demand conditions made it difficult for workers to insist on more.

Although wage increases in construction are clearly affected by the demand for labour, the correspondence between the level of demand and the amount of wage increases is not perfect. One reason for this is that the duration of collective agreements or decrees 'freezes' wage increases for three years. Market pressures can only have an effect on wages when contracts are being negotiated. However, even when wage negotiations occur in downturn years, market pressures may still not succeed in keeping wage increases down. Despite the downturn in construction activity in 1968, workers still managed to obtain a real raise of 7%. The same thing happened in 1977; wages rose by 5.3% in real terms despite the downturn. This suggests that the construction labour market in the short run does not behave as competitive theory would predict.

V.2.2 Changes in relative wages

The real wage increases construction workers obtained in the 1960's were relatively higher than those obtained by workers in other industries. This resulted in widening the relative wage differential between construction workers and manufacturing workers. This is shown in Table V-2 which compares average hourly earnings of construction workers and of hourly paid manufacturing workers in Quebec.

TABLE V-2
AVERAGE HOURLY EARNINGS OF HOURLY RATED WAGE EARNERS, CONSTRUCTION AND MANUFACTURING, QUEBEC, 1961-1980

YEAR	AVERAGE HOURLY EARNINGS IN CONSTRUCTION	AVERAGE HOURLY EARNINGS IN MANUFACTURING	PERCENTAGE RATIO OF MANUFACTURING TO CONSTRUCTION HOURLY EARNINGS
1961	1.93	1.65	85.5
1962	2.08	1.70	81.7
1963	2.18	1.75	80.3
1964	2.31	1.81	78.4
1965	2.49	1.88	75.5
1966	2.73	2.02	74.0
1967	3.21	2.16	67.3
1968	3.44	2.33	67.7
1969	3.66	2.50	68.3
1970	4.01	2.68	66.8
1971	4.51	2.89	64.1
1972	5.02	3.09	61.6
1973	5.58	3.35	60.0
1974	6.34	3.86	60.9
1975	7.64	4.56	59.7
1976	8.51	5.16	60.6
1977	9.63	5.77	59.9
1978	10.51	6.22	59.2
1979	11.18	6.80	60.8
1980	12.13	7.54	62.2

Source: Statistics Canada, Employment, Earnings and Hours, Catalogue #72-002; and Employment, Earnings and Hours, Seasonally Adjusted Series, Catalogue #72-206.

The existence of a differential between construction wages and manufacturing wages can be explained by the fact that construction workers are more skilled and have worse working conditions than workers in manufacturing. However, this does not explain why, since 1961, construction workers

have been able to considerably increase their wages relative to other workers. While manufacturing workers earned 85.5% of construction workers' hourly earnings in 1961, this percentage had fallen to 62.2 in 1980. However, most of this increase in relative wages occurred in the 1960's; the differential has been fairly constant since 1972, the ratio of manufacturing to construction wages hovering at around 60%. Because of bettering working conditions in the industry, (i.e. decreasing seasonality, and better safety laws) competitive theory would predict that the differentials would narrow.

Differentials among trades

Increases in average earnings of all construction workers mask some important trends in the wage structure. Between 1961 and 1976, there was a tendency for relative wage differentials between trades to narrow. Table V-3 presents a number of indices of relative wages. Pipefitters are among the highest paid construction workers, only elevator mechanics, who are unimportant in number, earn more, and electricians, structural steel erectors,and boilermakers earn as much. Bricklayers, carpenters and painters are presented as examples of other important trades, while labourers are, of course, the lowest paid. Tinsmiths and structural steel erectors are presented because they do not follow the general rule. There was already a tendency to narrow wage differentials between low paid workers and the highest paid in the 1960's, and a tendency to widen the gap between

bricklayers and other relatively highly paid workers and the highest paid pipefitters.

TABLE V-3
INDICES OF RELATIVE WAGES OF SELECTED CONSTRUCTION TRADES, MONTREAL, SELECTED YEARS, 1961-1979, PIPEFITTERS=100.0

YEAR	PIPEFITTER	BRICKLAYER	CARPENTER	PAINTER	LABOURER	TINSMITH	STRUCTURAL STEEL	ELECTRICIAN
1961	100.0	97.3	89.7	85.9	66.9	89.7	97.3	
1964	100.0	96.6	91.3	84.9	70.8	91.3	100.0	
1968	100.0	95.8	91.0	88.8	73.0	92.2	91.3	
1969	100.0	95.6	91.2	88.8	72.9	95.4	91.4	
1971	100.0	96.0	92.0	89.8	75.4	95.8	94.0	
1975	100.0	97.3	94.6	93.1	83.4	97.2	100.0	
1977	100.0	95.0	91.6	89.6	75.2	97.8	100.0	
1979	100.0	93.9	89.9	87.8	72.6	98.1	100.0	

Source: 1961-68: Statistics Canada, Construction Price Statistics, Service Bulletin, Vol. III, No. 6, Catalogue #62-206
1969: Décret relatif à la construction, région de Montréal, A.C. 3132, Gazette Officielle du Québec, 27 décembre 1969.
1971: Décret, A.C. 1424, G.O.Q., 17 avril 1971.
1975: Décret, A.C. 3984, G.O.Q., 14 novembre 1973, modifié par A.C. 204, G.O.Q., 17 janvier 1975
1977: Décret, A.C. 1287-77, G.O.Q., 27 avril 1977.
1979: OCQ, Analyse de l'industrie de la construction au Québec, 1979, p.116.

This table shows that inter-trade wage differentials have narrowed from 1961 to 1975. Between 1969 and 1975 most trades obtained the same nominal wage increase. All trades except structural steel erectors obtained raises totalling

$2.86 an hour between May 1971 and October 1975. Higher paid workers such as pipefitters and electricians saw their relative position decline considerably with respect to lower paid workers.

Larger wage increases were given to structural steel erectors in order to permit them to regain the relative position they had in the early sixties. Tinsmiths, unlike most other lower paid trades, did not see their relative position diminish after 1975. Their relative wage continued to increase until May 1981 to permit them to earn the same wage as pipefitters.

For the duration of the 1976 decree (1976-1978), percentage wage increases followed exactly the opposite pattern as they had in the previous two decrees. The higher paid workers received not only higher nominal wage increases, but also higher percentage wage increases in order to recapture their lost relative position. For example, labourers only obtained increases of 8.1%, 6.4%, and 5.2% in 1976, 1977, and 1978 respectively, while pipefitters obtained 12.9%, 12.9% and 10.6%. This was done following complaints by the higher paid trades that their relative position had been badly eroded, especially with respect to other provinces.

Larger wage increases for higher paid workers resulted in substantially worsening both the relative position and the real wage of the lowest paid workers. Had labourers bargained alone, it would be difficult to see them signing

agreements that would actually reduce their real wage when other workers in the same industry were obtaining real wage gains.

It is also possible that in the early seventies, higher paid workers would have fared better by themselves. In every year between 1971 and 1975, plumbers' and electricians' real wages actually declined. This may not have occurred if they had been bargaining on their own, and neither would they have easily accepted obtaining the same cents per hour increase as lower paid workers. Decreases in percentage differentials could nevertheless have occurred, but they would perhaps have been more gradual as in other provinces, without abrupt swings from substantial narrowing followed by widening to enable higher paid workers to make up some of their relative loss as occurred in Quebec.

The narrowing of wage differentials has also occurred in Toronto, where trades bargain separately. Table V-5 compares the wages of labourers with those of pipefitters for both Montreal and Toronto.

TABLE V-4
INDICES OF RELATIVE WAGES OF LABOURERS COMPARED TO PIPEFITTERS, MONTREAL AND TORONTO, 1961-1980, PIPEFITTERS=100.0

	MONTREAL	TORONTO
1961	66.9	59.4
1962	69.7	61.4
1964	70.8	63.2
1966	70.0	65.2
1968	73.0	67.6
1970	73.7	65.5
1972	76.1	68.6
1974	79.4	78.1
1976	83.8	76.6
1978	72.7	79.1
1980	73.1	81.3

Source: 1961-1970 - Calculated from Statistics Canada, Construction Price Statistics Service Bulletin, Vol. I, No. 6, Catalogue # 62-006. 1972-1980 - Calculated from Statistics Canada, Cansim Matrix No. 960, Construction Basic Wage Rates.

It shows that the narrowing of wage differentials between higher paid and lower paid workers was not only a Quebec phenomenon, it also occurred in Toronto. From a much lower relative wage in 1961, Toronto construction labourers have gone to a higher relative wage than labourers in Quebec. Labourers' wages in Toronto went from 59.4% of plumbers' wages in 1961 to 81.3 in 1980, compared to, respectively, 66.9% and 73.1% in Montreal.

This narrowing of differentials may have important effects on the supply of workers. It may be argued that apprenticeship for the lower paid trades may be discouraged, because entrants in the construction industry labour market

would be more inclined to obtain immediate high wages as a labourer, rather than serve a four or more years' apprenticeship at much lower wages to only obtain a 20% higher wage at the end of the process, especially since the difference in take-home pay would be much less than that. Narrowing of intertrade wage differentials may have the effect of discouraging entry into the higher paid trades with more difficult qualification conditions. However, pipefitter tradesmen have much higher annual incomes than labourers; the average income from construction for pipefitters in 1979 was $15,323 and $9,984 for labourers. Even apprentice pipefitters made more than labourers, $10,400, although they also worked more hours. (3) So the disincentive of smaller wage differentials, if it exists, is likely to be small.

Interprovincial wage differentials

The relative position of Montreal construction workers compared to Toronto workers is presented in Table V-5. The four trades presented in this table accounted for 54.2% of the number of construction workers in Quebec in 1979.

TABLE V-5
MONTREAL BASIC WAGE RATE AS A PERCENTAGE OF THE TORONTO BASIC WAGE RATE, CARPENTERS, PLUMBERS, ELECTRICIANS AND LABOURERS, 1961-1980.

YEAR	CARP-ENTERS	PLUM-BERS	ELEC-TRICIANS	LABOURERS
1961	79.1	77.4	70.2	87.1
1962	81.5	80.3	72.6	91.0
1963	82.5	80.4	74.1	91.9
1964	82.7	81.2	76.6	90.9
1965	83.8	82.7	78.2	90.7
1966	86.9	87.6	80.5	94.0
1967	93.8	96.5	90.8	101.4
1968	99.0	98.7	97.4	106.5
1969	92.4	91.6	92.9	99.7
1970	88.2	86.6	86.2	97.4
1971	79.6	82.1	80.4	92.7
1972	76.7	77.8	74.5	86.3
1973	75.1	79.4	73.5	82.5
1974	75.4	80.7	75.2	82.1
1975	83.9	82.7	79.3	91.6
1976	82.4	79.3	76.7	86.9
1977	82.7	85.2	82.7	83.3
1978	85.8	90.0	87.1	82.6
1979	83.5	90.1	88.3	79.8
1980	88.4	91.8	91.5	82.5

Source: 1961-1971 - Calculated from Statistics Canada, Construction Price Statistics Service Bulletin, Vol. 1, No. 6, Catalogue # 62-006.
1971-1980 - Calculated from Statistics Canada, Cansim Matrix No. 960, Construction Basic Wage Rates.

From 1961 to 1968, the wages of these Montreal construction workers were improving compared to Toronto; almost reaching the Toronto level in 1968 (surpassing it for the labourers). After that year, Montreal wages declined relative to Toronto's. The relative decline was arrested after 1976 for plumbers and electricians because of the higher wage

increases these trades received. However, the smaller wage increases for labourers since 1976 means that their relative position has been worsening since 1976. In fact, their relative position in the years following 1976 was worse than in the previous fifteen years, and their real wage has been falling since 1976. The carpenters' relative position has fluctuated and their relative wage is better than in the early 60's, but it is below the peak reached in 1968.

There was some justification on the part of electricians and other higher paid workers to complain about the decline of their relative position compared to Toronto workers in the mid-seventies, although the decline had not gone very far.

Interregional wage differentials

Wage differentials exist not only between provinces, but until 1978, they also existed within Quebec. Before 1970, each region had its own decree and its own definitions of trades, and hence different wage rates. In the first negotiation under the 1968 Loi des relations de travail dans l'industrie de la construction (Bill 290), a demand for wage parity throughout the province was put forward. (4) The idea of province-wide parity was adopted by the government in the 1970 decree, where it endeavoured to implement parity gradually by giving larger wage increases to workers in regions outside Montreal. By 1976, only six regions out of fifteen had lower wages than in Montreal in a small number of

specialized trades. Complete parity of wages throughout the province was achieved in 1978.

In any case, in the 1970's, some of the difference in income of construction workers among regions was due to wage differences, but by 1978 this could no longer be true. Differences in income between members of the same trade in different regions could only be due to differences in annual hours worked, hence to the demand and supply of that particular trade in each region.

Wage parity in the construction industry coexists with substantial wage disparities among workers in similar occupations in other industries among the different regions of Quebec. Neo-classical economists would question the wisdom of equalizing construction wages, since it would presumably lead to a mis-allocation of resources. The same wage in Montreal and Gaspé may reduce employment in the latter region because the advantages to locating in Montreal would not be suitably compensated by lower wages in Gaspé. Hence, wage parity may contribute to regional disparity, according to this type of argument. However, the low wage-elasticity of construction demand indicates that this effect would be very small. But Hébert noted a substantial increase of the use of prefabricated or mobile houses in certain regions, and he suspects that high construction wages compared to those in the pre-fab housing industry may be one of the causes of this. (5)

V.2.3 Fringe benefits

So far, only base rates or hourly earnings exclusive of fringe benefits have been considered. It should be noted that fringe benefits have been increasing considerably. Table V-6 compares the basic rate with the basic rate plus a number of supplements included by Statistics Canada in its construction wage data.

TABLE V-6
UNION WAGE RATES, BASIC RATES AND BASIC RATE PLUS SELECTED SUPPLEMENTS, MONTREAL, AVERAGE OF 16 CONSTRUCTION TRADES, 1961-1980.

Year	Basic rate	Basic rate plus suppl.	Supplements as a percent of basic rate
1961	$2.31	$2.39	3.5
1962	2.47	2.57	4.0
1963	2.57	2.73	6.2
1964	2.66	2.82	6.0
1965	2.85	3.02	6.0
1966	3.13	3.35	7.0
1967	3.62	3.97	9.7
1968	4.05	4.44	9.6
1969	4.25	4.66	9.6
1970	4.64	5.07	9.3
1971	4.94	5.49	11.5
1972	5.17	5.79	12.0
1973	5.61	6.27	11.8
1974	6.12	6.97	13.9
1975	7.30	8.56	17.3
1976	8.06	9.40	16.6
1977	9.17	10.63	15.9
1978	10.04	11.60	15.5
1979	10.57	12.18	15.2
1980	11.60	13.35	15.0

Source: Statistics Canada, Construction Price Statistics Service Bulletin, Vol. I, No. 6, Catalogue # 62-006, and Construction Price Statistics, Catalogue #62-007.

Supplements have increased considerably compared to the basic rate. In 1961, selected the supplements were only 3.5% of the basic rate, but by 1975, the selected supplements had reached 17.3% of that rate. The selected supplements only

include those that are counted in cents per hour such as vacation pay, pension, and insurance. Total compensation is greater than that presented by these data since what Statistics Canada calls variable costs such as unemployment insurance, Quebec Pension Plan contributions, and workmen's compensation, are excluded.(6)

In the Quebec construction industry, fringe benefits include 10% vacation pay, life insurance, salary insurance in the case of sickness, supplementary health insurance, and a pension plan. The uniformization and portability of fringe benefits was made possible by the centralization of the regulation of the industry under the C.I.C. (Commission de l'Industrie de la Construction) and later under the OCQ (Office de la Construction du Québec). Employers had to contribute 45 cents an hour for these benefits for the duration of the 1977 decree (from 1977 to 1979). In addition, employees had 25 cents an hour deducted from their pay for these benefits. There is also a one cent an hour contribution for a special indemnity fund to compensate workers for the salary and benefits lost because of jury service or employer bankruptcy. The pension plan is completely portable within the Quebec construction industry. A Quebec construction worker can now work in any trade or region without losing any of his pension benefits. The other usual government administered fringe benefits, such as the Quebec Pension Plan, Workmens' Compensation and Unemployment Insurance also apply to construction workers.

V.3 Income and hours worked

The main reason for quantitative controls of manpower is to ensure adequate employment and consequently adequate income for construction workers. Despite their relatively high wage rates, on average construction workers do not receive a high income from construction work. For example, the average income of construction workers in Quebec was only $12,654 in 1979. This is due to the small number of hours construction workers work on average in the industry. The average was around 1,000 hours a year between 1972 and 1979, while a normal full time year's work would mean 1960 hours a year. The average nominal and real income of construction workers along with the average number of hours worked is presented in Table V-7.

TABLE V-7
AVERAGE REAL AND NOMINAL ANNUAL INCOME AND AVERAGE ANNUAL HOURS WORKED PER WORKER, QUEBEC CONSTRUCTION WORKERS, 1971 DOLLARS, 1972-1979.

YEAR	NOMINAL INCOME	REAL INCOME	ANNUAL HOURS
1972	$ 4,545	$ 4,337	924
1973	5,409	4,799	972
1974	6,628	5,302	989
1975	8,317	6,005	1036
1976	8,449	5,674	931
1977	10,145	6,309	999
1978	11,285	6,445	1004
1979	12,645	6,618	1070

Source: OCQ data bank and Cansim Matrix #7000, Consumer Price Index, Quebec.

Table V-8 presents a summary of the distribution of

workers according to hours worked. As can be seen in this table, only a small proportion of workers work for what can be considered a full year. These data show that even in the best year of 1975, only 13,136 workers (or 8% of workers who worked in construction that year), worked over 2,000 hours. The great majority of construction workers were either unemployed or otherwise occupied during part of the year. It can therefore be expected that many of them received income from other sources. However, before considering these other sources, the factors associated with the distribution of income within construction will be examined.

TABLE V-8
PERCENTAGE DISTRIBUTION OF WORKERS ACCORDING TO HOURS WORKED, QUEBEC, 1972-1980.

	HOURS WORKED					
YEAR	LESS THAN 500	500-999	1000-1499	1500-1999	OVER 2000	TOTAL
1972	34.9	20.4	18.5	19.9	6.3	100.0
1973	32.9	19.5	18.1	21.6	7.9	100.0
1974	32.6	20.0	18.0	22.7	6.6	100.0
1975	30.2	20.5	18.2	22.4	8.7	100.0
1976	32.3	23.0	21.5	19.1	4.1	100.0
1977	30.7	22.5	20.0	20.8	6.0	100.0
1978	27.7	23.8	22.7	20.6	5.2	100.0
1979	22.4	23.8	25.9	22.8	5.1	100.0
1980	23.8	25.7	24.5	21.7	4.3	100.0

Source: OCQ, Analyse de l'industrie de la construction au Québec, 1974 to 1980 issues.

V.3.1 Factors affecting income

The factors that are associated with an individual worker's income from construction include trade or occupation, region of residence, geographic mobility, inter-employer mobility, and availability to work. Each of these factors will be examined in turn.

Trade is important in explaining variation in income among construction workers, because both the demand and the supply are different for each trade. In general, the more skilled the worker, the greater his chances of working more hours and earning a higher income. This is reinforced by the fact that the more skilled workers receive a higher wage. Labourers are at the bottom of the distribution. They work less on average than other workers, and they receive a lower wage. In the past, part of the reason for lower average hours for labourers was the lack of hiring controls in that occupation. With the implementation of the 1978 regulation on hiring, these workers have seen their average hours and their average income increase considerably. Despite the fact that real wages fell after 1975, labourers' average income increased after 1977 because of the increase in the number of hours worked by each labourer. This should not hide the fact that with a decline in real hourly wages, labourers had to work more hours to maintain the same real income. Table V-9 presents the income of labourers along with a comparison of labourers' and all trades' average income.

TABLE V-9
AVERAGE REAL AND NOMINAL INCOME OF LABOURERS AND LABOURERS' INCOME AS A PERCENTAGE OF AVERAGE CONSTRUCTION WORKERS' INCOME, QUEBEC, 1971 DOLLARS, 1973-1980.

Year	Nominal Income	Real Income (1971 dollars)	Percent of Average Construction Income
1973	$3,399	$3,016	62.8%
1974	4,078	3,262	61.5
1975	5,978	4,316	71.9
1976	5,823	3,911	68.9
1977	6,446	4,008	63.5
1978	7,316	4,178	64.8
1979	9,405	4,919	74.3
1980	10,367	4,975	76.1

Source: Calculated from OCQ data bank and Cansim Matrix # 7000, Consumer Price Index, Quebec.

The effects of the regulation on hiring on labourers are clearly demonstrated in this table. Not only did real annual income rise despite a fall in real hourly wages, but labourers' income relative to other construction workers also increased. From 1973 to 1978, labourers' income was below 70% of all construction workers average income, except for the boom year of 1975. But in 1979 and 1980, the income of labourers rose to respectively 74.3% and 76.1% of average construction income.

Region of residence also has an important effect on average hours worked. It appears that, as a rule, the more populous the region, the higher the average hours worked. In this manner, residents of the Montreal region usually work

more hours on average than residents of other regions. The exceptions are 1972, 1974, and 1978. In the first two of these years, the Seven-Islands region came first because of the large hydro and mining projects. In 1978, the Quebec City region came first, and that city has been second or close to second in most other years. The regions that form part of the Grand Montréal region (St.-Jérôme, Joliette, Sorel, St.-Hyacinthe, and Montreal) also have high average hours. Hull has consistently been the region with the lowest average hours, and is the major exception to the rule that more populous regions entail higher average hours. The low level of hours in the Hull region mainly reflects the inter-provincial mobility of its construction workers, who often find work in Ottawa and whose out of province hours are not counted in the OCQ statistics.

Geographic mobility also increase the chances of a worker to find work, and, consequently, to obtain a higher income. However, mobility is also related to trade, and the most mobile trades are also usually those that work the most hours on average. In 1979, workers who worked exclusively in their region of residence earned an average of $10,082, while those who worked in one additional region earned $12,310, as is shown in Table V-10. This table shows the effect of geographic mobility on income.

TABLE V-10
AVERAGE ANNUAL INCOME OF CONSTRUCTION WORKERS ACCORDING TO NUMBER OF REGIONS WORKED IN, QUEBEC, 1979.

	All Workers	Skilled Trades	Unskilled Occupations
Region of residence exclusively	$10,082	$11,644	$ 7026
Region of residence and other regions			
one other region	12,310	13,339	10,238
two other regions	14,979	15,501	14,012
three other regions or more	17,848	18,218	16,974
Other regions exclusively			
one region	12,490	14,056	11,026
two regions	14,625	15,916	13,206
three or more regions	18,158	17,628	18,824
Total All workers	11,286	12,604	9,087

Source: OCQ, Analyse de l'industrie de la construction au Québec, 1979.

The effect of geographic mobility is large for everyone, but it is even larger for unskilled workers. The average unskilled worker who works in an additional two regions shows a doubling of income.

The OCQ has noted that geographic mobility depends not only on trade but also in which sector of the construction industry a worker is mainly employed. (7) Workers who work mainly in residential construction tend to stay put in their region while those involved in major engineering projects have to be more mobile.

Inter-employer mobility is also related to income. Since the construction of most structures take less than a year and employees are often laid off at the end of a project, one would expect interemployer mobility to be positively related to hours worked and income. Table V-11 cross tabulates interemployer mobility with income.

TABLE V-11
AVERAGE ANNUAL INCOME OF CONSTRUCTION WORKERS ACCORDING TO NUMBER OF EMPLOYERS, QUEBEC, 1977 AND 1979.

	Year	
Number of Employers	1977	1979
1 employer	$ 9,608	$12,182
2 employers	11,037	13,575
3 employers	11,736	13,683
4 employers	12,618	13,527
5 employers	12,897	14,043
6 employers or more	13,744	13,400
All workers	10,145	12,653

Source: OCQ, Analyse de l'industrie de la construction au Québec, 1977, 1979.

This table shows that the positive relation holds, but it is not very strong for a number of reasons. First, employees may not be laid off at the end of a project, but may be transfered to another, so workers who who work for only one employer may nevertheless find continuous employment. Second, changing employers usually entails a period of unemployment, so the more often a worker switches employers, the larger the number of periods of unemployment. This effect is reflected in the fact that workers who worked for more than six employers in 1979 actually earned less than those who worked for between two and five employers.

Availability for work of any particular worker is also obviously a determinant of his income. It depends on a number of factors such as his health, his age, whether he is going back to school, or entering another industry, and employment opportunities elsewhere. It is difficult to obtain estimates of availability to work, and no data on these factors exists.

This notion of availability is closely related to the way the system of quantitative controls works. The systems of control over hiring are based on the idea that there are two kinds of people working in construction: 'real' or permanent construction workers, and people who only have a marginal or temporary attachment to the construction industry. The systems of control over hiring have attempted to give priority in employment to the former and to exclude the others as long as permanent workers are available. The

criterion used in Quebec to distinguish permanent and marginal workers is hours worked in the previous year or years. Presently, any worker who has worked in construction more than 500 hours in the previous year is considered a permanent construction worker. This criterion has varied; in Judge Gold's arbitration it was 800 hours, and the Cliche Commission recommended 900 hours. (8) Needless to say, these criteria are to a great extent arbitrary. Gérard Hébert did a study of incomes of construction workers in 1972, and his data indicates that there is no sharp break, but rather a continuum between workers who earn most of their income in construction and those who do not. (9) In addition, he found that those who earn little in construction, also have little income from other work.

V.3.2 Non-construction income

Hébert's study is quite valuable as it is the only one that examines the incomes of construction workers outside construction, and it presents masses of data, unfortunately only for 1972. He found that construction workers obtained 10% of their income from unemployment insurance, which is not surprising, given the transitional nature of construction employment. Overall, construction workers received 75% of their work income from construction, 10% from unemployment insurance, and the rest from other employment. (10) Skilled tradesmen obtain 80% of their income from construction, 5 to 10% from unemployment insurance, and the rest from other

employment. Unskilled occupations received only 65% of their income in construction and 25% from other employment, and 10% from unemployment insurance. Hence, skilled tradesmen are more attached to the construction industry than unskilled workers.

Among those with the lowest income from construction, income from other sources is more important than income from construction. However, people who have low income from construction also have low overall income from employment. (11) This perhaps reflects the then large number of students who obviously do not earn very much during the year and people in search of a temporary income to tide them over.

In 1972, those earning less than $2,000 in construction (corresponding roughly with less than 500 hours a year) earned only 23.6% of their income in construction, 51.7% in other industries and 24.7% from unemployment insurance. Those earning over $4,000 (corresponding roughly with 1,000 hours or more a year) obtained 89.2% of their income from construction work and only 4.9% from other employment. (12) Hence, a criterion of 1,000 hours in construction should include mostly those workers whose foremost source of income is construction work. Those who work less than 500 hours are mainly marginal workers for whom construction work is relatively less important as a source of income than work in other industries. The status of those who work between 500 and 1,000 hours is not clear; they obtain a substantial

proportion of their income from construction. All this is to underline the artificiality of any criterion based on hours worked. Many workers in the less than 500 hours class may depend much more on construction work than some in the over 1,000 hours class, simply because they are poorer. It should be noted that outside work is quite prevalent among construction workers; of all workers who worked in construction in 1972, 55% had income from other employment. This percentage increases as income from construction decreases and vice-versa. (13)

These data, because they seem to be smoothly continuous, cannot give us any point at which permanent construction workers can be separated from marginal ones. Perhaps a better handling of statistical methods would make this possible. Hébert's study was done only for 1972, and it would be interesting to examine how income has behaved over the past decade, and especially to look at the effects of the 1978 regulation on hiring on the income distribution of construction workers. However, this can only be done in the future, as the regulation on hiring is fairly new and the Ministère du Revenu du Québec will not let anyone study income tax data for any year until at least three years after. (14) It would also be interesting to find out more about the marginal workers: what their occupations are outside construction, whether they belong to the secondary low-paid labour market, how many are students, and what effects the regulation on hiring has had on them.

V.3.3 Employment and income security--The Cliche Commission recommendations

As has been noted in Chapter IV of this thesis, the Cliche Commission made recommendations regarding employment security in the Quebec construction industry because it rightly recognized that much of what it called the 'chaos' in the industry was due to workers' insecurity of income and employment. (15)

The Cliche Commission recommended that a system of guaranteed income be implemented in the construction industry, similar to the one that exists for longshoremen. Workers would be divided into three categories: 'A' workers, who would be guaranteed a full 50 weeks' salary; 'B' workers, who would be guaranteed nine months' salary; and 'C' workers without any income guarantee. According to the Commission's calculations, this program would have cost $508,637 for electricians, $546,655 for carpenters, and $11,878 for heavy equipment operators in 1974. (16) This would have been the cost of supplementary unemployment benefits, over and above the cost of regular unemployment insurance benefits which workers presumably already received. This low calculated cost is due to a number of reasons, three of which are described below.

First, as Hébert pointed out, this low cost reflects the fact that most potential recipients of this proposed program already obtain close to a full year's income from construction employment and unemployment insurance benefits. (17)

Second, 1974 was an upturn year, and costs would have been much higher in a downturn year, 1976 for example, where a large number of workers who worked the required hours in 1975 could not find work.

Third, this system is based on a number of very strict conditions that need to be met for it to work as planned. These conditions include almost perfect mobility of workers, the obligation to work whenever an opening is offered, a centralized pay system, good manpower planning, and centralized hiring. If any of these conditions were not met, or could be circumvented, the costs would soar.

This type of system has worked for longshoremen, but it is much easier to implement in their case because there is a small number of them (a few thousand compared to over 100,000 in construction) and longshoremen all work in one geographic location.

In all, it is an intriguing plan, but probably not yet feasible because of the complexity of the construction industry. For such a system to work, one would need much better manpower planning and a greater measure of stability than exists at present in the industry. Nevertheless, it has the merit of recognizing and attempting to solve the basic problem for Quebec construction workers: insufficient employment and income.

Footnotes to Chapter V

1. Gérard Hébert, Les relations du travail dans la construction au Québec, deuxième partie, Vol. II, (Ottawa, 1978), presents this study.

2. R.A. Jenness, Manpower in Construction, (Ottawa, 1975), pp. 52-53.

3. Calculated from OCQ data bank.

4. Hébert, op. cit., Vol. II, p.136.

5. Ibid., p. 150.

6. See Statistics Canada, Construction Price Statistics Service Bulletin, Vol. I, No. 6, Catalogue #62-006.

7. OCQ, Analyse de l'industrie de la construction au Québec, 1979, pp. 65-66. This statement is also found other OCQ publications, but is not substantiated anywhere by OCQ statistics.

8. See Chapter IV, Section 4 of this thesis.

9. Hébert, op. cit., Vol.II, deuxième partie, chapitre 3. See especially pp. 62-63.

10. Ibid., p. 47.

11. Ibid., p. 44.

12. Ibid., pp. 42-43, Tableau 3-1.

13. Ibid., pp. 55-56.

14. Interview with André Cournoyer of the OCQ.

15. See Chapter IV, Section IV.2 of this thesis, and Commission d'enquête sur l'exercice de la liberté syndicale dans l'industrie de la construction, Juge Robert Cliche, président, (Québec, 1975), (Commission Cliche), English edition, p. 395.

16. Ibid., pp. 499, 453, 457.

17. Hébert, op cit., Vol. II, p. 151.

Chapter VI Conclusion

VI.1 Summary

The purpose of this thesis is to explain the functioning of the construction labour market in Quebec. History, institutions and market forces have produced a set of patterns in the functioning of the construction labour market in Quebec that are different from most other industries.

However, in order to explain the construction labour market in Quebec, it is necessary to lay the groundwork by describing the aspects of the industry that are relevant to understanding the labour market. Chapter II examines three basic aspects of the industry that have important repercussions on the labour market: the product structure, the industrial organization, and the basic organization of the work force.

Chapter II also describes the level of competition of the industry and the pricing mechanism. These two ensure that firms in the industry are basically cost minimizers, and this has important effects on the demand for labour. The section on manpower characteristics briefly describes the craft organization of manpower. Workers are divided into a number of skilled trades and so-called unskilled occupations, but many of the so-called unskilled occupations are in fact highly skilled (such as shot firers, linemen, and pipewelders) while others are traditionally unskilled or

semi-skilled occupations such as labourers and truck drivers.

The two chapters on demand and supply of construction workers are at the core of the analysis. Briefly, demand for labour is taken as basically exogeneous and derived from the demand for investment constrained by technology and certain institutions. The supply of labour at any given time consists of a pool of trained workers. Since this pool of workers is usually larger than the demand, construction workers suffer from considerable unemployment.

On the demand side, a number of characteristics are necessary for unemployment to exist. First is the instability in the demand for structures. When demand is slack, there is less employment and vice versa. But slack demand need not immediately translate itself into unemployment if firms are willing to increase stocks or inventories in order to keep a steady output and work force. However, the peculiar nature of output and the small size and competitiveness of firms makes holding inventories of finished structures impossible. This results in a very transitional attachment of workers to firms. Workers are hired whenever their services are immediately required and laid off as soon as their task is finished. The technology of building also affects the stability of work. Components that use different types of labour must be built in sequence. Thus, as soon as a component that requires a particular trade is constructed, that trade is no longer needed and the

workers in it are often laid off. Another major aspect of employment instability is the seasonal nature of construction work. Much less construction occurs in the winter months, and this results in much less employment. All these factors (unstable demand for structures, the industrial organization of the industry, technology, and the nature of the product) conspire to make construction work unstable.

In addition, the major effect of the numerous technique changes seen in construction has been to lower on-site labour requirements. Part of this was due to mechanization, but industrialization was much more important by shifting work previously done by on-site construction workers to factory workers.

Demand-side factors are not the only cause of employment instability and high unemployment. If there were not a chronic excess supply of workers, the industry could not function the way it does and employment instability would be reduced.

Construction workers, like any other workers, aspire to some measure of employment stability. In other industries, this is obtained by seniority and other normative clauses in collective agreements. But those types of clauses have proved impractical for construction because of the great interfirm mobility of workers. What has been developed instead is a system where all hiring is done through a union hall. This system depends on a strong monopoly by individual unions over the local labour market. But this has proved

impossible to implement in Quebec because of the presence of two strong rival union bodies and their offshoots. Nevertheless, another system of control over hiring has developed because of worker demands for some measure of employment security. This is the system imposed by the regulation on hiring, where workers who have previously worked a specified number of hours in the previous year have priority in getting jobs over new entrants to the industry. This system was established in June 1978 after a number of earlier experiments and proposals.

Other aspects of the supply of labour are also examined in the chapter on supply. Workers in any given pool must come from somewhere, and be trained. This entails looking at training and geographic mobility. Formal apprenticeship is the traditional method of training construction workers, and in Quebec is regulated by the government. But qualification certificates, which attest to a workers skills, can also be obtained by workers who can prove that they have the necessary informal apprenticeship and can pass the examination in their trade. Only the 24 trades formally recognized by the decree and the regulation on professional qualification as skilled trades (travailleurs qualifiés) follow this formal system; other skilled workers, such as shot firers, linemen, and pipewelders, must go through different routes to be able to ply their trade.

Geographic mobility is an important aspect of the supply of labour in construction. Immigrants, who have

traditionally supplied much of Canada's needs for skilled workers, also supplied more than their pro rata share of construction workers, and Southern Europeans more than those from other parts of the world. But more important, at least from the policy point of view, is the intra-provincial and inter-provincial mobility of construction workers. Both have been controversial topics in the last decade because of the effects of control over hiring. Regional priority in hiring has been a source of contention between the two major Quebec union bodies; the CSN insisting on regional priority since a large part of its membership was in rural areas, and the QFL desiring fairly unrestricted mobility for Quebec workers. Some kind of regional priority in hiring was present in most proposals for control over hiring, and the result of the tensions between the two ideas is the regulations concerning regional priority in the 1978 regulation on hiring. Interprovincial mobility of construction workers came to the fore with the federal governments proposal for the inclusion of the right to mobility in its constitutional proposal. The Quebec government was adamantly opposed to the idea.

Chapter V describes the income characteristics of construction workers. The income of construction workers is the product of hourly wages and hours worked. Accordingly, both wage developments and factors related to hours of work are described in this chapter. A number of wage developments are examined in Section 2 of this chapter: real wage increases, changes in relative wages and the growth in

importance of fringe benefits. Section 3 described the factors that are associated with an individual worker's income: trade, region, mobility, and availability to work. The total income of a construction worker includes not only his income from construction but also his income from other sources such as unemployment insurance, work income from other industries and social welfare payments. The findings of Gérard Hébert's study of non-construction income are also summarized. Finally, the Cliche Commission's recommendations with respect to income security were reviewed.

VI.2 Evaluation and recommendations

It should be clear that the needs of workers are not well served by the way the construction labour market functions. They suffer from a very large amount of unemployment and they must bear a large part of the cost of something for which they are not responsible. Unemployment also means reduced incomes, and the average construction worker cannot expect as high an income as his hourly wages would indicate. The main problem facing construction workers is the instability of employment and the consequent shortfall in income.

How well the needs of society have been served by the structure of the construction labour market is difficult to assess accurately. In addition to lost output, it is clear that the high unemployment construction workers suffer from imposes substantial social costs in the form of unemployment insurance and social welfare payments and increased costs to the health system caused by the strains on individuals and their families as the result of the inability to have steady employment income.

In order to solve the construction workers main problem, both sides of the market must be addressed, since the construction labour market suffers from both erratic demand and excess supply.

The regulation on hiring only addresses one side of the market. It seeks to reduce the supply of construction

workers and consequently reduce employment instability. It has succeeded to some extent in reducing unemployment and improving the income prospects especially of lower paid construction workers. Because of its design, the regulation will not reduce the supply of workers to the extent necessary to force a readjustment of buyers' and employers' behaviour.. In boom periods, the regulation will permit a large number of workers to be recognized as permanent construction workers. In the inevitable downturn, a substantial number of these workers will have to be denied renewal of their classification certificate. Given the present climate in favour of 'deregulation' and the possibility that it may be espoused by an eventual Quebec government, it is possible that the regulation on hiring may not survive substantial employer pressure to abolish it.

In addition to measures to control the supply of workers, there is also a need to stabilize demand. Despite the studies that have been done on instability of construction, very little has been done so far to correct the basic demand side problem. Studies are needed on what extent construction stability is possible, on precisely how that construction stability is to be achieved, and which concrete government actions and policies need to be undertaken.

It must be noted that demand for labour cannot be perfectly stable because of the very nature of the work process, so part of a desirable manpower policy would include

some system of guaranteed income as was proposed by the Cliche commission. For the same reason, it would also be desirable to encourage workers to broaden their skills in order to take maximum advantage of employment possibilities in different trades. This would lead to a more efficient use of the highly skilled construction workers and help eliminate some of the remaining frictional unemployment.

On the supply side, a number of other types of studies are needed. Since the goals of a manpower policy should be sufficient manpower and adequate incomes and employment for construction workers, two sets of studies suggest themselves. First a number of studies providing the information necessary for ensuring a sufficient labour supply, such as labour requirements studies to assess the impact of expenditures on construction employment, and projections of private sector activities for the same reasons. Second, studies that would provide the necessary information for ensuring construction workers adequate income and employment: studies of methods of training, assessing the impact of multiple skills, a study of the effects of the regulation on hiring in order to evaluate different methods of controlling the amount of manpower.

The goals of these studies should be to provide the necessary information to achieve what are the desirable goals of any policy that attempts to solve the problems of the construction industry: on the one hand, stabilization of the

demand for investment goods coupled with a rational manpower policy that would ensure sufficient manpower, and, on the other hand, adequate incomes and employment possibilities for construction workers.

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Appendix 1

CLASSIFICATION OF CONSTRUCTION OUTPUT BY TYPE OF STRUCTURE

Building Construction

Residential

- Single detached
- Semi-detached including duplexes
- Apartments including row housing
- Other

Non-residential Building

Industrial
- Factories, plants, workshops, food canneries, smelters
- Mine and mine mill buildings
- Railway stations, roadway buildings
- Railway shops, engine houses, water and fuel stations

Commercial
- Warehouses, storehouses, refrigerated storage, etc.
- Grain elevators
- Hotels, clubs, restaurants, cafeterias, tourist cabins
- Stores, retail and wholesale
- Garages and service stations
- Theatres, arenas, amusement and recreational buildings
- Laundries and dry-cleaning establishments

Institutional
- Schools and other educational buildings
- Churches and other religious buildings
- Hospitals, sanatoria, clinics, first-aid stations
- Other institutional buildings

Other building construction
Farm buildings (excluding dwellings)
Broadcasting, radio and television, relay and booster stations, telephone exchanges
Aircraft hangars
Passenger terminals, bus, boat, air, and others
Armouries, barracks, drill halls, etc.
Bunkhouses, dormitories, camp cookeries, bush depots and camps
Laboratories
Other building construction

Engineering Construction

Marine construction
Docks, wharves, piers, breakwaters
Retaining walls, embankments, riprapping
Canals and waterways
Dredging and pile driving
Dyke construction
Logging booms
Other marine construction

Road, highway and airport runways
Highway, road and street construction (includes grading, scraping, oiling, filling)
Parking lots
Sidewalks, paths
Runways, landing fields, tarmac

Waterworks and sewage systems
Tile drains, drainage ditches, storm sewers
Water mains, hydrants and services
Sewage systems, disposal plants and connections
Water storage tanks

Dams and irrigation
Dams and reservoirs
Irrigation and land reclamation projects

Electric power construction
- Electric power generating plants, including water conveying and controlling structures
- Electric transformer stations
- Power transmission and distribution lines, trolley wires
- Street lighting

Railway, telephone and telegraph
- Railway tracks and roadbed
- Signals and interlockers
- Telegraph, telephone and cablevision lines, underground and marine lines, microwave stations

Gas and oil facilities
- Gas mains and services
- Pumping stations, oil
- Pumping stations, gas
- Oil storage tanks
- Gas storage tanks
- Oil pipe lines
- Gas pipe lines
- Oil and gas wells
- Oil refinery - processing unit
- Natural gas processing plants

Other engineering construction
- Bridges, trestles, culverts, overpasses, viaducts
- Tunnels and subways
- Incinerators
- Park systems, landscaping, sodding, etc.
- Swimming pools, tennis courts, outdoor recreational facilities
- Mine shafts and other below surface workings
- Fences, snowsheds, signs, guardrails
- Other engineering construction

Source: Statistics Canada, Construction in Canada, Catalogue #64-201.

Appendix 2

Special Trades Contractors

Electrical work(2)
Plumbing (1)
Excavating and grading
Masonry
Painting and decorating

Process piping (1)
Sheet metal and built up roofing
Dry wall
Sheet metal and other duct work (1)
Concrete pouring and finishing

Rough and framing carpentry
Elevators and escalators
Metallic and other siding
Resilient flooring and carpet
Asphalt paving

Wet heating and air conditioning (1)
Thermal insulation (1)
Form work
Finish carpentry
Structural steel erection

Equipment rental with operator
Dry heating and gas piping (1)
Tiling and terazzo
Glass and glazing
Commercial refrigeration (1)

Steel reinforcing
Environmental controls (1)
Roof shingling
Automatic sprinkler systems (1)
Millwrighting and rigging (1)

Plastering and stucco
Piledriving, shoring, underpinning, and caisson
Water well drilling
Insulation
Acoustical work

Fencing
Precast concrete
Ornamental and miscellaneous fabricated metal
Septic systems
Hardwood flooring

Wrecking and demolition
Other trade work N.E.S.

Notes: 1. Mechanical trades contractors
2. Electrical trade contractors

Source: Statistics Canada, The Special Trades Contracting Industry, catalogue # 64-210

Appendix 3

Definition of trades

SKILLED TRADES

GROUP I

Carpenter-joiner: "carpenter-joiner" means anyone who does wood carpentry and joinery work; assembles, erects and repairs wood or metal items such as:

concrete forms, including forms for footings, walls, piers columns, slabs, stairs, roads, sidewalks and curbs at ground level, and form ties;

insect screens, doors and window frames, doors, windows, sills, weatherstripping, curtain walls, and clapboard, aluminium or composition siding;

metal partitions;

shingles, unwelded and unhooked sheet metal connected therewith, sandstone tiles;

insulation in matt, roll, or panel form, fastened by means of nails, staples or glue;

wallboards;

wood or other composition lathing;

steel studding;

nailing metal corner beads and mouldings;

cupboards, counters and shelving (interchangeable or fixed), including the application of plastic laminates or other analogous coverings;

acoustical tile, including mouldings;

bowling alleys and accessories;

parquet flooring, including sanding and finishing;

synthetic lawn material;

the installation, hoisting and handling of: steel sheetpiling, shoring piles, wales, braces, struts, bearing piles, and temporary steel or timbers stays driven in the ground.

Interior Systems Installer: "Interior System Installer" means anyone who prepares and sets all types of laths;

prepares, assembles and sets any metal (tied or welded) used to erect and install metal support for suspended ceilings;

sets metal studs or frames for walls or partitions to be covered with metal, gypsum or similar composition laths or any wallboard or gypsum tile;

install gupsum or composition wallboard on partitions composed or metal studs, or on metal furrings;

installs any wire mesh to be covered with any type of coating;

sets acoustical tile.

Group II

Crane operator: Anyone who:

operates all types of cranes such as elevator cranes, twoer cranes, suspended cranes, derrick cranes, self-propelled cranes on locomotives or truck-mounted on wheels or tracks, with hydraulic, electric, mechanical and electro-mechanical attachments;

operates travelling cranes, boring machines, pile-drivers and cranes equipped with piledriving equipment used to drive cement, tubular or other piles or sheet-piles.

A crane operator also operates the above equipment when it is electrically-driven.

Shovel operator: Anyone who operates all types of shovels, backhoes, cranes with clamshell or dragline attachments, pivoted arm excavators and any other stationary or mobile excavating equipment, track-mounted or on wheels.

A shovel operator also operates the above equipment when it is electrically-driven.

Heavy equipment operator: anyone who operates equipment included in any of the following specialties:

Specialty of the tractor operator: Is part of the specialty of the tractor operator, the operation of wheel or track-mounted tractors with booms, buckets or attachments, "Pepine" backdiggers, concrete breakers,

bulldozers, scrapers, overhead and front-end loaders, trench-cutting machines, sideboom and endboom tractors, wheel-mounted tractors with excavating or forked attachment.

Specialty of the grader operator: Is part of the specialty of the grader operator, the operation of graders.

Specialty of the spreader operator: Is part of the specialty of the spreader operator, the operation of grader-spreaders and asphalt or concrete spreaders.

Specialty of the roller operator: Is part of the specialty of the roller operator, the operation of rollers and power compactors.

The operators of equipment included in the four specialties mentioned above also operate the equipment when it is electrically-driven.

Heavy equipment mechanic: Anyone who does the maintenance, bodywork and repair of heavy equipment used for landscaping, handling and excavating and of any other mobile or stationary power-driven equipment.

GROUP III

Structural steel erector: "Structural steel erector" means anyone who, with the exception of work done for the construction or maintenance of electric power transmission and distribution lines:

erects and assembles all iron and steel parts used in the construction of:

buildings, including partitions, prefabricated roofs, wall sections including metal windows;

completely prefabricated buildings;

bridges, viaducts, subways and tunnels;

antennas for radio and television broadcasting stations;

hoists, car dumpers, cranes, conveyors, ore unloaders;

lock gates, head gates;

hydraulic regulating equipment;

coal, stone, coke, sand and ore towers, bins and hoppers;

ash chutes and hoppers;

b) the erection of concrete structural memebers (wall panels, floor or ceiling slabs) when mechanical equipment is used;

c) the erection and construction of all sectional and otherwise assembled stacks, as well as the extension and repair of such stacks;

d) the unloading, hoisting and setting of complete boilers, steam drums and assembled sections of tubular boilers and machinery into their approximate positions;

e) torch-cutting, welding, riveting, rigging, scaffolding, framing, erecting and dismantling of temporary or supporting work in connection with any of the above operations.

Boilermaker: "Boilermaker" means anyone who performs the operations connected witht he construction of steam generators, boilers and tanks including;

all erection, dismantling, assembly and demolition work on boilers, as well as the steel erecting related thereto;

setting equipment on foundations or supports;

installing and rolling tubes;

fitting all pressure or non-pressure parts, except the unloading, hoisting and placing of portable boilers, steam drums and assembled sections of tubular boilers;

all work in connection with breechings, smoke boxes, stacks, uptakes, floats, air and water heaters, smoke consumers, all types of tanks, as well as all other plate work connected thereto;

the erection and construction of purifying boxes, gas generators, brewery vats, standpipes, penstocks and gasometers, as well as the unloading, hoisting and placing of equipment or parts related to the above mentioned devices;

all burning, chipping, caulking, reveting, welding and rigging work connected with the above-mentioned operations.

Ornamental iron worker: "Ornamental iron worker" means anyone who, by means of equipment, tools or welding, traces, cuts prepares and assembles all metal pieces for the manufacture of items such as: inside and outside stairs, railings, fences (except wire fences), gates, windows, canopies, cellar and inspection traps, all types of wire netting, coal chutes, vault doors, fire doors, partitions, lifesaving equipment or any other similar work; installs and erects the above items.

Reinforcing steel erector: "Reinforcing steel erector" means anyone who cuts, bends, fastens, installs and assembles rods and metal laths with wire, ties, or welding operations to strengthen concrete in the construction of forms, columns, beams, slabs or other smilar work.

GROUP IV

Tinsmith: "Tinsmith" means anyone who works sheet metal of a thickness not exceeding gauge ten (10). Sheet metal includes iron, copper, aluminum, stainless steel or other similar materials. He also

traces, makes and sets all types of sheet-metal items on construction sites;

erects and repairs ventilating, air conditioning and warm air heating systems, as well as all systems for exhausting such materials as shavings, fumes, smoke or dust, applies inside insulation connected with such systems and sets prefabricated apparatuses;

performs all other analogous work such as covering skylights, cornices, firestops and flashings with metal; installs gutters and other prefabricated metal items such as shelves, lockers, partitions, wall coverings, screeens and ceilings.

Roofer: "Roofer" means anyone who applies and lays asphalt composition, gravel, shingles, sandstone tiles or other similar products on roofs. Work also includes the repair and insulation of such roofs, including vapour seals, build-up roofing membranes and waterproofing barriers, as well as laying unwelded and unhooked sheet metal.

GROUP V

Painter: "Painter" means anyone who

a) prepares and conditions the inside and outside surfaces of any structure and covers same with one or more coats of film-forming compound for protection and aesthetic purposes;

"Film-forming compound" means any liquid, sticky, natural or synthetic, transparent, semi-transparent, opaque or coloured material that forms a continuous protective film on surfaces.

b) covers wall surfaces with wallpaper or any other similar material that is natural or synthetic, prepasted or glued;

c) performs other work entailing the application of backing, corner beads and accessories, as well as joint-pointing wallboard.

Resilient flooring layer: The term "resilient flooring layer" means anyone who lays:

resilient flooring made of vinyl, asphalt, rubber, cork, linoleum or of any other material that is glued but not nailed;

rugs, carpets and undercarpets, except acoustical tile applied on walls and ceilings.

Insulator: "Insulator" means anyone who, by spraying or any other regular method, applies thermal insulation to:

a) all existing or new piping systems whether it be in connection with the installation, repair or renovation of such systems, including the application of ally types of protective finishes;

piping used to convey any fluid (hot water, cold water, steam, gas, fuel, ammonia, etc...);

piping and duct work for air conditioning, ventilation or refrigeration purposes;

b) furnaces, boilers, tanks and other similar equipment, except the erection of brick walls for boilers.

An insulator may also apply rigid or semi-rigid insulating materials.

GROUP VI

Plasterer: "Plasterer" means anyone who

by means of a trowel or mechanically, applies coatings such as plater, celanite, mortar, cement metal composition, stucco or other substitutes;

sets metal corner mouldings or any other type of mouldings, as well as all accessories connected thereto;

points and fills gypsum wallboard joints;

does plaster moulding work and sets and pours ornaments.

Cement finisher: "Cement finisher" means anyone who

prepares and finishes cement surfaces on floors, walls, sidewalks and pavements;

performs plain or designed cement coating work;

applies hardeners and sealers or does all other similar coating work on floors, sidewalks, pavements and other roadwork inside tunnels;

applies and finishes metallic waterproofing, including the protective coating and the installation of waterproofing membranes.

For the cement finisher, work on walls, following flooring operations, may not exceed the height of the baseboard.

Bricklayer-mason: "Bricklayer-mason" means anyone who

a) cuts, saws, joint-points and lays, by using mortar, cement or any other adhesive material, the following masonry items:

brick, natural or artificial stone;

acid brick, fire brick, brick made of plastic, cement or any other refractory material, all such bricks being laid by hand, machine or compressor;

refractory material tiles;

terra-cotta;

architectural precast concrete;

blocks made of gypsum, concrete, composition materials and light aggregates, for walls or partitions;

b) sets and welds anchoring devices; applies rigid insulation inside walls and masonry cavities.

Tile setter: "Tile setter" means anyone who cuts and sets marble, granite, prefabricated terrazzo, slate, glazed or enameled ceramic tiles and all other similar or substitute materials;

installs strips, laths and metal anchoring devices and applies various granitic mixtures;

sets the base for the above operations;

polishes by hand or machine and by means of dry or wet processes, all surfaces made of granite, marble or any other similar material and cements or fills in cracks or gaps.

GROUP VII

Millwright: "Millwright" means anyone who

installs, repairs, sets, erects, dismantles and handles equipment, including equipment for bowling alleys; conveyors and permanently-installed equipment; automatic doors and accessories; adjustable floors used to support machinery;

makes templates for such machinery and equipment.

GROUP VIII

Electrician: "Electrician" means anyone who does construction overhead, alteration, repair and maintenance work on electrical installations used for lighting, heating and motive power purposes. This includes all wires, cable conduits, accessories, deices and electrical apparatus that form part of the installation itself and are connected theretor or are used to connect the installation to the public or municipal utility, such connection being ont he wall of the building or structure neares the utility line.

Pipe fitter: "Pipe fitter" means any person who performs, in any building or construction, the work of installing, renewing, altering, repairing or maintaining the systems included in the following specialties, except the piping of sewers and water mains and the connections thereof.

a) Specialty of the plumber

The plumber is responsible for

1. plumbing systems, including:

   i) piping, devices, accessories and other apparatus necessary for the flow of fluids in the said systems;

   ii) piping, devices, accessories and other appratus used for the draining and the back air ventilation of the said systems;

2. the piping, the devices and accessories used in installations such as refineries, gasoline pumps, air vents, pipe-lines and sprinkling systems;

b) Specialty of the fire protection mechanic

The fire protection mechanic is responsible for automatic sprinkler systems including their piping, devices, accessories and other apparatus used to prevent and fight fires.

c) Specialty of the heating systems installer

1. heating and combustion systems including their piping, devices, accessories and other apparatus necessary for the distribution of fluids or the production of motive power or heat by the said systems;

2. piping, devices and accessories utilized in installations such as oil refineries, gasoline pumps, air vents, pipelines and sprinklers.

d) Specialty of the refrigeration mechanic

The refrigeration mechanic is responsible for refrigeration systems with at least 1/4 h.p. capacity, including their piping, devices, accessories and other apparatus necessary for the distribution of fluids and the production of cold air by the said systems.

GROUP X

Elevator mechanic: "Elevator mechanic" means anyone who installs, renews, alters, repairs or maintains a mechanical conveying system composed of apparatus, accessories and other equipment such as elevators, hoists, escalators, flying scaffolds, ski lifts, dumbwaiters, moveable stage platforms, rolling sidewalks and other similar equipment generally used or usable for transporting persons, things or materials.

The installation of a mechanical conveying system also involves the electrical connection of apparatus and accessories from the main line disconnexion switch. The installation also includes the operation of a temporary or unfinished system when the latter is used, at the employer's request, to convoy his employees and materials.

UNSKILLED OCCUPATIONS

Steam-Boiler Fireman: means anyone who supervises the operation of any heating or motor installation governed by the Stationary Enginemen Act (R.S.Q., 1964, c.157) and the Regulation enacted thereunder.

Generator Operator: "Generator operator" means anyone who supervises the operation of stationary internal combustion diesel engines governed by the Stationary Enginement Act (R.S.Q., 1964, c. 157) and the Regulations enacted thereunder.

Shot Firer: "Shot Firer" means anyone who holds a valid shot firer's certificate under the Industrial and Commercial Establishments Act (R.S.Q., 1964, c. 150) and performs all work governed by the said Act; may also perform any related work such as preparing shot holes.

Watchman: "Watchman" means anyone who performs general duties on a construction site for the purpose of insuring the protection of property and the safety of persons.

Diver: "Diver" means anyone who, wearing a diving suit or equipped with proper breathing apparatus, does building, repair, installation, demolition or inspection work on equipment or structure under water.

Storeman: "Storeman" means anyone who:

checks in, stores and distributes materials, supplies, tools or equipment;

sees that tools and equipment are properly maintained without having to repair same;

checks to see that goods received tally with requisitions and invoices;

keeps a permanent stock record of outgoing and incoming material.

Clerk: "Clerk" means anyone who does clerical work on a construction site, such as:

checking employees' arrival and departure times;

computing time worked by the employees.

Labourer (day labourer): Anyone who performs work not belonging to skilled tradesmen, apprentices, classified workmen or general helpers.

General Helper (specialized labourer): "General helper" means anyone who:

a) performs various duties related to masonry work such as:

mixing cement or mortar by hand or machine;

sawing with the masonry saw;

erecting and dismantling prefabricated scaffolds;

handling materials to skilled workmen in the trades involved;

performing various clean-up duties related to his usual work.

b) is assigned to loading, unloading and handling bagged or bulk cement;

c) fires a portable kettle whenever asphaltic materials are used as a mordant, insultaiton or waterproofing agent;

d) operates power or air drills;

e) rakes asphaltic materials in the construction or repair of paved surfaces;

f) is responsible for starting up and controlling a stationary or mobile heating unit, or both, for drying aggregates or heating asphalt;

g) operates any heating unit whenever such operation does not call for a certificate;

h) operates a concrete vibrator;

i) operates a platform scale for weighing truck loads;

j) applies rigid or semi-rigid insulation materials, except when such insulation materials are requird for roofs, piping and ducts as well as inside walls and masonry cavities;

k) applies caulker.

General Helper (Tile Setter): Any person who performs the work provided in the definition of the general helper when such work is related to the tile setting trade, and who performs joining and power saw cutting when such work is related to the tile setting trade.

Hoisting equipment operator: "Hoisting equipment operator" means anyone who operates a hoist or any other vertical, stationary or mobile hoisting equipment equipped with one or more drums.

Truck Driver: "Truck driver" means anyone who drives all types of trucks.

Pump and Compressor Operator: "Pump and compressor operator" means anyone who:

operates diamond drills of all types and sizes;

operates a drill and a self-propelled drill car-mounted on the rails or wheels;

operates one or more water pumps with a discharge pipe 6" or over;

operates, cleans and maintains one or more concrete pumps or sets concrete by means of such equipment;

operates a compressor having a capability of 210 cu. ft./min. or two or more compressors with a 110 cu. ft./min. capacity.

Stationary or portable mixing plant operator: "Stationary or portable mixing plant operator" means anyone who, on the construction site:

operates and maintains a concrete, asphalt or aggregate mixing plant; also runs and oeprates truck-mounted concrete mixing plants (ready-mix trucks), but does not carry out duties usually performed by the drivers of such trucks;

controls the operation of a machine used to crush stone, rock or other similar materials;

supervises or regulates the delivery of materials into the crusher to prevent jamming;

stops and clears the crusher, as required.

adjusts accessories to control gravel or stone sizes;

controls the machine's output;

oils, cleans and maintains his machine to ensure optimum operational performance.

Pipe Welder: "Pipe welder" means anyone who:

does pipe welding, prusuant to the provisions of the Pressure Vessels Act (R.S.Q., 1964, c. 156) and the Regulations enacted thereunder;

performs, according to the aforementioned provisions, all other pipe-welding work on such installations as oil refineries, gasoline pumps, air lines, sprinklers and pipelines.

Welder: "Welder" means anyone who does all types of welding other than those mentioned in the definition of pipe welder."

DISTRIBUTION LINES

Lineman, Class "A": Any employee who, in the construction, dismantling, painting and maintenance of power distribution lines and transformer stations, and under the general supervision of a group leader or a crew leader, carries out complex operations such as: properly sagging conductors, installing clamps and hardware; inspecting and painting structures, conductors and insulators; making joints; erecting wooden, galvanized steel or other type structures; installing busbars, circuit breakders, switches, transformers or capacitors, as well as other station equipment. The term also means anyone who performs aerial work on live or dead circuits using "hot-line" tools, as requried, and who assists the group leader of the crew leader in crew work. Such person shall have a minimum experience of four (4) years.

Lineman, Class "B": Anyone who works under the general supervision of a crew leader of a group leader or of a class "A" lineman, and carries out the operations mentioned in subparagraph 1 of these definitions. Such person shall have a minimum experience of three (3) years or have passed the training course and have a minimum experience of two (2) years and a half in distribution lines work. Any employee who is qualified as a lineman, class B shall be classified as such, and the linemen, class C shall be used only if there are no linemen, class B available when the crews are formed. This applies for the eleven (11) regions listed in Appendix "A" of this decree. These provisions shall become effective for contracts tendered after August 1, 1976 and at the latest on May 1, 1977.

Lineman, Class "C": Anyone who carries out simple operations on lines, under the general supervision of a group leader or a crew leader and under the immediate direction of a class "A" or "B" lineman and who has a minimum experience of one (1) year in distribution lines work. No class "C" lineman may work alone on a live line having a voltage above 600 volts.

Groundman, apprentice-lineman: Anyone whose work is carried out at ground level under the immediate supervision of a group leader or a crew leader or a lineman and consists in assisting in the erection, removal, replacement or repair of distribution lines and transformer stations by performing various manual tasks. From time to time, an apprentice-lineman may also be called upon to perform work usually done by class "A", "B" or "C" linemen, provided such work be done on dead lines.

TRANSMISSION LINES AND TRANSFORMER STATIONS

Lineman, Class "A": Any employee who, under the general supervision of a group leader of a crew leader has the requird trade knowledge and physical fitness to perform and does perform all work in connection with the construction, dismantling or maintenance of transmission lines (including the painting) and transformer stations; he also directs, as requird, employees of lower classifications who perform related duties.

Lineman, Class "B": any employee who, under the general supervision of a group leader of a crew leader or of a Class "A" lineman, has the required trade knowledge and physical fitness to perform and does perform all work in connection with the construction, dismantling or maintenance (including the painting) of transmission lines and transformer stations, in view of qualifying as a Class "A" lineman.

Lineman, Class "C": Any employee who, under the general supervision of a group leader of a crew leader or of a Class "A" lineman, has the required trade knowledge and physical fitness to assist and does assist a Class "A" or "B" lineman in his work, in view of becoming more highly-skilled and of qualifying as a Class "B" lineman.

Apprentice-lineman: Any employee who, under the close supervision of a Class "A" or "B" lineman, has the required trade knowledge and physical fitness to assist linemen in the carrying out of their work, in view of becoming more highly skilled and of qualifying as a Class "C" lineman.

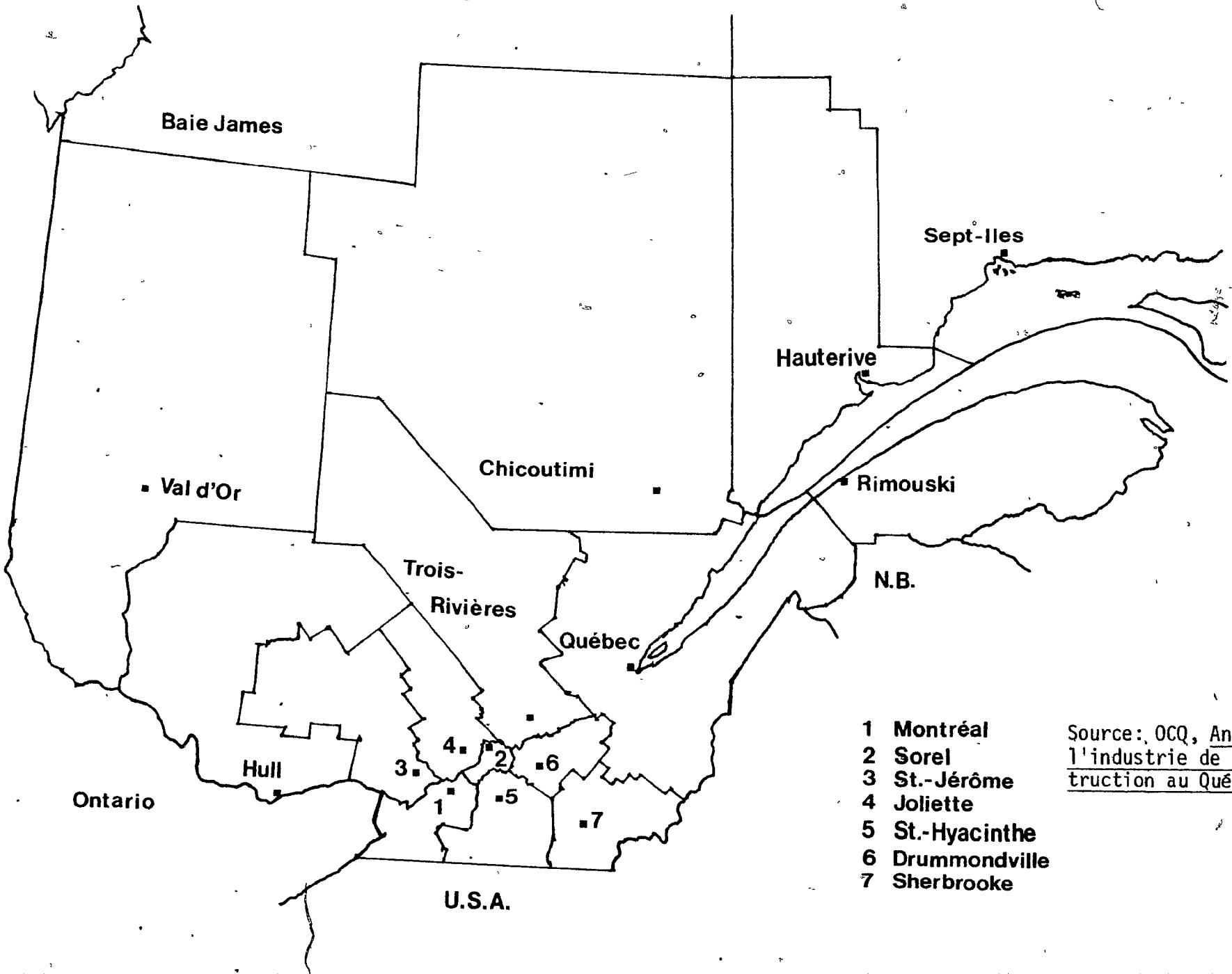
Groundman: Any employee who, under the supervision of a group of crew leader or a lineman, has the required trade knowledge and physical fitness to perform and does perform at ground level all work in connection with the construction, dismantling or maintenance of transmission lines and transformer stations.

Assembler: Any employee who assembles, at ground level, parts which make up a power transmission or distribution line structure or a power station.

Source: Décret relatif à la construction, Arrêté-en-Conseil 1287-77, Gazette Officielle du Québec, 27 avril 1977.

APPENDIX 4

OCQ Administrative Regions



Source: OCQ, Analyse de l'industrie de la construction au Québec, 1979.