Labour Market Information
Tracking Construction Labour Markets
An Introduction to the Construction Sector Council's Model

Alberta, November 20, 2006

This paper describes the general concepts and basic features of the Construction Sector Council's labour market model for Canada and its regions. The paper and the associated "LMI 101" presentations are intended to brief key industry representatives on the content of the Construction Sector Council's Labour Market Information model. There are five parts:

1. Core Logic
2. Core Concepts
3. Components
4. Dynamics
5. Frequently Asked Questions

1. Core Logic

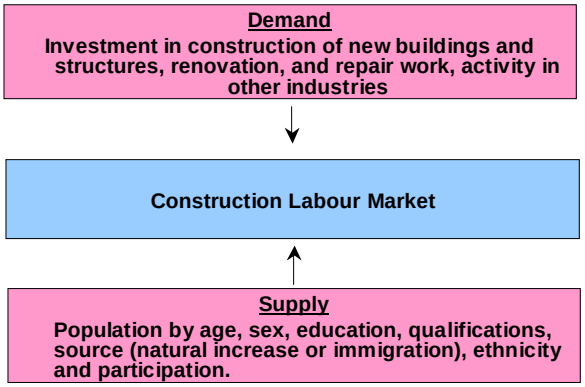
Construction labour markets match the available work force (supply) to the labour requirements of employers (demand). The markets place a worker in a job at an agreed rate of compensation. The CSC model tracks the operations of the market and describes:

- **Demand** or jobs required by industry, region and trades
- **Supply** of workers available by industry, region and trade

The really important part is describing how the market *adjusts to changes* in demand and supply.

It is useful to distinguish the forces affecting supply and demand both ***outside and inside*** the construction labour market. Exhibit #1 represents these forces:

Exhibit #1: The Labour Market in the Wider Economy

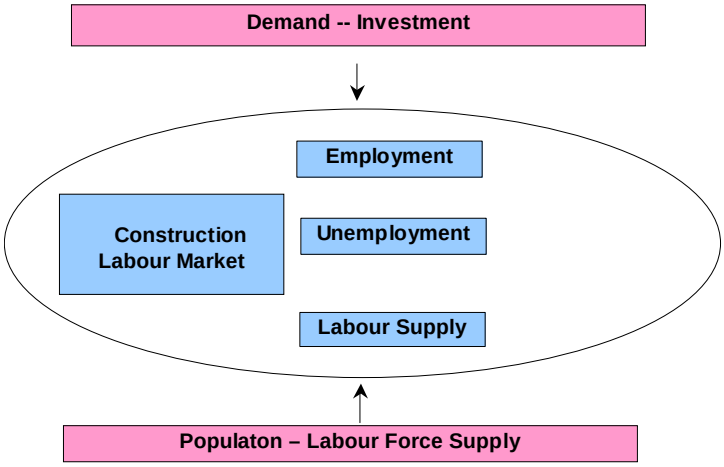


The model is designed to track detailed circumstances in the outside environment and in the construction labour market itself. The intention is to measure conditions for specific industries, trades and sectors. In each case, the basic building blocks are:

- Population, number of people resident in the region
- Labour Force, the number of people available for work in all industries and specifically in construction at any point in time
- Employment, the number of people working in all industries and specifically in construction jobs at any point in time
- Unemployment, the number of people available but not working – labour force less employment

Each of these concepts is measured by Statistics Canada in household surveys. A sample of households is selected randomly and contacted regularly (either monthly or every five years in the Census) and asked about their work situation. The household surveys rely on self-identification (e.g., “I am a plumber”) and reported employment is allocated to the region of residence.

Exhibit #2: The Labour Market in the Wider Economy



In the wider economy, outside the construction industry, the overall potential supply of workers is set by the resident population. The portion of the resident population available for work or working is called the labour force. The ratio of the labour force to population is called the participation rate.

There are two core formulas:

Participation Rate = Labour Force / Resident population

Labour Force = Employment + Unemployment

2. Core Concepts

Notice that many of the components in the model are **stocks** – measures that are fixed at a point in time. All of the following components, used in the model, are stocks:

- Building Stock (‘000s of sq ft.)
- Housing Stock (# of units)
- Employment (# of people)
- Labour Force (# of people)
- Unemployment (# of people)
- Population (# of people)
- Registrations (# of apprentices)

Some of the most important behaviour is represented by **flows** or measures of the change in the stock per unit of time. Other components in the model are flows:

- Investment ($ per year)
- Housing Starts (# of units, year)
- Immigration (# of people per year)
- Inter-provincial migration (# of people per year)
- New Registrations (# of new apprentices per year)
- Completions (# of apprentices per year)
- Withdrawals (# of apprentices per year)

Stocks and flows are linked by formulas, for example:

Stock (Dec. 31, 2001) = Stock (Dec. 31, 2000) + Additions (Jan. 1 to Dec. 31, 2000) – Subtractions (Jan. 1 to Dec. 31, 2001)

3. Components

To be useful to the industry the model needs to offer details. At the present time, measures of most of the concepts are included in the construction labour market for industry, provinces, for five regions in Ontario, and the trades noted here.

Industry
- Construction
- All other industries

Provinces and Regions
- Greater Toronto
- Southwest Ontario
- Central Ontario
- Northern Ontario
- Eastern Ontario

Trades

1. Boilermakers
2. Bricklayers
3. Carpenters
4. Concrete Finishers
5. Construction Managers
6. Construction Millwrights
7. Contractors and Supervisors
8. Crane Operators
9. Drillers and Blasters
10. Electricians (including industrial and power system)
11. Elevator Constructors and Mechanics
12. Floor Covering Installers
13. Gas Fitters
14. Glaziers
15. Heavy Equipment Operators (except crane)
16. Heavy-duty Equipment Mechanics
17. Industrial Instrument Technicians and Mechanics
18. Insulators
19. Ironworkers & Structural Metal Fabricators & Fitters
20. Painters and Decorators
21. Plasterers, Drywall Installers and Finishers, and Lathers
22. Plumbers
23. Refrigeration and Air Conditioning Mechanics
24. Residential and Commercial Installers and Servicers
25. Roofers and Shinglers
26. Sheet Metal Workers
27. Steamfitters, Pipefitters and Sprinkler System Installers
28. Tilesetters
29. Trades Helpers
30. Truck Drivers
31. Welders and Related Machine Operators
32. Total CSC Trades as a Whole

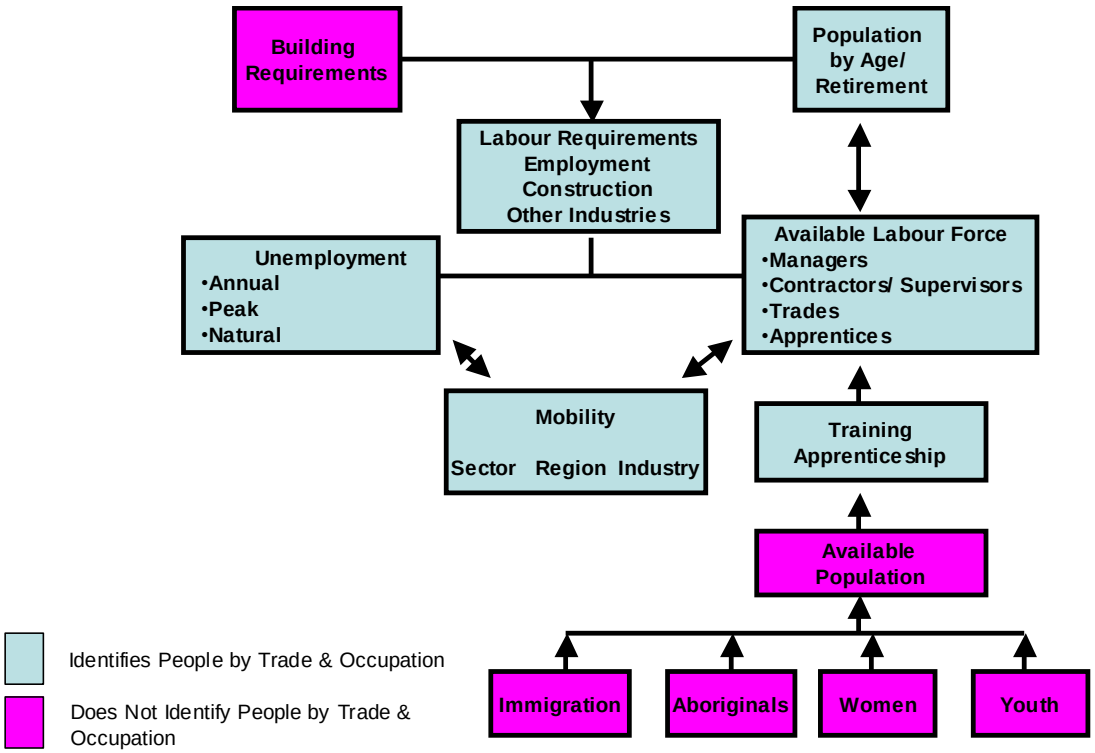
More detailed components in the model describe the regional economy, i.e., outside the labour market. These include:

- Population
  - By age
- Investment by sector
  - Residential construction, New housing
  - Renovation
  - Housing starts
- Non-residential construction
  - Engineering
  - Industrial
  - Commercial
  - Institutional

Adding to these levels of detail is a priority for the CSC. For example, work is underway to add information on the residential sector to the labour market model. Adding new dimensions expands the complexity of the model. The accuracy of measures deteriorates as more detail is added. There are practical limits to the expansion of the model. In some cases, the model has already encountered these limits and information on very small populations (e.g., a small trade in a small region) is often not available – it is suppressed because it is not reliable.

These are the core building blocks for the model. Exhibit #3 shows how the pieces are combined in the full model.

Exhibit #3



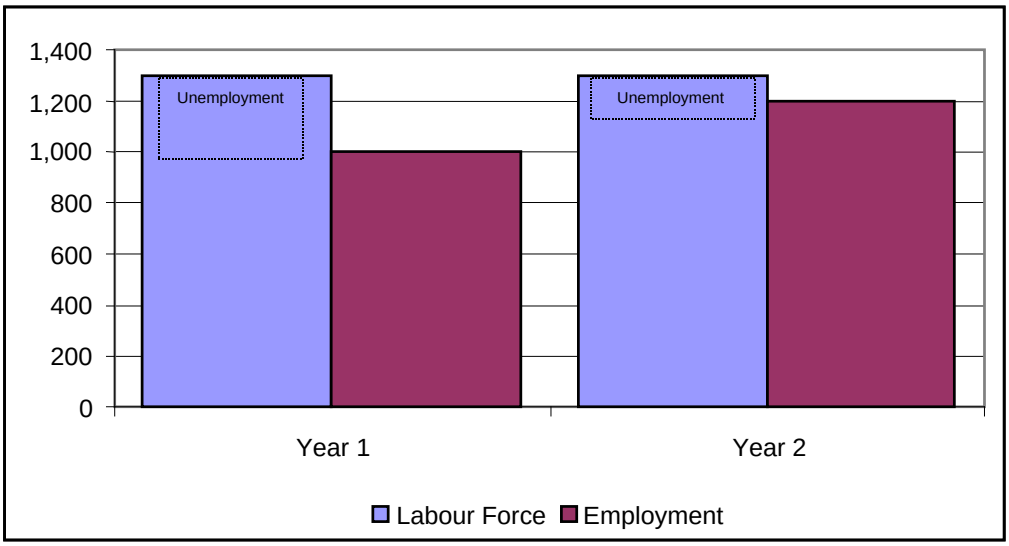
4. Dynamics

The most important question is, “How do the components of the market react when there is a change in the system?” For example, what happens as building requirements increase? The model simulates this change across time.

In the first round:

- Increase in employment
- Decrease in unemployment

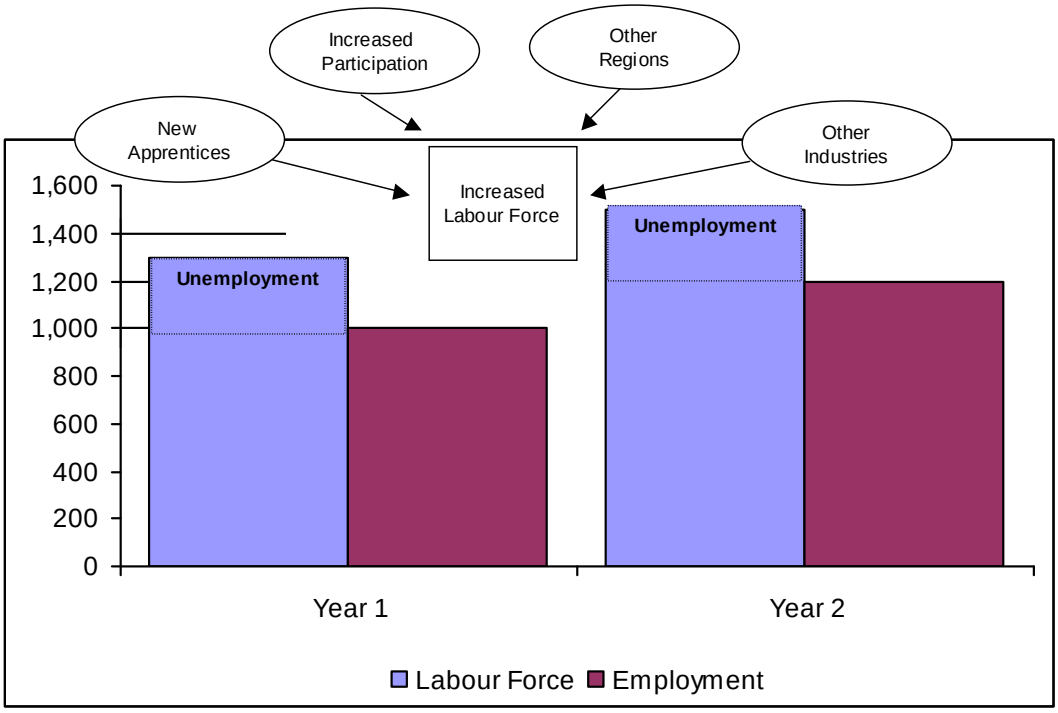
Exhibit #4: First Round Adjustments



In the second round:

- Increase in the labour force from
  - Mobility from related regional markets
  - Mobility from other industries
  - Increase in participation in the region’s populations

Exhibit #5



In the third round:

- Increase in completions from apprenticeship programs
- Increase in permanent immigration

The immediate impact depends on the *unemployment rate*. ***The unemployment rate is the pivotal point.***

Unemployment is an essential feature of the labour market. It is a problem when unemployment is large, lasts too long and deprives workers of needed income. But the labour market is in constant flux – everyday there are workers seeking jobs and employers recruiting. Unemployment represents the cushion that absorbs the shock of change. It allows workers time to search for their preferred job and offers employers the chance to review the qualifications of alternative recruits. At some level unemployment offers benefits. But too much or too little unemployment create costs. What level of unemployment balances these costs and benefits?

To answer this critical question, the model considers three different measures of unemployment – seasonal, cyclical and natural.

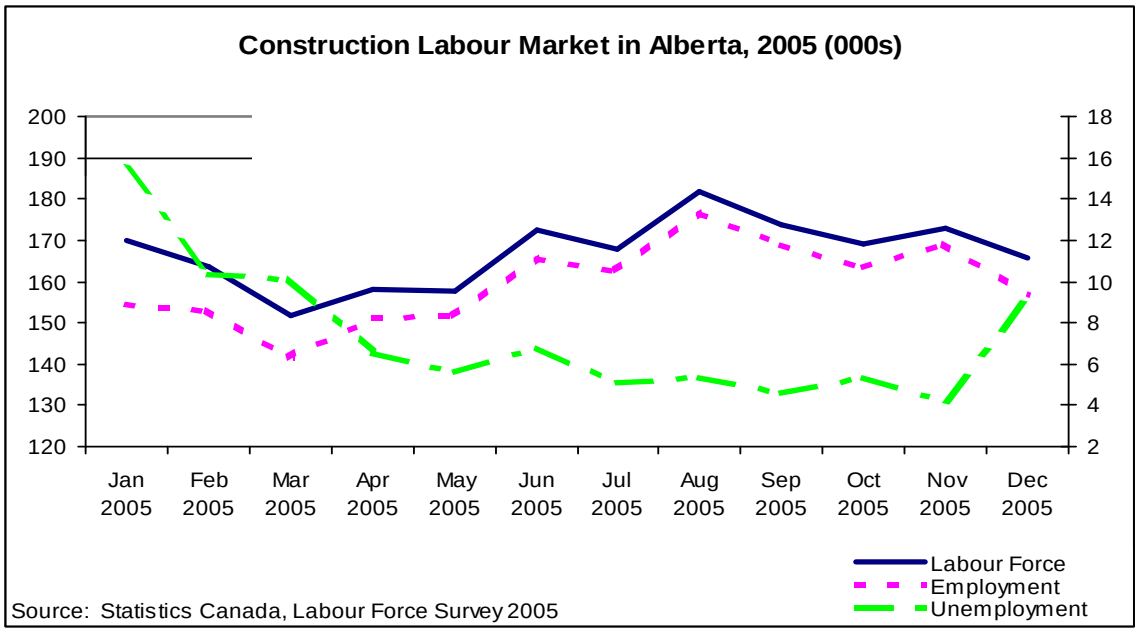
Seasonal Dynamics

Labour market patterns are not subtle or just a minor burden. Market variations can be huge and impose very large costs.

Consider the situation in Alberta. Specifically, Exhibit #6 shows the month-to-month variation for all construction workers during 2005.

Employment rises by over 36,000 from March to August. Unemployment drops more gradually across the year – declining 12,000. The overall labour force rises in line with employment so that rising participation and declining unemployment share equally in the adjustment process.

Exhibit #6: Seasonal Variations in 2005[1]



This is a typical year. Exhibit #7 shows monthly labour market conditions over many years. Notice the combination of the seasonal swings and the longer-term cyclical swings.

[1] Source: Statistics Canada, Labour Force Survey, All Employees, All Occupations in Construction, 2005

Exhibit #7: Alberta, Construction Labour Market, Monthly Data, 1976 to 2006

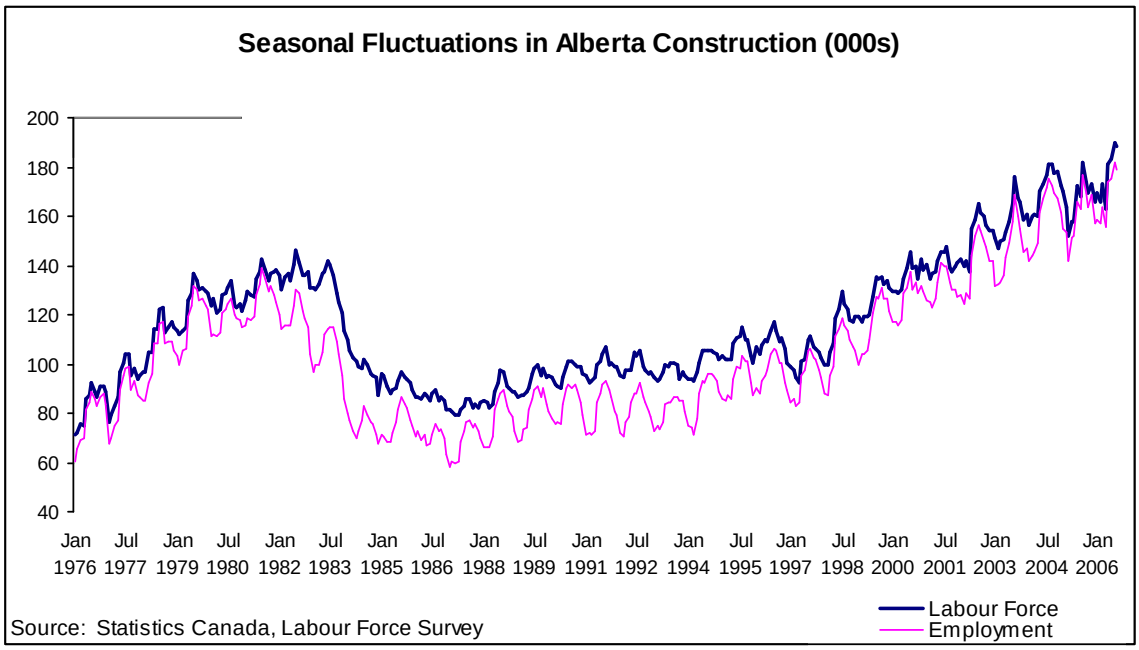


Exhibit #8: Alberta, Unemployment Rate in Construction, Monthly Data, 1976 to 2006

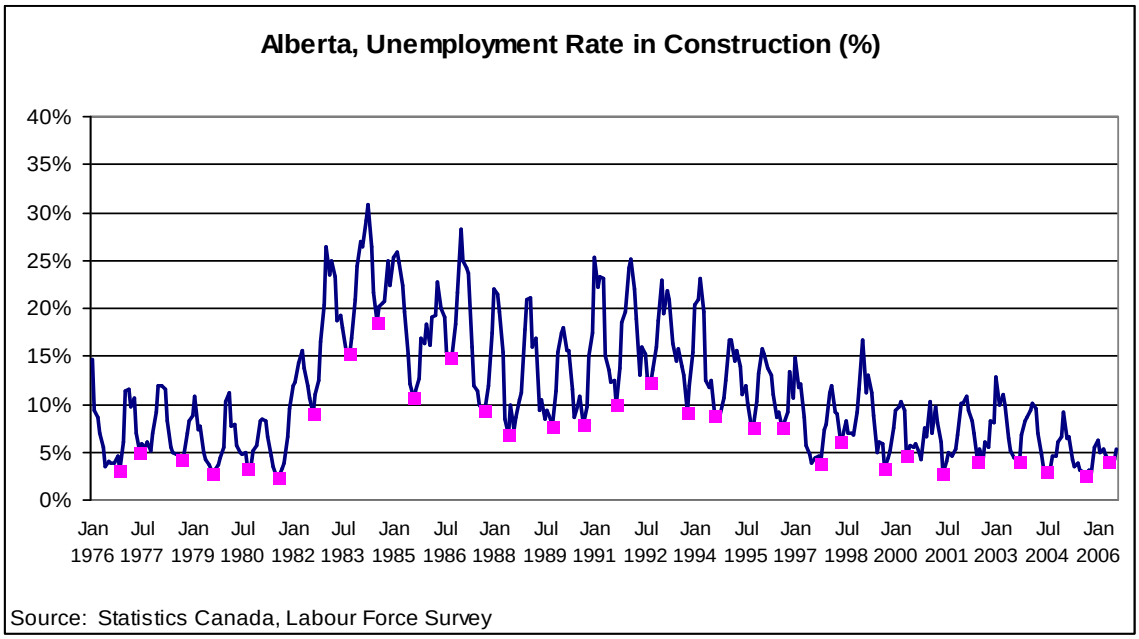


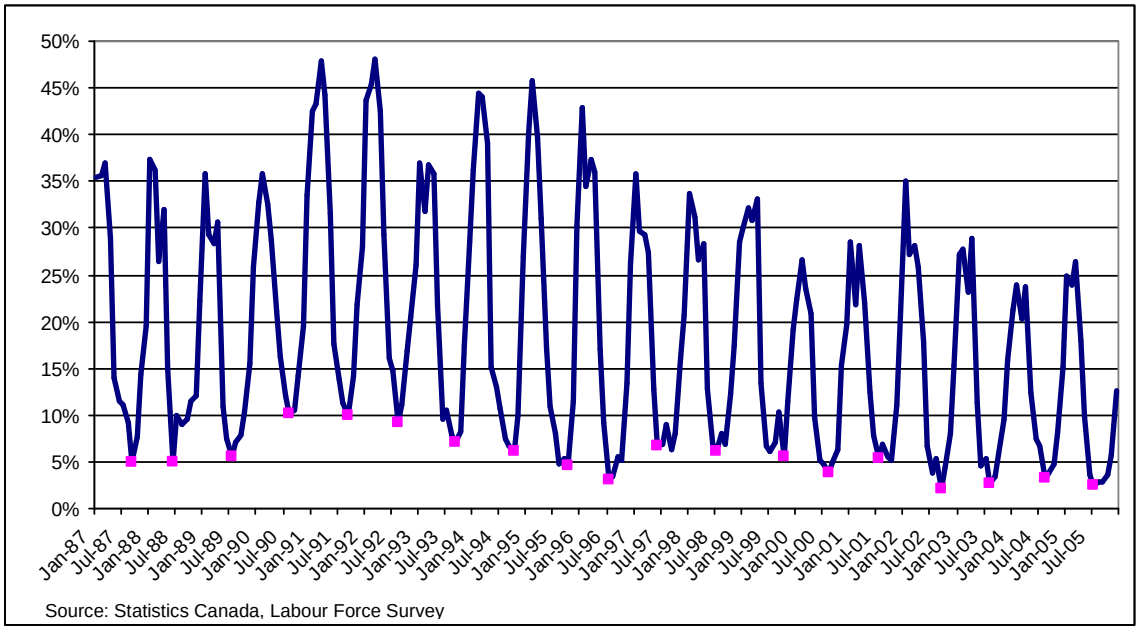
Exhibit #8 shows the unemployment rate for all construction in Alberta. Notice that it is inverted by comparison with Exhibit #7. Where employment reaches a seasonal peak in July or August of each year, unemployment falls to a minimum. Also when employment reaches cyclical peaks in 1981 and again in 2005, the unemployment rate reaches a minimum. It seems that employment reached a new peak during the building season this year

The seasonal and cyclical peaks for employment (troughs for unemployment) are a key focal point for the model as this represents the point where the market is stretched most thin. Pressures for recruiting really are focused on this point. The construction cycle can be described by the “envelope” of seasonal peak employment and minimum unemployment.

Heavy Equipment Operators, All Canada

The story becomes more complicated when we consider these labour market dynamics for individual trades. Some trades are more volatile – both seasonally and cyclically than others. Exhibit #9 focuses on Heavy Equipment Operators as an example.

Exhibit #9: Unemployment, Seasonal and Annual Variations, Canada, Heavy Equipment Operators



Notice that the seasonal variation here is greater than we saw for all the trades in Alberta. In the model these seasonal fluctuations are accounted for by using the unemployment rate at the seasonal peak – that is the lowest monthly rate – for all trades and regions. *The peak unemployment rate is regarded as the most sensitive measure of the state of construction labour markets*

Cyclical Dynamics

The next aspect of market adjustment is to building cycles. Sticking with Alberta, Exhibit #10 shows the annual fluctuations in employment and the labour force from 1976 to 2006. Notice that the peak annual levels of construction employment occurred in 1981 and 2005 – important reference points. The steady rise in construction employment in Alberta, across 20 years, is really not a typical cycle at all. Looking back though, it is likely that Albertans have not forgotten the dramatic downturn in 1982.

Exhibit #10: Alberta All Trades

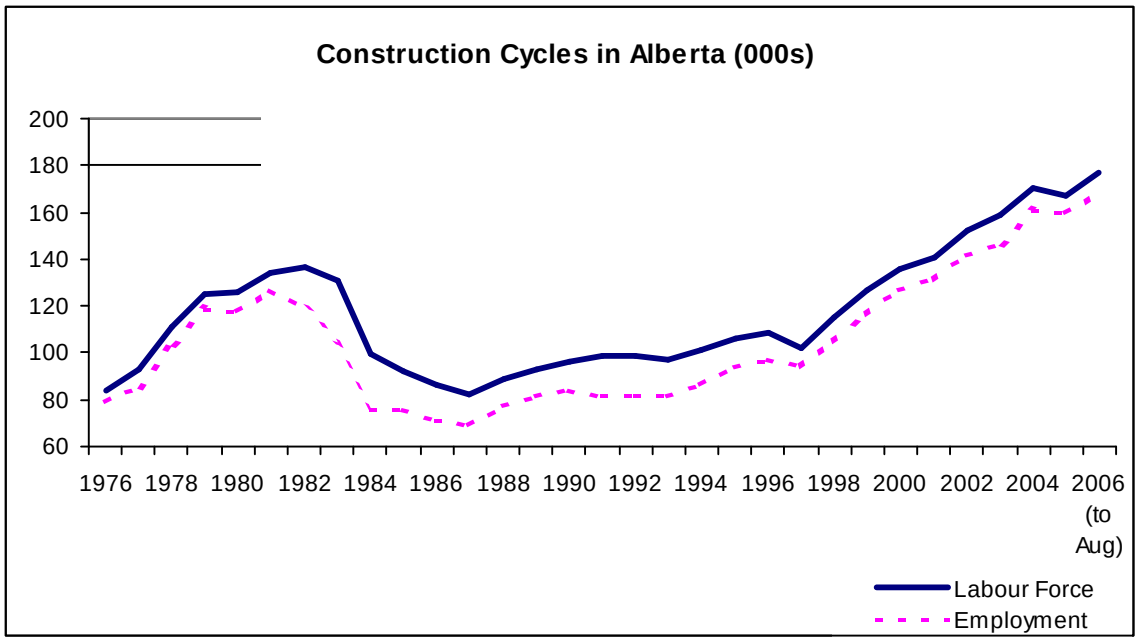
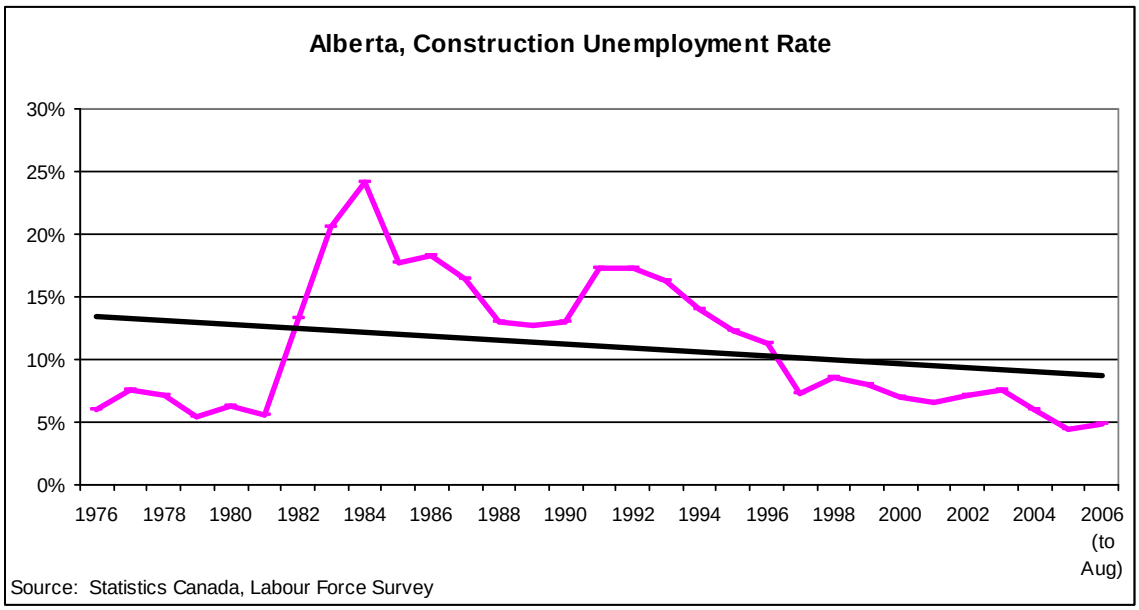


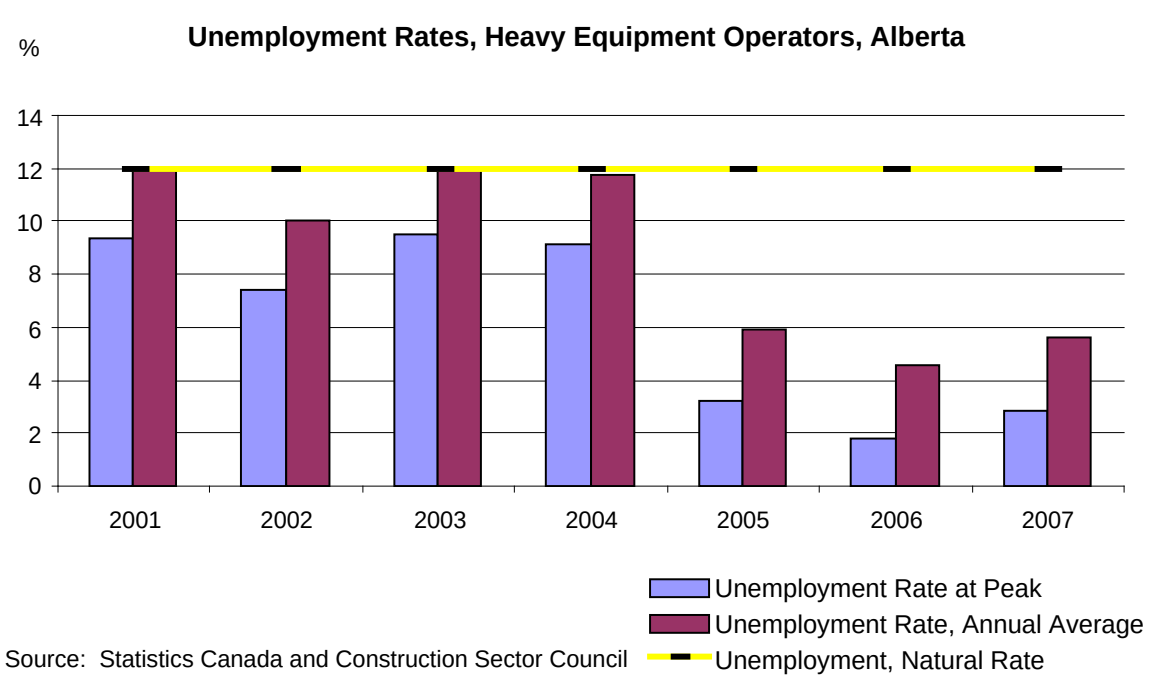
Exhibit #11



Cyclical swings in employment and unemployment for each trade will vary around the pattern set by the overall industry. Variations are usually due to distinct cycles in each sector. It is common for housing cycles to differ from industrial, commercial and institutional conditions. To the extent that specific trades work in one sector, the cyclical and seasonal patterns will differ.

For each trade and region, the model identifies a long-term trend in the unemployment rate called the natural rate. *The natural rate represents average or balanced conditions.* Consider again the example of Heavy Equipment Operators in Alberta. Exhibit #12 tracks the annual value and the natural rate (12%) for equipment operators in Alberta. Notice how the actual rate has fallen below the natural rate in recent years. This signals that the market is tight.

Exhibit #12: Alberta, Heavy Equipment Operators



When unemployment is below the natural level employers will find tight market conditions. For example, *"Workers meeting employer qualifications are generally not available in local and adjacent markets to meet any increase. Employers will need to compete to attract additional workers. Recruiting and mobility may extend beyond traditional sources and practices."*

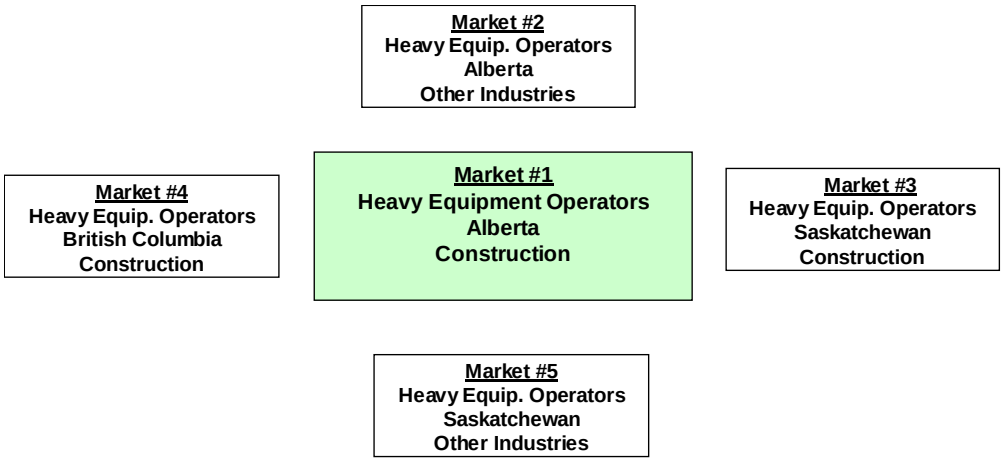
And workers would characterize the market as: *"Competition for work is limited with largely unskilled and new entrants seeking employment. Employers will offer inducements for experienced or skilled workers. Union locals will have a large proportion of members working locally on travel cards. Workers are recruited from more distant areas."*

The estimated level of the unemployment rate – compared to its seasonal peak and long tern or natural value – is the most important measure of the state of the market.

Dynamics and Mobility

The model estimates the potential for mobility across labour markets under changing conditions. There are two dimensions to mobility – across industries and across regions. There are numerous possibilities for workers to move in response to change. Consider the specific labour markets identified in the model:

Exhibit #13: Adjacent Markets, Equipment Operators in Alberta in Construction

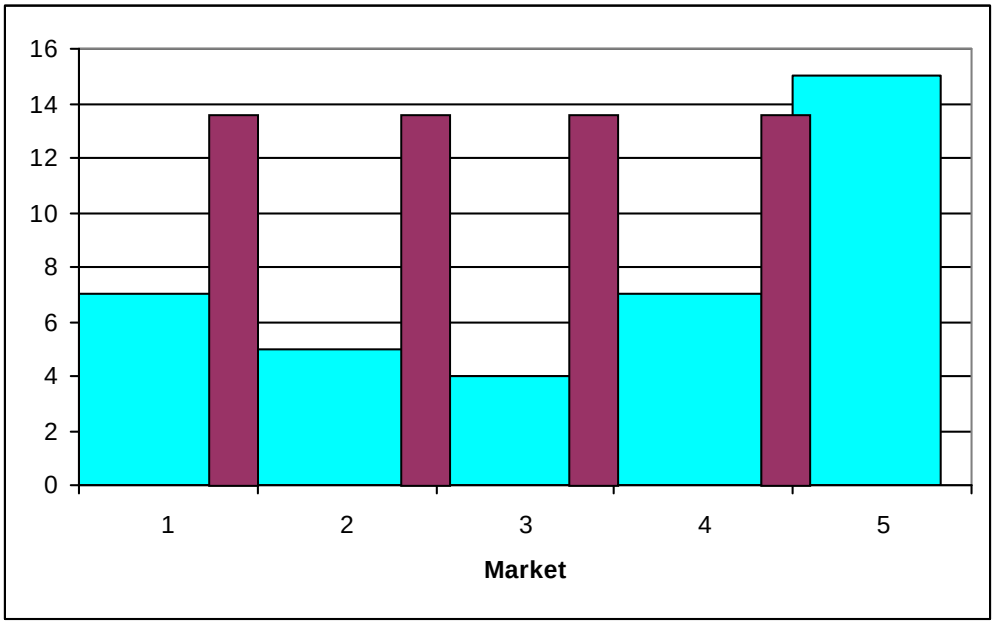


Each of these adjacent markets could have qualified workers to meet demand in the home market. Of course, the network of markets expands rapidly outward and the potential for recruiting rises.

In the model the unemployment rate in the respective markets is the principle factor that determines the potential for mobility. Exhibit #14 demonstrates the core idea – when the differences in unemployment rates fall below specific thresholds, the workers are motivated to move.

The thresholds are set for each market by considering, among other things, the unemployment rate relative to the natural level.

Exhibit #14: Mobility Across Adjacent Labour Markets



Age Distribution Dynamics

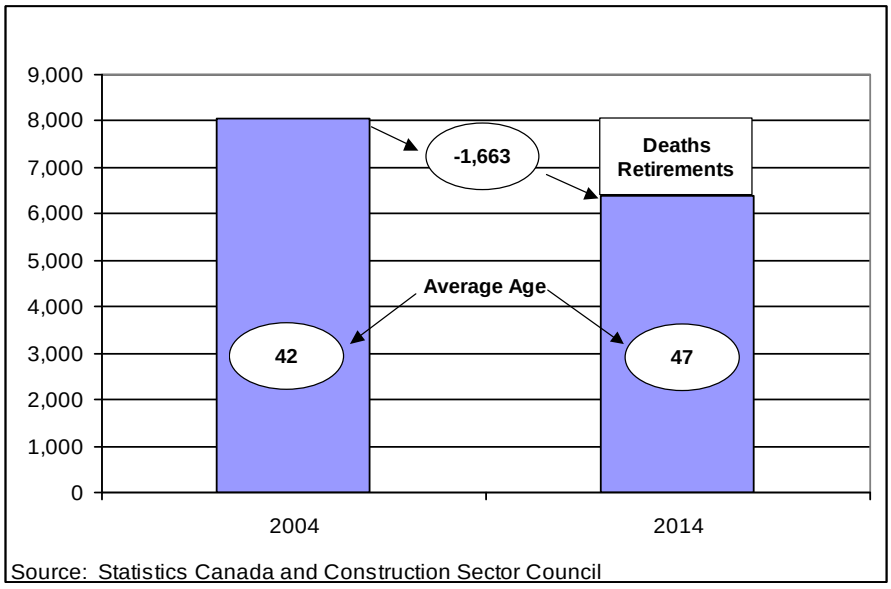
Canada's population is dominated by the baby boomers, the generation born between 1947 and 1965. This large group is approaching retirement and their departure will cause a decline in the working population of skilled and experienced workers. Replacing this group is a key long-term priority for the construction industry.

The CSC LMI model tracks the age distribution in each market and calculates a "retirement rate." This rate shows the numbers of workers aged 55 and over in 2004 that are expected to leave the labour force over the forecast period. There are two important factors that determine how many tradespeople, present in 2004, are expected to retire: the age profile at the starting period and the expected change in participation.

The average age of a trade at the start of the forecast varies across markets. In Alberta, the average age across all trades is 42, and the equipment operators are notably older with an average age of 47.

The model applies year-to-year changes to each single age group in the 2004 age distribution. There are two components: first, mortality rate, and second, the decline in the participation rate. Each estimated reduction in the workforce age 55 and over represents the number of workers that must be replaced to sustain the starting size of the work force.

Exhibit #15: Equipment Operators in Alberta, Calculation of Retirement Rates



Source: Statistics Canada and Construction Sector Council

The number of required replacements signalled by the retirement calculation becomes a second source of demand. In other words, more workers are required and the labour force must rise or unemployment decline, to meet both types of demand.

The required increase in the labour force from 2005 to 2014 is the sum of retirement demand and requirements for new construction.

Frequently Asked Questions

1. The model shows a very different number of workers than I believe are in my trade for this region. What explains the difference?

The model depends on Statistics Canada surveys for most measures of employment. These measures assume that the region of residence is the same as the region of employment. For many industries this is an appropriate assumption. In construction it is common for non-residents to be working in a region – or for resident construction workers to be working elsewhere.

2. Why do industry groups report market conditions that are different from what the model is showing?

Industry observers often see the market from a specific perspective. For example a union local may be at full employment because of a big industrial project but non-union trades face unemployment in (say) home building. Estimates in the model represent the entire construction industry and these overall conditions may not apply for the union or other sectors.

3. XYZ Corp. is a big owner around here and they say that they are going to build a big project next year. But the model is forecasting a weaker year. What is wrong?

Working with the provincial LMI Committees, the CSC maintains a list of all the major projects included in the forecast. There are several criteria applied before projects are included. It is likely that the project that you have in mind has not yet been added to the list.

4. I hear that there will be a recession in the United States next year. How will that affect the construction industry in my region?

Each annual forecast of the CSC LMI model is based on one specific economic forecast. This is described in the national and provincial reports. However, the model is a tool (a computer system) that can be applied to a different economic forecast. In the interest of simplicity and economy the CSC does not yet provide alternative forecasts to reflect these conditions. It is possible to create alternative projections for the construction labour markets. Call the CSC to ask how this might be done.

5. Industry conditions in my regions are different from the overall province. Is it possible to prepare a version of the model that applies to my region?

CSC is working on several extensions to the model. Work is underway to add details for the residential sector. Consideration is being given to adding regional detail. One concern is that the data describing employment and the labour force in small areas is not reliable. If reasonable estimates are available, it may be possible for the CSC to add regional details.

6. How does the model account for construction trades working on maintenance or renovation projects?

The answer depends on the particular details. Major improvements and some renovation are included in the investment data that determines the demand side. However, in some cases,

trades doing maintenance work for one company will be recorded in the company's industry, not construction. The CSC model tracks construction trades working in other industries. Major industrial shut downs for maintenance can require large numbers of key trades for short periods. These are not always included in the forecast. Owner groups are working to add this information.

7. What if demand declines in the future, won't that reduce the number of retiring workers that need to be replaced?

It will! The model calculations of replacement demand and construction requirements are independent of each other. Because of this replacement demand will not necessarily be reduced if construction activity falls. But in most regions, in the 2006 forecast, total construction requirements increase in the forecast period and it seems likely that all retiring workers will need to be replaced.

8. How do you account for a low aboriginal participation rate and the potential for that group to be a source labour pool?

The forecast assumes that the future participation rate for aboriginals will be thee same as in the past. It would be possible to calculate how increasing participation by aboriginals in each trade would increase the labour force.

9. What is the difference between the CSC LMI Model for construction and the COPS system at HRSDC?

The CSC construction model is an expansion of the COPS system, adding details for trades and regions.

10. What is the difference between a forecast and a scenario?

Forecasts are projections of specific expected conditions and outcomes. Scenarios are related forecasts where differences in future conditions reflect alternative assumptions about one key feature. An alternative scenario, for example, might be based on a different exchange rate projection.

11. Why is there a difference between total employment in the CSC construction employment in the model and total construction employment in the Statistics Canada Labour Force Survey?

The LFS identifies all employees in construction and this includes managers, office staff and supporting workers (e.g. building inspectors). The CSC model focuses only on the trades.

12. How can the CSC analysis be consistent with a need to train new workers when the total projected gain in employment between 2006 and 2014 is very small?

Projected employment reflects only the requirements for building and does not include replacement demand for retiring workers. Even in periods of limited increases in building, replacement demand will be strong.

13. A change in the hours of work is an important adjustment factor in construction. How does the model measure this?

Unfortunately, the data that we use to measure employment is not as reliable for hours worked. It is certainly true that hours will be the first level of adjustment and this is a buffer that would delay adjustments through employment.

14. How does the model take into account changes in the natural rate of unemployment?

The 2006 version of the model estimated a constant value of the natural rate based on past trends. Evidence confirms that there is a clear, long-term downward trend in unemployment and efforts will be made in the 2007 version to reflect this change.

15. In terms of retirements, does the model just remove workers as they reach 65?

Estimates for retirement are based on historical rates of declining participation for each age group over 55.

16. How is the rising proportion of self-employed construction workers and related impacts on the underground economy reflected in the model?

It is not directly taken into account. If this characteristic is identified as a critical in a region, it would be possible to draw on Census data and other research to add comments on the impact of self-employment and the underground economy by trade and region.

17. Is the CSDC system being used to track registrations in apprenticeship and other community college programs?

Provincial apprenticeship programs are providing current data on registrations and completions. While the text offers short comments about the levels of registrations and completions, some Provincial Apprenticeship are using the projections more closely to monitor the programs. Atlantic Canada has gathered data on registrations in Community Colleges programs, outside apprenticeship, related to construction for their report.

18. What does a ranking of 3 (versus 4, for example) mean in terms of labour costs? How do labour rates change with the changing market conditions?

The model does not link market conditions to compensation rates and labour costs. While this connection is possible from an analytical point of view, the industry is sensitive to these relationships and the potential for conflicting interests makes the analysis difficult.